

Investigating the contribution of physician assistants to primary care in England: a mixed-methods study

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**National Institute for
Health Research**

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Declared competing interests of authors: none

Published May 2014

DOI: 10.3310/hsdr02160

This report should be referenced as follows:

Drennan VM, Halter M, Brearley S, Carneiro W, Gabe J, Gage H, *et al.* Investigating the contribution of physician assistants to primary care in England: a mixed-methods study. *Health Serv Deliv Res* 2014;**2**(16).

Health Services and Delivery Research

ISSN 2050-4349 (Print)

ISSN 2050-4357 (Online)

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: nihredit@southampton.ac.uk

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The research reported in this issue of the journal was funded by the HS&DR programme or one of its preceding programmes as project number 09/1801/1066. The contractual start date was in August 2010. The final report began editorial review in March 2013 and was accepted for publication in October 2013. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HS&DR editors and production house have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the final report document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the HS&DR programme or the Department of Health. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the HS&DR programme or the Department of Health.

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Abstract

Investigating the contribution of physician assistants to primary care in England: a mixed-methods study

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Background: Primary health care is changing as it responds to demographic shifts, technological changes and fiscal constraints. This, and predicted pressures on medical and nursing workforces, raises questions about staffing configurations. Physician assistants (PAs) are mid-level practitioners, trained in a medical model over 2 years at postgraduate level to work under a supervising doctor. A small number of general practices in England have employed PAs.

Objective: To investigate the contribution of PAs to the delivery of patient care in primary care services in England.

Design: A mixed-methods study conducted at macro, meso and micro organisational levels in two phases: (1) a rapid review, a scoping survey of key national and regional informants, a policy review, and a survey of PAs and (2) comparative case studies in 12 general practices (six employing PAs). The latter incorporated clinical record reviews, a patient satisfaction survey, video observations of consultations and interviews with patients and professionals.

Results: The rapid review found 49 published studies, mainly from the USA, which showed increased numbers of PAs in general practice settings but weak evidence for impact on processes and patient outcomes. The scoping survey found mainly positive or neutral views about PAs, but there was no mention of their role in workforce policy and planning documents. The survey of PAs in primary care ($n = 16$) found that they were mainly deployed to provide same-day appointments. The comparative case studies found that physician assistants were consulted by a wide range of patients, but these patients tended to be younger, with less medically acute or complex problems than those consulting general practitioners (GPs). Patients reported high levels of satisfaction with both PAs and GPs. The majority were willing or very willing to consult a PA again but wanted choice in which type of professional they consulted. There was no significant difference between PAs and GPs in the primary outcome of patient reconsultation for the same problem within 2 weeks, investigations/tests ordered, referrals to secondary care or prescriptions issued. GPs, blinded to the type of clinician, judged the documented activities in the initial consultation of patients who reconsulted for the same problem to be appropriate in 80% ($n = 223$) PA and 50% ($n = 252$) GP records. PAs were judged to be competent and safe from observed consultations. The average consultation with a physician assistant is significantly longer than that with a GP: 5.8 minutes

for patients of average age for this sample (38 years). Costs per consultation were £34.36 for GPs and £28.14 for PAs. Costs could not be apportioned to GPs for interruptions, supervision or training of PAs.

Conclusions: PAs were found to be acceptable, effective and efficient in complementing the work of GPs. PAs can provide a flexible addition to the primary care workforce. They offer another labour pool to consider in health professional workforce and education planning at local, regional and national levels. However, in order to maximise the contribution of PAs in primary care settings, consideration needs to be given to the appropriate level of regulation and the potential for authority to prescribe medicines. Future research is required to investigate the contribution of PAs to other first contact services as well as secondary services; the contribution and impact of all types of mid-level practitioners (including nurse practitioners) in first contact services; the factors and influences on general practitioner and practice manager decision-making as to staffing and skill mix; and the reliability and validity of classification systems for both primary care patients and their presenting condition and their consequences for health resource utilisation.

Funding: The National Institute for Health Research Health Services and Delivery Research programme.

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Glossary

Clinical Commissioning Group (CCG) A group including GPs, at least one registered nurse and a secondary care doctor that, since April 2013, has had responsibility for commissioning local health services in England.

Confidence interval (CI) A measure of the uncertainty of statistical estimates arising from the fact that studies include only a sample and not the entire population of patients of interest. A 95% CI has a 95% probability of containing the corresponding value in the entire population.

Family medicine Used in countries outside the UK, particularly the USA, to refer to the medical specialty known in the UK as general practice.

Local education and training board (LETB) A local health care employer-led organisation in England that, since April 2013, has been able to plan and commission the supply of all health professionals and also allocate monies for continuing professional development training requirements.

Logistic regression A statistical procedure to find the factors that predict an outcome that is either present or absent, such as whether or not advice on medication was given. The effect of each predictor is measured in terms of an odds ratio.

Mid-level practitioner A term used to describe a qualified health professional (non-medical and non-dental) who is practising at a level with authority to assess, investigate and commence or change treatment within the agreed scope of practice with his or her employer and/or clinician supervisor.

Odds ratio (OR) A measure of how big an effect a predictor (such as whether a PA or a GP saw the patient) has on an outcome that is either present or absent (such as whether or not advice on medication was given). If one-third of patients seeing a GP received such advice, the odds are $1/2 = 0.5$ (the number with the outcome divided by the number without). An OR of 1.4 then suggests that the odds among people who saw PAs will be $1.4 \times 0.5 = 0.7$.

p-value A statistical measure of how convincing the evidence is for a difference or effect seen in the sample also being true in the whole population of patients attending general practices. It is the probability that the observed difference (or an even greater one) could have occurred by chance if there really is no difference in the population.

Physician assistant (PA) A medical professional who works as part of a team with a doctor following a 2-year postgraduate qualification. PAs perform physical examinations, diagnose and treat illnesses, request and interpret laboratory tests, and make referrals. They can work in all health-care settings.

Primary care A term used in the UK setting to refer to first contact care and entry into the health-care system, continuous and ongoing patient-focused care for a defined population, co-ordination of care and comprehensiveness of services.

Quality Outcomes Framework (QOF) The QOF is a voluntary annual incentive programme against nationally agreed clinical and management criteria for all GP surgeries in England.

Rate ratio A measure of how big an effect a predictor (such as whether a PA or a GP saw the patient) has on an outcome that is measured as a count (such as how many reconsultations took place). If patients seeing a GP had 1.5 reconsultations per fortnight on average, then this is the rate. A rate ratio of 1.1 then suggests that the rate among people who saw PAs will be $1.1 \times 1.5 = 1.65$.

Same-day appointments Appointments that are requested and booked on the same day (sometimes known as unscheduled, in contrast to those pre-booked in advance), which indicates a patient-perceived need for an immediate consultation.

List of abbreviations

CCG	Clinical Commissioning Group	NIHR	National Institute for Health Research
CfWI	Centre for Workforce Intelligence	NP	nurse practitioner
CI	confidence interval	OR	odds ratio
DCG	diagnostic care group	PA	physician assistant
df	degree of freedom	PCRN	Primary Care Research Network
GMS	General Medical Services	PMS	Personal Medical Services
GP	general practitioner	PN	practice nurse
GPAS	General Practice Assessment Survey	QOF	Quality and Outcomes Framework
HCA	health-care assistant	RCP	Royal College of Physicians
HCP	health-care professional	REC	research ethics committee
HEI	higher education institution	SD	standard deviation
IMD	Index of Multiple Deprivation	SHA	Strategic Health Authority
IQR	interquartile range	study ID	study identifier
IT	information technology	UKAPA	UK Association of Physician Assistants
LAP	Leicester Assessment Package	UKCRN	UK Clinical Research Network
LETB	local education and training board	WTE	whole-time equivalent

Plain English summary

General practice is changing and employing different types of staff in response to changing needs and delivering more care outside hospitals. One such type of staff is physician assistants (PAs), who are trained in a medical model over 2 years at postgraduate level and work under a supervising doctor. This study looked at the contribution PAs could make and whether or not they were acceptable and provided safe care. We answered this through multiple research activities including investigating the patient experience. We found that PAs were mainly deployed to provide same-day appointments for patients. They were in the main acceptable to professional groups, patients and health-care and workforce planners, although patients wanted to ensure that they had choice in who to consult. The PAs worked in ways to complement the general practitioners (GPs), seeing patients who had less complex and medically acute problems. There was no difference between PAs and GPs in the rate of patients returning with the same problem within 2 weeks. A clinical review of PA records and consultations judged them competent and safe. Consultations with PAs were on average longer than those with GPs and cost the health service less, although we could not account for all costs. We concluded that PAs are an asset in primary care and could offer a flexible addition to the staffing. This has implications both for health professional workforce and education planning and for the inclusion of PAs in regulatory processes.

Scientific summary

Background

Primary health care has a pivotal role in the NHS that is changing in response to demographic shifts, technological changes and fiscal constraints. Predicted pressures on the medical and nursing workforce raise questions as to the most effective, efficient and acceptable staffing configurations. Physician assistants (PAs) are mid-level practitioners trained in a medical model to undertake physical examinations, investigations, diagnosis and treatment, and to prescribe within their scope of practice as agreed with their supervising doctor. The role has a 40-year history in the USA. A promising evaluation of American PAs in a variety of health-care facilities in England in 2006 led to a national curriculum and competency framework, agreed by the Department of Health and the Royal Colleges of Physicians and General Practitioners (GPs). Students joining the 2-year postgraduate course are typically science graduates. In 2009, the first English-trained PAs graduated. Scotland has also now established a PA course. PAs in the UK are not regulated, although they have a voluntary national register, and cannot prescribe medication. A small number of general practices in England have employed PAs but in 2009 there was limited evidence as to the contribution of PAs in the NHS general practice setting.

Objectives

This study aimed to investigate the contribution of PAs to the delivery of patient care in primary care services in England. The research questions addressed were:

1. How are PAs deployed in general practice and what is the impact of including PAs in general practice teams on the patients' experiences and outcomes?
2. What is the impact of including the PAs in general practice teams on the organisation of general practice, the working practices of other professionals, relationships with these professionals and the practice costs?
3. What factors support or inhibit the inclusion of PAs as part of English general practice teams at the local and macro level?

Methods

This was a mixed-methods study with two phases of enquiry: (1) at the macro and meso levels of the health-care system and (2) at the micro level.

The macro and meso levels of the health-care system

A rapid review of empirical evidence of the contribution of PAs to primary care was undertaken. A documentary analysis was conducted of published commentaries and of UK workforce policy. A scoping survey, using semi-structured interviews, was undertaken of key informants in professional bodies, NHS workforce planning organisations, patient organisations, higher education institutions and commissioning bodies in England and Wales. An online anonymous survey was used to identify deployment of PAs in primary care and volunteers for phase 2.

The micro-level investigation through comparative case studies

The comparative case study design sought six general practices employing PAs and six not employing PAs, matched by practice size, sociodemographics and health economy setting. Multiple methods were used to collect data. GPs, PAs, nurses and administrative practice staff were interviewed. In designated surgeries,

adult patients attending for same-day appointments were offered a validated, anonymous survey with a unique study identifier (study ID), and those in PA practices were invited for interview. The anonymous patient record, with a study ID, was extracted for all patients attending these surgeries together with any record of primary care attendance within the following 2 weeks. The primary outcome was rate of reconsultation within 2 weeks for the same problem. The patient records of those reconsulting for the same problem within 2 weeks were reviewed. With permission, consultations were videoed and analysed using a validated tool for assessing GP competency. An economic analysis was conducted at two levels: practice team configurations and costs; and patient-level comparison of the contribution and costs of GP and PA consultations.

Emerging findings were tested with advisory group members, patient and public involvement group, and participants of both phases.

Results

Phase 1: the macro and meso levels

The rapid review found 49 published studies, mainly from the USA, which showed growth in PA numbers in primary care settings over 40 years but weak evidence for their impact on the process of care, patient outcomes or costs. The analysis of the interviews in the scoping survey found that the majority offered a positive or, at worst, neutral view of the contribution that PAs could make as mid-level professionals in the NHS. A similar finding emerged from the analysis of published commentaries. PAs were, however, absent from English health workforce and education planning documents at national and regional levels. Only one mention of them was found in a Welsh policy document for rural primary care. In contrast, the NHS in Scotland had policy and plans to develop a PA workforce.

The online survey of PAs working in primary care in England had an estimated response rate of 64% from 16 PAs working in primary care. Half were graduates of English universities. The PAs reported that the majority of their time and effort was deployed in providing same-day appointments with patients. A range of other activities were reported, including chronic disease management, home visits, cryotherapy, teaching, clinical audit and supervision of other staff such as health-care assistants.

Phase 2: the micro level of comparative case study design

From the 45 professional interviews, five sets of work diaries and observations in practices and clinical meetings, it was evident that PAs were deployed to complement the work of the GPs. They were a flexible resource and could also cover the work of the nurses when absences required it. The PAs mainly provided clinician time in same-day appointments, with the expectation that the PA would behave as a doctor for their patient case mix and within their competency as agreed by their supervising doctor. They were allocated either longer appointment slots or the same length of time as GPs but with free appointment slots for conferring with a GP. Some work changed over time with the expertise of the PA and the requirements of the practice. Some were deployed to activities that were incentivised nationally and locally to support the policies of more services closer to home and more preventative work in primary care, for example insertions of intradermal, long-acting contraceptives.

Of the 539 respondents to the patient satisfaction survey, the majority reported high levels of satisfaction with no significant difference between those consulting PAs or GPs [odds ratio (OR) 1.00, 95% confidence interval (CI) 0.42 to 2.36, $p = 0.99$]. The majority of respondents who had consulted a PA said that they would be very satisfied (62%) or satisfied (28.3%) to consult a PA again. Thirty-four patients gave interviews. While most participants expressed a high degree of satisfaction with and confidence in PAs (often in relation to the supervision by a doctor or their trust in the practice), some expressed the need to

fully understand this new-to-the-UK role, to have choice in whom to consult and to ensure continuity in their relationship with their clinician.

From the analysis of the 2086 anonymous patient records, it was found that PAs were consulted by a wide range of patients but, in comparison with those of the GPs, the patients were younger, had fewer indicators of ongoing multiple chronic conditions and were presenting that day with less medically acute/complex problems. Once adjusted for clustering at practice level, patient age, PA study condition classification and other covariates of relevance, there was no difference between PAs and GPs in the rate of procedures undertaken (rate ratio 0.85, 95% CI 0.34 to 2.15, $p = 0.734$), diagnostic tests ordered (rate ratio 1.08, 95% CI 0.89 to 1.30, $p = 0.439$), referrals to secondary care (rate ratio 0.95, 95% CI 0.63 to 1.43, $p = 0.797$) or prescriptions issued (rate ratio 0.87, 95% CI 0.87 to 1.53, $p = 0.309$). PAs were significantly more likely to document general advice (OR 3.30, 95% CI 1.689 to 6.4532, $p < 0.001$).

Thirty-two per cent of the patients attended the surgery again within 2 weeks. Of the primary outcome measure, there was no difference between those consulting PAs or GPs in the rate of reconsultation with the same problem at the practice or an urgent care facility within 2 weeks (rate ratio 1.314, 95% CI 0.843 to 2.049, $p = 0.228$) or for the same or a linked problem (rate ratio 1.240, 95% CI 0.861 to 1.78, $p = 0.247$).

Blinded to whether the clinician was a GP or a PA, a panel of experienced GPs reviewing records of patients ($n = 475$) reconsulting for the same problem judged the documented activities in the initial consultation to be appropriate in 80% of PA records and 50% of GP records. The GP reviewers could not easily identify whether the clinician was a GP or PA from the records, correctly classifying 40% of PA consultations and 76% of GP consultations. Video observations of PA consultations were judged by the panel of GPs to be competent, with scores between 40% and 60% for the dimensions of interview/history taking, physical examination, patient management, problem solving, behaviour/relationship with patients and anticipatory care. Across all the dimensions of competence, PAs scored significantly lower than the GPs they were compared with [median overall percentage for GPs 58.6%, for PAs 47%, Mann–Whitney U -test (two-tailed), $p = 0.012$].

Staffing configurations varied within and between the groups of practices that did and did not employ PAs. The average cost per patient ranged from £146 to £176 in practices employing PAs and from £68 to £405 in those not employing PAs. The proportion of GPs who were salaried (as opposed to partners) was higher in practices employing PAs than in practices without PAs. After adjusting for covariates, the average patient consultation with a PA was 5.8 minutes longer than with a GP (95% CI -7.1 to -2.46 ; $p < 0.001$). Consultation costs were £34.36 for GPs and £28.14 for PAs. However, costs could not be apportioned to interruptions to GPs for conferring or signatures for prescriptions, and do not take account of the time GPs spend on supervising and training PAs.

Discussion

The deployment of PAs in primary care to mainly same-day patient appointments has been reported before. This is the first UK report that PAs are deployed to complement the work of GPs in seeing younger patients with fewer indicators of comorbidity and fewer medically acute problems on the day. In addition, this is the first report of PA work in the UK into clinical activities that support ambulatory care outside hospitals and in health promotion, as incentivised for general practice by local and national contracts. The lack of current regulation and authority to prescribe was viewed as problematic by many stakeholders and practice employers.

Physician assistants were found to be acceptable to professionals, managers, commissioners and patients. The patient survey reported high levels of satisfaction, as found in other national surveys, and no difference in ratings between those consulting PAs or GPs. Patient interviews revealed, as in other studies, positive views but also the need to ensure that patients understand the exact nature of this new-to-the-UK role and continue to be offered a choice of clinician. Continuity of clinician was important to those with multiple and ongoing problems, as has been noted before.

The PAs were judged by GPs, through observations of consultations, to be competent and, through review of records of reconsulting patients, to be more likely than GPs to document appropriate clinical activities.

The impact of PA consultations on the wider health system was the same as GP consultations for the same patient case mix. We report for the first time, to our knowledge, that there is no significant difference in reconsultation rate for the same problem or rates of process outcomes (procedures, referrals for diagnostic tests or to other professionals, issuing of prescriptions) between patients who have consulted a PA or GP, when adjusted for covariates of relevance.

We report, for the first time, average length of PA same-day appointment consultations in the English general practice setting as significantly longer than that of a GP. Although we were not able to cost the supervising of a PA for GPs, we report for the first time that consultation costs were £6.22 lower with a PA than with a GP.

It was evident from the interviews that GPs as clinical employers had varied views as to whether or not the use of mid-level practitioners was efficient in clinical care in comparison with a doctor. This related to both speed of consultation and ability to complete all associated tasks rather than refer on to the GP. For those not employing PAs, this was often based on evidence or experience with nurse practitioners (NPs). For those employing PAs, this related to the deployment of the PA to maximise productivity in same-day appointment surgeries (e.g. length of appointment times given) as well as other activities that added value to the services offered and practice income. All views were also tempered by the availability or lack of GPs, experienced practice nurses and NPs in the local labour market.

The introduction and adoption of any health-care innovation is influenced by sociopolitical and organisation factors and personal and peer influences, as well as characteristics of the innovation itself. The extent to which PAs are available in the English primary care labour market is dependent on their featuring in the NHS national, regional and local workforce education plans and policies. These were documents in which they did not feature at the time of the study. The modelling and costing of including PAs in workforce plans was outside the scope of this study and requires further investigation.

Limitations

This mixed-methods, multilevel study had both strengths and limitations. The conduct of comparative case study element was different from planned, in part a result of changes required by the ethics committee, but also shaped by the capacity of general practices, as small organisations, to undertake research. This resulted, in some instances, in not all data being available, for example missing work diaries.

Conclusions

Physician assistants were found to be acceptable, effective and efficient in complementing the work of GPs. PAs provide a flexible addition to the primary care workforce. They offer another labour pool, with a shorter training period than GPs or NPs, to consider in health service workforce and education planning at local, regional and national levels. However, in order to maximise the contribution of PAs in primary care settings, consideration needs to be given to the appropriate level of regulation and the potential for authority to prescribe medicines. Further research is required as to the contribution PAs could make in other first-contact, primary care services.

Funding

The National Institute for Health Research Health Services and Delivery Research programme.

Chapter 1 Background

This study addresses questions of the implications of the changing workforce in primary care. It is focused, in the first instance, on providing information that addresses the questions of general practitioners (GPs), managers and those involved in commissioning services and education programmes in the UK. This chapter provides the background and rationale to the study by presenting contextual information about primary care, the workforce in general practice, mid-level practitioners including physician assistants (PAs) and the evidence at the point the study was commissioned (December 2009). The aims and objectives of the study are presented, followed by brief detail of the advisory mechanisms and public involvement to the study team. The chapter concludes with an outline of the rest of the report.

Rationale

Primary health care has a pivotal role in the NHS, as in other countries.¹ In all countries of the UK, the policy direction over the past 20 years has been to increase the delivery of health care outside hospitals at the same time as addressing issues of effectiveness, accessibility, equity, patient choice and affordability in primary care.²⁻⁸ This policy stream, together with views from within the profession of general practice itself, argues that the delivery of services will require differently skilled and different types of health professionals working in general practice.⁹ The changing demands on health-care systems combined with financial pressures and/or shortages of professionals raise questions of effectiveness and efficiency in all health-care workforce structures and/or staff deployment.¹⁰ Task-shifting from one occupational group to another, substitution of one professional for another and the growth of support workers (in direct health-care and administrative roles) are three strategies evident in primary and secondary care in many countries.¹¹⁻¹⁴ These strategies are evident in the changes in the UK general practice workforce, including the use of 'mid-level' providers. 'Mid-level' health practitioner is a term that has been used to describe a qualified health professional (non-medical and non-dental) practising at a level above that of the basic level of qualification for most health professionals in the UK and with authority to assess, investigate and commence or change treatment within the agreed scope of practice with their employer and/or clinician supervisor.¹⁵ PAs and nurse practitioners (NPs) are two examples of mid-level practitioners among a diversity of titles and roles worldwide.¹⁶

We outline first of all the developments in the general practice workforce before providing information on PAs in primary care and the rationale for the study.

Developments in the UK general practice workforce

There are about 10,000 general practices in the UK and, as a sector, these have been characterised by entrepreneurial developments in service delivery as well as in practice organisational forms.^{17,18} Many of these developments have arisen through individual enthusiasms and values^{19,20} and others have developed in response to incentives and health professional labour market fluctuations.^{21,22} The flexibilities created both by the new General Medical Services Contract²³ and other forms of contracts for primary care^{24,25} created opportunities for different organisational forms and skill mixes appropriate to the needs of patient populations and to the provision of out-of-hours and extended hours services. GPs, as both health-service professionals and employers, exemplify the human resource policy stream articulated first in the human resource strategy for the NHS Improvement Plan in 2002: 'more staff working differently'.²⁶ The GP workforce has, in the last 10 years, both grown and diversified, with increased numbers of part-time and salaried, rather than partner, GPs.²⁷⁻³⁰ However, it should be noted that shortages of GPs and their distribution are not uniform across the country. For example, the number of GPs per 10,000 population in England in 2011 ranged from 6.3 in the east of England region to 7.7 in the south-west region.²⁷ There have also been changes in the types and volume of consultations undertaken in general practice, with shifts of responsibilities from secondary care to primary care, for example in chronic diseases management and the development of GPs with special clinical interests.³¹

These shifts have been accompanied by GPs moving to employ a wider skill mix within general practice teams.²⁹ Such a development is evident in the growth over the past 25 years in numbers of administrative staff, nurses and others providing direct care.^{27,28} Current statistics for general practice staff in England are illustrated in *Figure 1*.

In the UK, the solo GP with only a receptionist is an organisational model of the past.³³ However, debates continue within the profession of general practice regarding the appropriate mix of staff and skills for a general practice team.^{20,34} It is evident from annual surveys in general practice in Scotland that nurses, together with direct care staff such as health-care assistants (HCAs), account for increasing volumes of patient consultations (30% in 2011).³⁵ Analysis indicates that these are not consultations in which patients present with undifferentiated diagnosis but are follow-up consultations for monitoring or review activities.³⁵ This suggests that the nursing and direct care staff are both supplementing the work of the doctor and undertaking delegated tasks. Outside general practice itself there are suggestions, such as from a HM Treasury-commissioned report, that NPs could provide a form of substitution, undertaking at least 25% of the work undertaken by GPs.³⁶ A Cochrane Review published in the same year³⁷ suggested that the evidence was more nuanced. Previous systematic reviews indicated that patient health outcomes were broadly the same for NP and doctor consultations but that patient satisfaction was higher, the length of consultation was longer and the rate of investigative tests was higher for nurse consultations than for consultations with doctors.^{38,39} The Cochrane Review excluded observational studies and also separated analysis between those studies in which the nurses were taking ongoing responsibility for chronic disease management and those in which they substituted for the doctor in first-contact, urgent consultations.³⁷ It was reported that in the studies of ongoing chronic disease management 'there were no appreciable differences between doctors and nurses in health outcomes for patients, process of care, resource utilisation or cost'.³⁷ In the five included studies of first-contact, urgent consultations, broadly similar health outcomes for patients were reported for nurses and doctors. Differences reported between the two were lengthier nurse consultations, greater rates of recall by nurses, but higher satisfaction scores for nurse

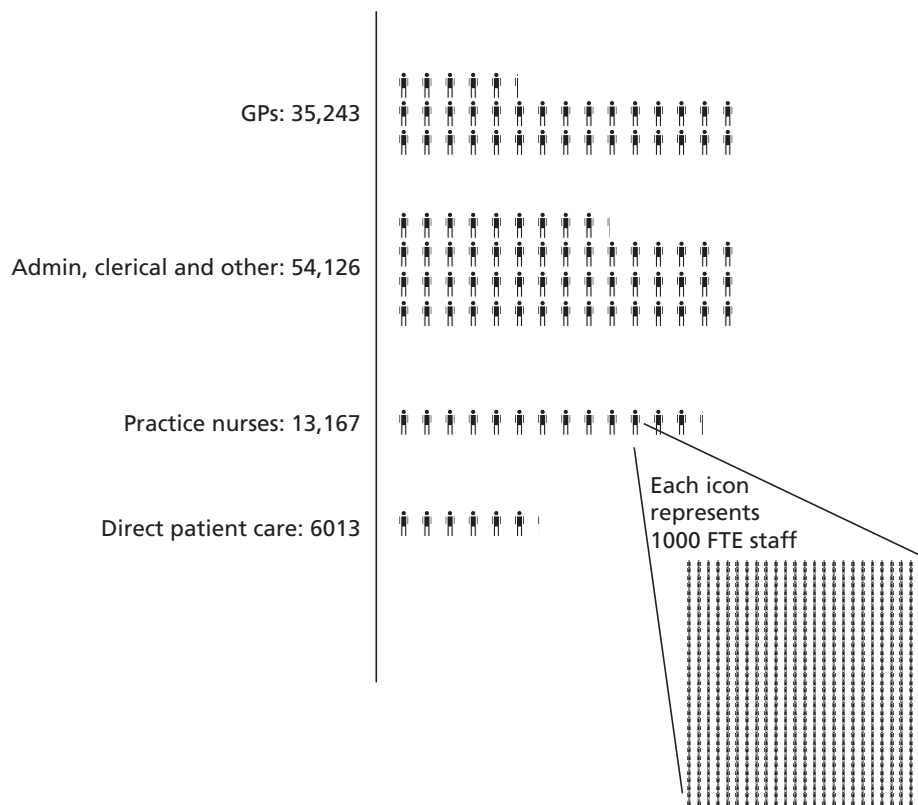


FIGURE 1 Composition of general practice workforce in England, 2011. FTE, full-time equivalent. Data source: NHS Information Centre.³²

consultations than for doctor consultations.³⁷ The authors reported that the 'impact on physician workload and direct cost of care was variable'.³⁷

By the turn of the twenty-first century there was a policy impetus for a redesigned workforce, particularly in primary care and first-contact services,²¹ an acute shortage of nurses and doctors applying to work in primary care and encouragement to develop and test new roles from a national body for service innovation known as the NHS Modernisation Agency.⁴⁰ At this point, some GPs with others who were looking for workforce solutions began to consider the contribution that another type of 'mid-level' practitioner, the PA, working in the USA, could make to the NHS. Before examining this occupational group in the UK, the following section provides contextual information on PAs in the USA and other countries.

Physician assistants

Physician assistants were introduced as a new professional group in the USA in the 1960s in response to medical shortages and misdistribution.⁴¹ PAs are 'graduates of an accredited PA educational program who are nationally certified and state licensed to practice medicine under physician supervision'.⁴² The 170 educational programmes in the USA last an average of 27 months and require applicants to have qualifications in basic science and behavioural sciences and experience of health care.⁴² The courses are based on medical education programmes and include 2000 hours of clinical experience practice.⁴² Each qualified PA is required to undertake continuing medical education and recertification every 6 years.⁴² PAs undertake physical examinations, investigations, diagnosis, treatment, and prescribing within their scope of practice as agreed with their supervising doctor.⁴³ They have to be registered in the state in which they want to work, and each state has separate regulations and limitations on the prescribing authority of PAs. There are similar numbers of PAs⁴⁴ and NPs⁴⁵ in the USA, and about one-quarter of PAs work in family medicine settings⁴⁶ (Table 1).

Studies have demonstrated that PAs, as an occupational group in the USA, provide equivalent and safe care to physicians for the case mix they attend and are acceptable to patients.^{47,48} PAs have been shown to have the same task productivity of between 50% and 80% of a physician, dependent on practice setting and experience of the PA, with attendant cost savings to the organisation dependent on the remuneration levels of both the PAs and the physicians they are replacing.⁴⁹⁻⁵¹

A number of other countries have PAs in their health-care systems and have developed PA educational programmes. Hooker *et al.*⁵² provide an overview of international developments. Canada introduced PAs in the military in 1984 and in the civilian health service in 1999. Taiwan (Province of China) converted a group of nurses to PAs in 1997 and introduced a PA programme, as did the Netherlands in 2001. The health services in Australia ran pilot projects in rural and remote areas in Queensland starting in 2009, developed the first PA education programme in 2010⁵³ and are looking to develop this workforce further.⁵⁴ New Zealand has also run a demonstration project and is about to commence a second in rural areas and in primary care.⁵⁵ The International Association of PA Educators reported that in 2012 there were 12 countries with PA education programmes: Australia, Canada, England, Germany, Ghana, India, Kenya, the Netherlands, Saudi Arabia, Scotland, South Africa and the USA.⁵⁶ Key issues in all countries have been how to achieve recognised accreditation and regulation mechanisms as well as authority for

TABLE 1 Number of PAs, NPs and Doctors of Medicine practising in the USA

Role	Total number practising in the USA	Percentage practising in family medicine
Doctors of Medicine (2009)	766,836 ⁴⁴	12 ⁴⁴
NPs (2006)	81,433 ⁴⁵	25 ⁴⁵
PAs (2009)	62,960 ⁴⁴	26 ⁴⁶

prescribing.⁵² The earliest record of GPs in the UK exploring the use of PAs was in 1980.⁵⁷ We will now describe the UK experience of PAs from 2000 to 2009.

Physician assistants in the UK

In undertaking a review of the literature, it became evident that in the UK setting the term 'physician assistant' was being used in two ways. The first was by some hospital trusts in the UK to describe medical technicians with national vocational qualifications (NVQs) at level 2 or 3. The second was in relation to PAs either trained in the USA or trained in the UK at postgraduate level to the American model. This study is concerned with the second group.

Under the auspices of the policy for the modernisation of the workforce, many developments in new roles were encouraged in the first decade of the century. Small-scale, local pilots of training for roles such as PAs (although often under different role titles) were developed in many parts of the country.⁵⁸ The central government health department interest in exploring the utilisation of PAs was evident in two ways. The first was the support of the development of the anaesthetist practitioner programme, later PAs (Anaesthesia), with the Royal College of Anaesthetists in 2003.⁵⁹ The second was the funding of pilot projects deploying PAs in support of a wider range of medical teams. Two large-scale pilot projects were funded from central health departments in which USA-trained PAs were employed in a variety of health-care settings: primary care, emergency departments, intermediate care, orthopaedics and surgical specialties in England (2002–5)⁶⁰ and Scotland (2005–8).⁶¹ The pilot in England arose specifically out of the difficulties of recruiting GPs to deprived communities and the interest in the PA role as a potential solution from a nurse partner in a personal medical services practice, some local GPs and the local primary care trust managers.⁶⁰ The evaluations reported that they were very well received by patients, received without problems by other professionals, worked at the level of either a NP or a doctor in training and were reported to be safe in clinical practice. Caveats were noted; for example, demands on mentors were higher than anticipated and a tendency towards slightly longer consultations was reported.^{60,61} The evaluation study in England reported on eight USA-trained, experienced PAs working in GP practices.⁶⁰ Mixed methods were used including interviews, electronic appointment data and PA- and supervisor-completed forms of types of patients seen and their clinical activities over specified weeks. The PAs were found to provide a similar number of consultations a day (an average of 16.5 per day) to GPs (17 per day) and see, broadly, the same types of patients, with variations between individuals according to prior experience, subspecialisation and practice organisation.⁶² Issues that were reported included a period of acclimatisation to the NHS and medical practice in the UK being necessary for American PAs, and a lack of prescribing rights resulting in a greater demand on supervising GP time than would be usual in the USA.⁶² It was also noted that the PAs expanded the scope of types of services offered in some practices and allowed others to increase their numbers of registered patients.⁶² The Scottish pilot evaluated supernumerary PA posts, of which five were in general practice. Mixed methods were used, including interviews with staff and patients and self-completion work activity by the PAs and events diaries by the PAs and their supervisors.⁶¹ In the primary care setting, the findings concurred with the reports of the English pilot.⁶³ In their conclusions, both evaluations pointed to the need for research that considered cost-effectiveness more systematically.^{60,61}

Concurrent with these pilots, PA educational programmes were initiated⁶² and then further developed by the Department of Health, involving the Royal Colleges of Physicians and General Practitioners. Together these organisations have agreed a competency and curriculum framework for PAs' education,⁶⁴ modelled closely on that of the USA. By 2009, postgraduate diploma courses for PAs had commenced in four English universities and a further three trained PAs in the specialty of anaesthesia only.⁵⁹ The first of their students had graduated by 2009. These developments were supported by national PA networks and structures. The PAs in anaesthesia established an Association of Physicians' Assistants (Anaesthesia), which has an agreed curriculum and competency framework with the Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland, and holds a voluntary managed register of qualified PAs (Anaesthesia).⁶⁵ The UK Association of Physician Assistants was established in 2005.⁶⁶ Together with the UK and Ireland Universities Board for Physician Assistant Education (UKIUBPAE),

it established the Physician Assistant Managed Voluntary Register (PA MVR) in 2010.⁶⁷ The Department of Health agreed an updated version of the competency and curriculum framework⁶⁴ to reflect this last development.⁶⁸

Although both the medical and the nursing professions have in the past been hostile to the introduction of the PA role,^{59,69,70} there has been increasing acceptance that the addition of PAs to multidisciplinary teams, such as first-contact services, can enhance the delivery of care.⁷¹ At the same time, the number of general practices employing PAs, although small, is growing.⁷² In an interview study of 20 GPs, respondents reported that they were motivated to employ PAs in order to increase the practice capacity to manage patient demand within government targets for access, while considering value for money and broadening the skill mix in their teams.⁷² The GPs reported that the PAs were primarily being used to see 'same-day' and 'urgent' appointment patients, although some had also forward-booked appointment clinics and chronic disease management clinics, and some undertook home visits. That study did not quantify or collect details on the work activity of PAs.⁷²

It was evident that there was growing interest from potential employers in PAs and a potential supply of UK-trained PAs. The UK evidence was limited in 2009 as to the effect of introducing PA personnel into general practice on issues of patient outcomes, service efficiency and safety. This study aimed to address the knowledge gap and provide information to inform decision-makers in health services, commissioning and higher education institution (HEI) settings.

Study aims and objectives

This study aimed to investigate the contribution of PAs to the delivery of patient care in primary care services in England. The research questions addressed were:

1. How are PAs deployed in general practice and what is the impact of including PAs in general practice teams on the patients' experience and outcomes?
2. What is the impact of including the PAs in general practice teams on the organisation of general practice, the working practices of other professionals, relationships with these professionals and the practice costs?
3. What factors support or inhibit the inclusion of PAs as part of English general practice teams at the local and macro levels?

The full protocol has been published on the National Institute of Health Research (NIHR) Health Service and Delivery Research Programme website. The study team had the benefit of both an advisory group and a patient and public involvement group (see *Appendix 1*). Both of these groups met during the course of the study to help inform study tool development and research processes, and participated in the seminar in which emerging findings were presented and discussed. In between meetings, communication was electronic, using a newsletter and a website. In addition, the study team were successful in applying for a NIHR management fellow to work alongside the team, allowing synergy between the NHS management community and the research community. Further details are provided in *Appendix 2*.

The following chapters provide details of the study methods (see *Chapter 2*) and the findings reported in four chapters. The report concludes with the discussion and recommendations.

Chapter 2 Methods

This investigation employed an evaluative framework suggested by Maxwell⁷³ to examine the contribution that PAs make to the effectiveness, appropriateness, equity, efficiency, acceptability and costs of primary health care. The study had two phases of enquiry. The first investigated the research questions at the macro and meso level of health-care systems through (a) a review of evidence, (b) a scoping survey⁷⁴ of key informants at national and regional levels and (c) a survey of the current work deployment of PAs in UK general practice. The second phase used a comparative case study design⁷⁵ of 12 general practices to investigate the research questions at the micro level of the health-care system. Each of these phases is described in detail below. The evidence from each of these elements was then synthesised by the research team and brought to a wider consultative group of people who had participated in the study, including the advisory group and public and patient involvement group.

Phase 1: investigating at the macro and meso levels of health systems

This phase had three elements: (1) a review of evidence, (2) a scoping survey⁷⁴ of key informants at a national and regional level and (3) a survey of current work deployment of PAs in UK general practice.

The review of evidence

In this element we undertook three review activities. The first was a review of empirical evidence using a rapid review methodology⁷⁶ for empirical evidence of the deployment and impact of PAs (research questions 1 and 2; see *Chapter 1, Study aims and objectives*). The second was a narrative review⁷⁷ of published commentaries and opinions of the PA role in the UK setting. The third was a narrative review⁷⁷ of national and international policy and developments on health-care workforce planning in relation to PAs and primary care. The last two activities addressed the question as to factors supporting or inhibiting the presence of PAs in the primary care workforce.

The review of empirical evidence

A review⁷⁸ was conducted to investigate the evidence of the contribution of PAs to primary care as applicable to a European model. The European model of general practice/family medicine was that given by the European region of the World Organization of Family Doctors⁷⁹ (WONCA Europe). Seven databases [British Nursing Index, Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, MEDLINE, PsycINFO, Social Sciences Citation Index (SSCI) and Scopus] were searched from 1967 (or start date if later) to September 2010. A broad range of search terms was used singly and in combination: physician assistant, primary health care, family practice, general practice, family physician, general practitioner (see *Appendix 3*).

The inclusion criteria were defined as follows:

- The PA role was one with a recognised PA qualification.
- The setting was of general practice/family medicine (including community paediatrics in the USA) or the data were identified as pertaining to 'family medicine' within other findings from broader 'primary care'.

The exclusion criteria were defined as follows:

- Settings of secondary care, in-patient care ambulatory or outpatient care.
- Health care provided by primary care specialists in the USA (obstetrics, gynaecology, internists or primary care physicians) that would be regarded as secondary care in the UK.

- The personnel were student PAs or nurses/others who had received special training as medical assistants (that is, without a recognised PA course) for a particular disease condition.
- The data presented did not distinguish either between PAs and other professionals or between the general practice/family medicine setting from 'primary care' overall in its presentation of results.

Retrieved abstracts were screened and full papers, where available, were obtained. Each full paper was assessed for inclusion by two researchers independently and a third (HG, SdeL, VMD, and MH) in cases of indecision or disagreement. A data extraction framework was developed which included categories of PA activities, study methods and key findings. Study outcome measures were categorised using Donabedian's⁸⁰ framework of structure, process and outcome. Owing to the wide range of methods used in the retrieved studies, a broad quality assessment of the studies was undertaken using critical appraisal tools⁸¹ appropriate to the papers' methods (e.g. qualitative, cohort, health economic) with additional questions derived from the *British Medical Journal's* guidance for peer reviewers.⁸² The heterogeneity of the retrieved studies precluded any pooling of data and a narrative synthesis was undertaken using the Donabedian⁸⁰ framework.

Review of commentaries

A documentary analysis⁸³ was undertaken of published commentaries and opinion pieces about PAs in the UK health-care system or addressed to UK audiences. The published material was identified in two ways: first, through the electronic database search described in the previous section and, second, by an internet search using the Google™ (Mountain View, CA, USA) search engine. The internet search used a combination of terms: physician assistant, physician assistants, National Health Service (NHS), primary care, secondary care, England, Scotland, Wales, Northern Ireland, pilots and workforce, and was repeated at intervals by WC from April 2011 until December 2012. 'Published' was defined as in print and electronic formats including online forums between 1980 and 2012. The lower date was determined by our previous knowledge of the first paper published on the experience of a PA in UK primary care.⁵⁸ A data extraction framework was developed which included a categorisation of the author (journalists, doctors, nurses, health service managers, etc.), the intended audience, any catalyst for the item (e.g. another published item), inclusion of any empirical evidence and from which country, evidence of support, resistance or neutrality in the publication. The items were recorded chronologically with the data extraction in a Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) spreadsheet. A narrative synthesis was drawn from the data.

Review of workforce policy and developments

The purpose of this review was both to identify policy and developments pertaining to PAs in the primary health-care workforce in the UK and internationally in order to both help the research team contextualise the study and to identify supporting or hindering factors in the development of the PA profession in the English health-care workforce. The review drew on the methods of the documentary review.⁸³ Publications were identified through the searches described above. Additional searches were performed to identify policies and reports on health-care workforce planning and development relevant to, primarily, the education and employment of PAs and, secondarily, primary care. The time period covered was from the mid-1990s to the present day. The searches were conducted by:

- visiting key websites in the UK, for example government health departments in each of the four countries, the Centre for Workforce Intelligence (CfWI) and Strategic Health Authority (SHA) websites
- using keyword searches in the Google search engine for open source materials related to the topics of interest, for example 'primary care workforce', 'physician assistant/s' (and other titles to describe this profession, such as medical care practitioners) and 'health care workforce'
- snowballing techniques of references and website links.

The documents identified in this way were screened to include only those with relevance to health-care workforce in primary care. Research team alerts of new policy or reports relevant to the study were generated by one researcher (WC). A data extraction framework was developed to classify the document

by country, type of author, type of document (e.g. policy, analysis of primary data, opinion and evaluative reports), any reference or absence of reference to PAs and key points from or about the document. The information was saved on an electronic database with full references, any URLs and electronic copies of the original. A narrative synthesis was undertaken addressing the questions of interest.

Scoping survey

A scoping survey⁷⁴ was undertaken to address research question 3: what supports or inhibits the use and development of PAs in the primary care? (See *Chapter 1, Study aims and objectives.*) The method is one element of a scoping review⁷⁴ and allows for data to be gathered from those knowledgeable in the issue of interest, providing a range of perspectives to ensure breadth in the analysis.⁸⁴ It is an approach that has been widely used, most recently in exploring European perspectives on human health resource issues.⁸⁵ A purposive sample of key informants at national and regional levels in England and Wales was approached to participate. These were individuals at a senior level from central departments of health, professional organisations, regulatory organisations, patient organisations, and commissioning bodies who are concerned with the development of primary care services, workforce development and health professional regulation. At the point of the design of the study (2009) the Department of Health and Social Services (Wales), unlike the Departments of Health for England and Scotland, had not explored the use of PAs. In order to consider diversity in national environments, individuals were approached to participate in England and Wales. Individuals were identified for approach through an internet search of public domain organisational sites, suggestions of the study advisory group and members of the research team, and snowball techniques from participants. An aide-memoire was developed of topic areas, based on the issues of interest, to be used in semi-structured interviews⁸³ which were offered either face to face or by telephone, dependent on participant preference. The aide-memoire explored knowledge of mid-level practitioners, PAs and perceptions of the factors that currently and will in the future support or inhibit their use and development in the UK settings. Notes were taken during the interview and, with permission, digitally recorded. These were transcribed, anonymised and the recordings deleted. The transcriptions and notes were analysed using the constant comparison method⁸⁶ by two researchers (WC and VMD) independently, compared and further analysis confirmed with a third researcher (JG). The analysis of the early interviews assisted in identifying further stakeholder groups from whom views were sought. This element of the study was deemed service evaluation by the NHS ethics query service and as such not for research ethics review. It conformed to all university requirements.

Survey of current use of physician assistants in general practices in England

An online, anonymous, self-completion survey was developed and piloted with two PAs who had previously worked in general practice in England. It posed questions of career history, work environment, work activities and estimates of volumes of work. PAs known to working in primary care were invited to participate in 2010 through e-mails sent out by the UK Association of Physician Assistants (UKAPA), course leaders of PA courses in English universities and practices identified as employing PAs in previous research.⁷² All invitation e-mails included a link to the survey website and requested forward distribution to any other PAs thought to be working in primary care. UKAPA estimated that there were about 25 of their member PAs employed in primary care. The electronic survey was open for responses for 7 weeks (7 October to 30 November 2010). It addressed three areas: the activities and role of PAs in the primary care team, their primary care setting and their qualifications. Those interested in volunteering for the second phase of the study were given an opportunity to give their contact details at the end of the survey. The survey did not require NHS ethical review and fulfilled all university requirements for the ethical conduct of research. Descriptive analysis of the data was undertaken using Statistical Product and Service Solutions (SPSS) (IBM Corporation, Armonk, NY, USA).

Phase 2: the micro level

A comparative case study design⁷⁵ was used to address the three overarching research questions at the micro level of analysis through examination of 12 case studies: six general practices currently employing PAs and six matched practices not including PAs in their staffing. A mixed-methods approach⁸⁷ allowed for both description and the quantification of the impact of PAs in the context of general practice. This element of the study addressed specific additional questions:

- (a) How are PAs deployed and supervised in general practice and how do their roles and responsibilities compare with those of the doctors, NPs and practice nurses?
- (b) How do PA outcomes of care differ from those of GPs, specifically with respect to prescriptions rates, referrals, investigations, reattendances for the same problem within 2 weeks, patient safety, and patient satisfaction?
- (c) How do patients understand the role of PAs and what is the experience of patients when consulting PAs?
- (d) How does employment of PAs affect practice organisation, staffing configurations and costs?
- (e) What are the factors that support or inhibit the employment of PAs?

The six practices employing PAs were identified either by the PAs initially volunteering through the survey (see *Survey of current use of physician assistants in general practices in England*) or by an expression of interest from a practice. The volunteering PA practices achieved diversity in features such as general practice size, practice population sociodemographic characteristics, rural and urban coverage, and in the country in which the PAs had qualified. The comparative that was designed required some similarity between PA and comparator GP practices. Following the agreement to participate from PA employing practices, comparison practices were sought in the same health economy and with similar characteristics and patient population size. After the adoption of the study by the UK Clinical Research Network (UKCRN) Primary Care Research Network (PCRN), officers in five local PCRN made the initial approaches and requests for comparison general practices. Practices expressing interest were then contacted and provided with information, and an initial meeting was set up between the researchers (VMD and MH) and the GP, the practice manager and, in those employing practices, the PA. A summary description of the practices is provided at the end of *Chapter 2* (see *Table 5*).

The general practices and staff likely to be included in the study were provided with full participant information sheets for all research activities. Written agreement and consent for the practice to participate was obtained from the senior partner GP. Procedures for obtaining individual informed consent for each of the research activities are described below.

Data were gathered through the activities detailed in the following sections in this chapter. The analysis is described in each section and the economic analysis in *Economic analysis*. Analyses were then combined and synthesised to address the research questions as outlined in *Table 2*.

Semi-structured interviews with practice staff

Semi-structured interviews⁸³ were undertaken with PAs, GPs, practice managers, receptionists and practice nursing staff. A purposive sample in each practice was approached, provided with information and invited to participate. Aide-memoires for each professional group were developed addressing the questions (a), (b), (d) and (e), above, but allowing flexibility to explore new issues or ideas raised in the interview. GPs, PAs and nurses were also asked to describe their responsibilities and activities within the practice. In addition, practice managers and GPs were invited to provide any practice documents that would provide the research team with information about the practice, its working practices, services provided, staffing and planning. If documents on staffing were not available, the practice managers were asked to provide this information verbally. The interviews were conducted face to face or by telephone as preferred by the participant, digitally recorded with consent, transcribed and erased after analysis. Thematic analysis was undertaken⁸⁸ initially by one researcher (RL), with further analysis by two other researchers (VMD and MH) and interpretative discussion with the wider research team. Documentary evidence on staffing was read and data extracted as relevant to providing contextual information for each practice.

TABLE 2 Summary of data to address research questions

Research questions	Data
(a) How are PAs deployed and supervised in general practice and how do their roles and responsibilities compare with those of the doctors, NPs and practice nurses?	Interviews with practice staff Work activity diaries Administrative data Observation of consultations/meetings
(b) How do PA outcomes of care differ from those of GPs, specifically with respect to prescriptions rates, referrals, investigations, reattendances for the same problem within 2 weeks, patient safety and patient satisfaction?	Consultation record review and patient survey Clinical review of reconsultations Observation of consultations
(c) How do patients understand the role of PAs and what is the experience of patients when consulting PAs?	Patient interviews Patient survey
(d) How does employment of PAs affect practice organisation, staffing configurations and costs?	Interviews with practice staff Work activity diaries Administrative data
(e) What are the factors that support or inhibit the employment of PAs?	Interviews with practice staff

Consultation record review and linked patient survey

The consultation record review and linked patient survey, which addressed question (b) above, was of patients presenting in urgent or same-day surgeries. This was the type of surgery that PAs were predominately working in as identified from the national survey (p. 9). Each practice identified time periods in summer and winter periods (known as reference periods) during 2011 and 2012 in which they were able to assist the research team in data gathering. The length of time periods were based on the practice's estimation as to the number of surgeries required to reach the sample size. Each practice made staff and patients aware of the research during the reference periods in keeping with their usual practice, for example via notices at the reception desk.

The patient surveys

The validated General Practice Assessment Survey (GPAS)⁸⁹ focuses on patient outcomes and consultation experience and was used with permission (Paula Metcalfe, GP Patient Survey Team, 12 October 2010, personal communication). During a meeting of the study's public and patient participation group (see *Chapter 1, Study aims and objectives*) the GPAS was scrutinised and amendments suggested to improve the clarity of the wording and to specifically address the experience of a consultation with a PA. The amended, self-completion GPAS (see *Appendix 4*) was then to be offered to adult patients in each designated surgery during the reference periods. The method of distribution and collection varied in each practice, according to their working practices. In some practices, the GP or PA handed the patient a sticker to return to the receptionist, following the consultation, to collect a survey pack (containing a questionnaire, participant information sheet, and business reply envelope). In other practices, the survey pack was sent by post either the same day or the next. All completed questionnaires could be returned in a sealed envelope to a collection box in the practice reception or by post to the research team. The questionnaire did not include any information that could identify the person. Each questionnaire had a unique study identifier (study ID). Practice staff kept a log of the dates of survey administration (the index event) and recorded the unique practice identifier of the patient against the study ID. Practice staff were asked to send out a research team prepared reminder and duplicate survey pack to all those who had taken or been sent a questionnaire who had not responded. The practice staff did not have any access to

any of the completed questionnaires, ensuring that anonymity was protected. Data were entered onto a SPSS spreadsheet and descriptively analysed. The data were then also added to the data drawn from the consultation record review as described below.

In the PA-employing practices, the survey pack included additional material inviting patients to participate in a face-to-face or telephone interview. A separate consent form and business reply envelope were provided to respond to the invitation.

Consultation record review

This review addressed the primary outcome of the study: the rate of reattendance in general practice or an urgent care facility defined for the study as GP out-of-hours care, emergency department, walk-in centre, minor injury unit or other direct entry emergency unit (e.g. early pregnancy assessment unit) within 2 weeks of the initial consultation (the index consultation) with a PA or GP, and questions of whether or not the initial consultation activity by the PA or GP was appropriate in the light of the subsequent reattendance. The consultation records also provided the data for the process measures of advice, investigations, treatments, referrals and prescriptions.

The sample

The sample size required for the primary outcome was based upon randomised controlled trial data which compared the rate of reattendance in general practice within 2 weeks and outcomes of care delivered by NPs and GPs in the UK for patients attending 'same-day appointments'. These studies reported figures ranging from a self-reported 18.2%⁹⁰ through to extracted medical records 28.4%⁹¹ and 29%⁹² for patients seeing GPs and 20.4%, 31% and 37.2% for NPs, respectively. Taking Venning *et al.*'s⁹¹ analysis as the most robustly adjusted of these, the reattendance rate within 2 weeks of the consultation for this sample size calculation was taken as 28.4% for GPs and 37.2% for NPs. Assuming an OR of 1.5 and adjusting for slight multicollinearity as reported by Venning *et al.*,⁹¹ we estimated that a sample size of 205 in each group (consultations with a PA or a GP) was needed to give 80% power at a significance level of 5% for a logistic regression using the covariates of age, gender and general practice. We estimated that anonymised clinical records data might be required for up to approximately 600 patients each attended by PAs and GPs in the 12 practices in the data collection periods in order to meet the required sample size, assuming a response rate of 30% to the patient survey. However, in conducting the study, two problems arose. The first was that a condition of the research ethics approval was that child consultations were excluded from the survey element but could be included in the review of clinical records. We therefore included all child consultations in the designated surgeries in the reference periods as our review and survey had shown that PAs were consulted by children and their parents. The second problem arose through inaccurate research team and practice staff estimates of patient survey return rates in their practice (i.e. lower than our assumptions) resulting in more surgeries being designated for survey distribution. In some practices, clinical records were passed to the research team some months after the designated surgeries and only then did it become apparent to the research team that these had much greater numbers than anticipated. In addition, in some practices, there was a lack of fidelity to the protocol in that not all eligible patients were offered the survey (in some instances only 30% were offered). This was apparent to the research team staff only when they returned to discuss the participant numbers and check that the reference periods were similar to those of the preceding weeks for the practice. As the possibility of selection bias could not be eliminated, the research team decided to include all of the clinical records sent by the practices. This resulted in a larger sample than in the study design.

The data

Data from the electronic records of those patients who consulted in the designated surgeries during the reference periods were extracted and all patient identifiers removed in the practice. These data were then passed to the research team using the unique study ID number only. The data extraction occurred at a time point more than 2 weeks after the end of the reference period. The data extracted by the practice staff for the index event included the consultation date, person consulted (PA or GP) and length of consultation; the patient's age, gender, ethnicity and postcode; the patient's presenting conditions;

number of prescriptions from the consultation; the number and type of Quality and Outcome Framework⁹³ chronic conditions registers the patient was entered on; the number of repeat prescriptions; and the number of times the patient had contact with the practice in the three months preceding the index event. For any consultations in the following 2-week period, the location of consultation, the professional consulted, presenting condition(s) and number of prescriptions issued were recorded. The research team used the postcode on each record to assign the Index of Multiple Deprivation (IMD)⁹⁴ and then deleted the postcode. The practice records varied in the extent to which Read codes⁹⁵ were used for the presenting problem or diagnosis. The research team subsequently reviewed each record and assigned Read codes⁹⁵ to presenting problems that were documented but not coded by practice staff and assigned study codes for groups of diagnostic tests, referrals, procedures, certificates, medicine management and advice given (see *Appendix 5*). Each consultation record was coded by one member of the research team and then checked by a second. Uncertainties were discussed and resolved with a third member of the team. A categorisation of the presenting problems in the index consultation was also assigned to each patient record in order to examine the case mix of the consulting patients. This classification of acute, chronic, minor/symptoms, prevention and processes was an adaptation of that used by de Jong *et al.*,⁹⁶ developed by the research team in which the GP in the research team (SdeL) made the final decisions on categorisation and assignment. The method of assignment of a condition category to each patient is presented in *Appendix 6*.

Each index consultation that had subsequent consultations was identified. Each subsequent consultation was coded by two research team members to identify whether it was for exactly the same, a linked or a different problem to that of the index consultation. The method for designation was developed and refined with the GP research team member (SdeL).

All data were entered into a SPSS spreadsheet, to which the data from the patient survey (where available) could be matched by the study unique identifying number.

The data were then analysed descriptively, involving summary measures of location (e.g. means /medians/ proportions) and dispersion [standard deviations (SDs)/percentiles] appropriate for the type and distribution of the individual variables. Differences in processes and outcome between those practices with and without PAs were assessed by generalised estimating equation models.⁹⁷ The resulting ORs or rate ratios were adjusted for the case mix and IMD variables where they were significant predictors or notably confounded the relationship between practice type and the dependent variable. The correlation matrix was set to be exchangeable, that is to say patients were assumed to have some shared characteristics within each practice, whether from demographics or organisation of the practice.

The clinical review of reconsultations records

All records in which a patient had reconsulted within 2 weeks for the same or a linked problem were assigned to clinical record review. The review of medical records, or 'chart review', is a longstanding method of assessing the consultation⁹⁸ used in assessing overall quality⁹⁹ and considered reliable in detecting prescribing errors.¹⁰⁰

An anonymised printout of the computerised medical record system was reviewed to assess the quality of the record and to assess the appropriateness and safety. The data on whether it had been a GP or PA who had conducted the index consultation were removed, as well as any other references that might identify the practice or its geographical area (e.g. hospital name). A clinical review process, which addressed the question as to whether or not, in the light of the subsequent consultation(s), the first consultation had been appropriate, was developed by the GP member of the research team (SdeL) in consultation with the clinical review team of four GPs. The four GPs all had experience of assessing the quality of the consultation and, to a more limited extent, of the medical record. They were all active in education: one was a trainer while the other three took medical students in their practices; two were research active; two were male, two were female. They were trained in two 2-hour training sessions led by SdeL.

Based on the problem-orientated medical record format,¹⁰¹ the experienced GP reviewers were asked to judge each element of the consultation, the overall appropriateness and whether a GP or a PA had been consulted. Weed's taxonomy,^{101,102} for the elements of a problem-orientated medical record, was used as an measure of quality of the record, and the opinion of experienced GPs about appropriateness of the content of each part was used for the problem presented. The GP raters also gave an overall assessment. Weed's^{101,102} approach was to suggest that there were four key elements of the record, described by the acronym SOAP:

- Subjective: what the patient complains of, the problem from the patient's perspective.
- Objective findings from the consultation (e.g. blood pressure measurement).
- Analysis by the clinician of the problem.
- Plan for future action, including follow-up.

We modified this by making it explicit that the plan could have different elements: investigations, prescriptions and other aspects of the plan, such as referral or follow-up (*Table 3*).

Each record was assessed by a GP and 20% by two GPs independently using a study-designed form (see *Appendix 7*). Data were entered into a SPSS spreadsheet, analysed descriptively and inter-rater reliability was assessed. Inter-rater reliability is a measure of the extent to which the reviewers agreed with each other in their responses. Fleiss's kappa¹⁰³ is a simple measure of this inter-rater reliability. A kappa score of 0 indicates no more agreement than one would expect to occur simply by chance, and a score of 1 indicates complete agreement on all the data that were rated. Negative scores indicate agreement that is worse than chance. It is often said that a kappa score of 0.0–0.2 is 'poor', one of 0.21–0.4 is 'fair', 0.41–0.6 is 'moderate', 0.61–0.8 is 'good', and 0.81–1.0 is 'very good'.¹⁰⁴ The raters assessed one case/medical record as a group. Next, they analysed three cases on their own and checked back afterwards. They then did a further 10 cases, which were assessed for inter-rater reliability.

Patient interviews

Patients who had consulted PAs and received a survey were also invited to participate in telephone or face-to-face interviews. This was designed to address question (c): how do patients understand the role of PAs and what is the experience of patients when consulting PAs? An aide-memoire was developed to explore issues not captured by the patient survey such as patient choice, understanding of the role of the PA, perceptions of the consultation with regard to communication and perceived expertise. A researcher (WC) contacted those who responded to the invitation as soon after the index consultation as possible. With consent, the interviews were digitally recorded, transcribed and analysed thematically⁸⁸ by three researchers (LJ, MH, WC) using the NVivo software programme (QSR International Pty Ltd, Doncaster, Australia) (LJ, MH).

TABLE 3 Modification of Weed's SOAP^{101,102} to judge the appropriateness of the medical record

	Weed's SOAP	Modified SOAP	Includes	Explanation
1	Subjective	Subjective	History	Patients' complaint(s)
2	Objective	Objective	Exam	Objective findings (e.g. blood pressure recording)
3	Analysis	Analysis	Problem	May include diagnosis, recorded as the problem or reason for encounter
4	Plan	Investigation	Tests	Laboratory tests, X-rays, other tests initiated in primary care
5		Prescription		Acute, repeat or recommendation for over the counter
6		Other aspects of the plan	Referral	

Observation of physician assistants and general practitioners

Patient consultations were video recorded, with consent of the practitioner and the patients, during one surgery per PA and GP. This element addressed questions (a), (b) and (e). We recorded GPs and PAs using two video channels, and assessed competence at consulting using the validated Leicester Assessment Package (LAP) rating scale.¹⁰⁵ Video recording is an established method of assessing the consultation¹⁰⁶ and the use of two channels was a compromise between the multichannel recording we planned¹⁰⁶ and what we could gain the NHS REC permission for.

Patients in the designated surgeries were provided with information and consent was sought in writing by a researcher in the waiting room before recording commenced. Recording was stopped at the end of each consultation. Patients were then asked whether they continued to give consent or would prefer that it was withdrawn and the recording deleted. Practitioners also consented to the inclusion of each recording or could ask for a recording to be withdrawn at the end of the surgery. The recordings were made using ALFA: a computer-mediated consultation observation technique developed to provide an analysable overview of the consultation.¹⁰⁷ Each consultation was assessed by two GPs independently using the LAP¹⁰⁵ for assessing competence in general practice on dimensions of interviewing and history taking, patient management, problem solving and behaviour and relationship with patients.

The LAP for video consultation is a tool for measuring competence by direct observation. It was initially developed in the 1990s and demonstrated to have validity^{108–110} and reliability across levels of clinical competence.¹⁰⁷ Testing of reliability found a range of mean scores between 51.3% and 70.2% in one study, depending on levels of experience,¹¹⁰ and between 45% and 75% in another looking at the effect of interruption.¹⁰⁹ Although it has been criticised, no better package has been developed.^{111,112} The LAP has also been used in a range of clinical contexts – assessment of cancer patients,¹¹² the needs of caregivers¹¹³ and in the assessment of psychosexual problems.¹¹⁴ This package has also been used in an international setting, where a 50% pass mark was included,¹¹⁵ for assessing practice nurses¹¹⁶ and medical students.¹¹⁷

Grades were given by the four raters, using the seven main categories of the assessment package, and the results were then analysed. The seventh element of the package, the record, could not be rated as it could not be properly observed from the two-camera set-up used. Record keeping referred to how the health-care professional (HCP) interacted with the computer. It was not possible to view the detail of the individual record being collected by the HCP owing to the fact that only two channels of video were being recorded, and an additional channel is required for recording video directly from the HCP's computer screen. Three of the seven categories – interview/history taking, patient management and problem solving – are given a double weighting, and count for 20% of overall marks (*Table 4*). When combined, this means that the LAP scale total is 100, allowing final results to be expressed as a mean score (out of 5 for each category) or be expressed as a total percentage score.

TABLE 4 Components of the LAP (adapted from Fraser *et al.*¹⁰⁵)

LAP ¹⁰⁵ component	Weighting (%)
Interview/history taking	20
Physical examination	10
Patient management	20
Problem solving	20
Behaviour/relationship with patients	10
Anticipatory care	10
Record keeping	10

A workshop was held to discuss the findings with the raters (unblinded) which was video recorded and transcribed.

Observation was also undertaken in a sample of practice clinical meetings in which PAs and GPs were both present to understand more broadly how the PAs interact with the GPs in clinical decision-making in the practice. Permission and invitations was sought from the practice manager, the GPs and the PA. Permission and consent to observe was sought at each meeting that the research team was invited to. Field notes were made of only the activity and interaction of the team members. Analysis of these notes was used to complement data from the staff interviews (see *Semistructured interviews with practice staff*) and consultation video observations.

Work activities of physician assistants and general practitioners

Work activity diaries, using the 2006–7 general practice workload survey,¹¹⁸ were offered to PAs to complete for 1 week in the summer and winter. This addressed question (a), above. Early discussions with GPs made it evident that these diaries were unlikely to be completed by practice professionals other than the PAs and the data were therefore sought through interviews (see *Semi-structured interviews with practice staff*) and administrative systems. Data were entered onto a SPSS spreadsheet and analysed descriptively.

Economic analysis

The economic analysis was conducted at two levels:

1. The resource implications and costs of different team configurations were explored using practice-level data on staffing. Skill mixes, and the relative contribution of different practitioners, were compared within and between practices that do and do not employ PAs, after consideration of case mix differences. Nationally validated scales¹¹⁹ were used to calculate total human resource costs and costs per patient.
2. The impact of PAs, compared with GPs, on consultation processes (e.g. prescribing, referral and investigations), consultation outcomes (e.g. reattending, consultation satisfaction) and length, at individual patient level, as analysed in the clinical record element were incorporated in a high-level analysis of costs and effectiveness.

Practice level

Data

Each of the 12 practices (six with and six without a PA) was asked in November 2012 to provide information about their staffing configurations – headcounts and whole-time equivalents (WTEs) of:

- (a) clinical personnel
 - GPs (partners and salaried/other)
 - mid-level professionals – PAs and NPs
 - nursing and other staff engaged in direct patient care – practice nurses (PNs), HCAs, phlebotomists
- (b) support staff
 - managers and professionals [e.g. for information technology (IT), finance]
 - secretarial, reception, clerical.

The number of patients on the list of each practice and the proportions aged > 65 years and < 15 years were obtained from the Department of Health NHS Commissioning Board.¹²⁰ IMD 2010 for each practice was obtained from the NHS Information Centre.¹²¹

Costs

Unit costs of clinical personnel were obtained from validated national sources.¹¹⁹ These unit costs provide a value, per annum, that covers remuneration, on-costs, qualifications (where relevant), training, capital and other overheads associated with each role (see *Appendix 8*). PAs were costed as Band 7 nurses (secretary of UK Association of PAs, 2012, personal correspondence). The same costs were applied to GP partners and salaried GPs because evidence on this was contradictory. One study suggested that partners cost less than salaried GPs¹²² and others argued partners cost slightly more¹²³ or the same.¹²⁴

The remuneration levels of management and other support staff were obtained by looking at several job vacancies within the NHS for each role (outside London rates) in January 2013, and inferring an average salary. The on-costs and overheads associated with each role were assumed to be equivalent to those of clinical NHS staff working in general practice with the same remuneration. For example, the salary of a NP was £38,800 and job advertisements for practice managers were around the same level, so the on-costs and overheads of the NP were used to estimate the costs of a practice manager.

Analysis

The numbers of WTE staff in each category, and numbers of patients per GP, were calculated and compared within and between practices with and without a PA. Reported vacancies were included in the calculations.

Staffing costs were calculated for each category in each practice on an annual basis by multiplying the WTE by the unit cost. Total staff costs for each practice per annum were obtained by summing across all staff categories. An average cost per patient per practice was calculated, and compared within and between practices with and without a PA.

The sample of practices included in the study in both the PA and no-PA groups were compared with national staff headcount data from the NHS Information Centre 2012¹²⁵ with respect to the proportions of GPs who were salaried (vs. partners), and the numbers of administrative/clerical staff and nurses/direct patient care staff per GP.

Patient level

Analysis

The patient-level analysis used findings from the analysis of consultation records and the patient survey to compare the costs and effectiveness of consultations by PAs and GPs. The mean length of consultations in minutes for PAs and GPs was calculated from available data recorded by the 'time enter' and 'time leave' functions on practice management systems. Nationally validated unit costs¹¹⁹ were applied to mean consultation lengths to explore differences between PA and GP practices in the cost of consultations. Other ways in which the use of PAs may affect practice costs were also considered, such as GP time spent in supervision and training, but could not be quantified as data were not available. The relative effectiveness of PAs and GPs was judged by rates of reconsultation (primary outcome), patient satisfaction, and rates of referring, prescribing, testing, fitness to work certification, procedures and advice giving (process outcomes). Adjusted values of variables were used, after controlling for covariates.

Ethics and research governance

Phase 2 of the study required a number of types of reviews and agreements. The research ethical review was undertaken by NHS Research Ethics Committee (REC) South East Coast – Surrey who gave approval but required that child patients were not included in some elements (REC reference number: 10/H1109/28). Local NHS primary care research governance approvals were obtained using different local processes from five different bodies. The procedures for local agreement of the UKCRN NHS service support costs to research in general practice varied in each area. Agreements were obtained for each participating general practice.

The case study settings

Twelve practices participated in the study in the south-west, east and south-east of England. They were diverse in the sociodemographic features of their locale, the number of practice partners and the size of their registered patient population. These data are presented within ranges, to ensure anonymity for the practices, in *Table 5*.

The report now turns to presenting the findings.

TABLE 5 Summary of the practice settings

Practice study ID	Type of location ^a	IMD	Practice partners (WTE)	Patient list size	Employing a PA
1	Rural-50	11–15	1–3	5001–10,000	Yes
2	Rural-50	6–10	4–6	> 10,000	No
3	Rural-80	6–10	4–6	> 10,000	No
4	Rural-50	11–15	4–6	5001–10,000	No
5	Rural-50	16–20	1–3	5001–10,000	Yes
6	Significant rural	16–20	4–6	> 10,000	Yes
7	Significant rural	11–15	4–6	> 10,000	No
8	Major urban	31–35	1–3	< 5000	No
9	Major urban	31–35	1–3	5001–10,000	No
10	Major urban	31–35	4–6	< 5000	Yes
11	Other urban	11–15	1–3	> 10,000	Yes
12	Major urban	46–50	1–3	5001–10,000	Yes

a Classified using Office for National Statistics Rural/Urban Local Authority Classification for England.¹²⁶

Major Urban, districts with either 100,000 people or 50% of their population in urban areas with a population of more than 750,000; *Other urban*, districts with fewer than 37,000 people or less than 26% of their population in rural settlements and larger market towns; *Significant rural*, districts with more than 37,000 people or more than 26% of their population in rural settlements and larger market towns; *Rural-50*, districts with at least 50% but less than 80% of their population in rural settlements and larger market towns; *Rural-80*, districts with at least 80% of their population in rural settlements and larger market towns.

Chapter 3 Findings: evidence at the macro and meso levels

In this chapter we report on the findings from the first phase of the study: (a) the review of evidence, (b) the scoping survey⁷⁴ of key informants at a national and regional level and (c) the survey of current work deployment of PAs in UK general practice.

The review of evidence

In this section we report on our rapid review⁷⁶ of different types of documentary evidence. This includes a systematic review of empirical evidence, a review of commentaries and a review of workforce policies (see *Chapter 2, The review of evidence* for the method).

The systematic review of empirical evidence

Of the 2167 publications identified and screened, 49 met the inclusion criteria^{49,62,127–161} as presented in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)¹⁶² diagram in *Figure 2*.

Of these included studies, 46 were from the USA, and one each was from the UK,⁶² Australia,¹⁶³ and the Netherlands.¹⁶⁴ The heterogeneity of the types of studies (*Table 6*) and their outcome measures mean that any meta-analysis was not possible and a narrative review is presented. The overall judgement of the quality of the research was that it was weak to moderate with few studies providing comparative data about other occupational groups.

Evidence regarding structural aspects of PAs in primary care was found in 24 studies^{62,127–149} ranging in date from the late 1970s to 2007. These studies focused predominantly on PAs as a human resource in primary care, investigating questions as to the numbers employed in primary care, the willingness of physicians and managers to employ PAs, perceptions of barriers to employment and issues in retention rates. In the USA, the numbers of PAs are seen to have grown over time. Although studies vary in their findings, several suggest that approximately half of those with PA qualifications work in primary care.^{128–132,139} Support for the concept is mostly reported to be high among family doctors,^{62,142–148} with the potential for releasing the doctors' time to allow them to focus on more complex patients (and thereby increase practice productivity)^{143–146} being one of the most prominent reasons, alongside perceptions of patient satisfaction.^{146,147} Retention is not considered problematic.^{140,141}

Aspects of the process of care were reported in 24 studies^{49,62,134,137,140,144,147,151–161,164–168} ranging from the late 1970s to 2009. The majority of these studies describe the work activities of the PA and the patient groups who consult them. The greater part of the PA work is reported to be in consultations with patients with acute presentations.^{140,150,151,153–155,158,160} Two studies suggest that doctors who are in the same primary care facility as PAs attend more patients with chronic conditions^{49,153} and one suggests that the doctors attend more patients with more serious problems.¹⁴⁰ The evidence indicates that, while PAs can be consulted by patients of all types, primary care facilities have systems which direct particular groups of patients to the PA.¹⁵⁶ The activity level of PAs' work is reported in a number of studies but without conclusive evidence. Varying levels of PAs' productivity in patient throughput have been reported compared with those of family physicians, suggesting that there is near equivalency⁶² and up to 60% physician whole-time equivalence.¹⁶⁴ PAs are consistently reported to require supervision from physicians, although this is low in actual patient care episodes^{154,165,166} apart from when PAs are not afforded prescribing rights.⁶² Some evidence suggests that the employment of PAs provides greater capacity and efficiency in the provision of primary care.^{62,149,153,164} Seven papers^{49,154,155,157,158,167,168} report on investigations in the USA about the issue of cost and the impact on practice finances. Only one provides data after the year 2000.⁴⁹ Again, no conclusive evidence is provided, with four suggesting that

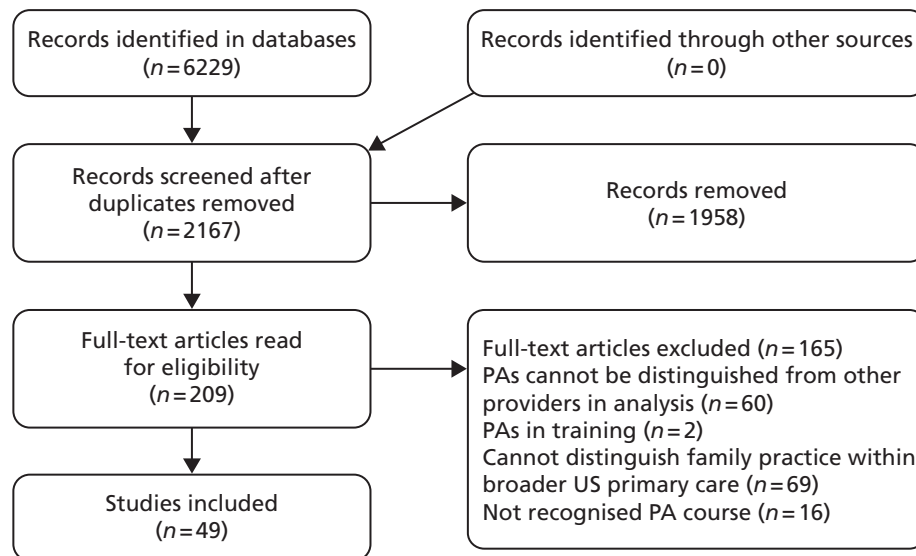


FIGURE 2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)¹⁶² flow chart of the review. Adapted from Halter *et al.*¹⁷⁶

TABLE 6 Method of studies included in the systematic review of empirical evidence

Method and data source	Number of studies
Quantitative surveys	27 (five are secondary analyses)
Medical record review	5
Structured/quantitative observations of practice	3
Individual or focus group interviews	4 (three qualitative analysis)
Administrative cost data analysis	1
Mixed methods	9

the employment is not financially advantageous for the practice^{49,155,156,168} and four suggesting otherwise.^{38,154,158,167}

Evidence about the outcomes of care was found in 14 papers.^{140,141,144,154,155,160,163,168–173} Overall, PAs were reported as acceptable to patients,^{141,155,160,168–171} although this decreased in a rural setting in which patients were not offered the choice to see a doctor.¹⁴¹ One study involving hypothetical scenarios suggested that patients were less willing to consult a PA in primary care if they had more complex conditions.¹⁷³ The evidence on technically appropriate care provided by PAs was weak and mainly from the 1970s.^{140,144,154,155,168,169,174} While evidence was mainly positive regarding the appropriateness of care, some less favourable comparisons with other providers were also reported.^{155,175} It is noteworthy that most of these studies were concerned with care for people with chronic conditions, for example diabetes; however, the evidence suggests that this patient group are in the minority in the PA workload.

Despite 40 years of studies, the evidence pertaining to PAs in family practice remains descriptive and weak, accentuated by poor reporting. While the review provides some evidence of the consequences of changing from physicians to PAs, it also makes it clear that research questions remain which would benefit from country-specific, good-quality investigation.

The findings of this systematic review are reported in full elsewhere.¹⁷⁶

Review of commentaries

This section reports on the findings of the review of commentaries and published opinions. This was one element of the study that contributed to investigating the question as to what supports or inhibits the development of PAs in primary care in the UK. The review was undertaken as reported earlier (see *Chapter 2, The review of evidence*). One hundred and seventeen published (print and electronic) commentaries and opinions were found that met the criteria for the review and these are listed in *Appendix 9*. They were found in sources with public, medical and nursing audiences (*Table 7*).

The commentaries ranged in date from 1980 to 2012, with the greatest number published between 2004 and 2006 (*Table 8*). This was the period in which a Department of Health-funded pilot project was being conducted in England.⁶⁰

Journalists were the most frequent type of author ($n = 28$), followed by medical staff ($n = 24$), including those with clinical backgrounds and senior medical practitioners, and by academics ($n = 20$). A notable absence was a patient or public perspective. Only one member of the public^{177,178} pointed out that the public were not asked for their views and questioned the need for new roles in the NHS. Many of the commentaries were unclear as to the competencies of a PA. In some, the author confused a PA trained in the USA model with a similarly named role in the UK in which individuals are trained to undertake only technical tasks such as taking bloods under the direction of a doctor.

Fifty-one of the commentaries gave a positive view of PAs, 24 gave negative opinions and the remainder were neutral, often suggesting that more information was required to help inform opinion. The positive opinions were authored for the most part by senior medical practitioners and academics. The doctors were mainly from the acute setting and, either from direct experience or from consideration of their current staffing issues, could envisage a place for PAs in their teams. Some of the more recent opinions relate to the potential for PAs to provide solutions to contemporary health policy requirements such as those found in the Quality, Innovation, Productivity and Prevention programme^{174,179} and as support to GPs in the new commissioning structure.¹⁸⁰ The majority of the negative opinions were authored by GPs and nurses. None of these had direct experience of PAs. Issues raised included the transferability of a US model to a UK setting; confusion for the public when faced with multiple roles; concern that PAs were not cost-effective in general practice when compared with GPs; and a viewpoint that nurses and NPs fulfilled this role in the UK health-care workforce and offered greater value to patients than another professional trained in the

TABLE 7 Sources of commentaries

Source type	Number
Journals and magazines targeted primarily to medical audiences (print and electronic)	65
Journals and magazines targeted primarily to nursing audiences (print and electronic)	28
Journals and magazines targeted to health-service managers	9
National newspapers	7
Other types of journals	8
Total	117

TABLE 8 Publication years of commentaries

	Time period			
	Pre 2000	2000–3	2004–6	2007–12
Published commentaries (n)	6	28	58	25

medical model. Conflicting views were authored from junior doctors; some reported that PAs made their working lives better as they could delegate routine tasks, while others questioned whether or not they would be in competition for jobs for which PAs would be seen as preferable by managers because they were cheaper.

There was little citation of empirical publications to support opinions in the commentaries, with most referring to other opinion pieces. It is possible to detect a trend over time to more positive, or at least neutral, opinions as more direct experiences of PAs in the UK were reported.

We turn now to the findings from reviewing the workforce policy documents and associated material.

Review of workforce policies and developments

One hundred and thirty-three documents were identified. Those concerned with international developments regarding PAs in primary care informed the context for the study (reported in *Chapter 1*). Twenty documents were published after 2010 (the year of the election of the Coalition government) by central government departments or regional bodies responsible for NHS workforce and education planning. There was a lack of reference to PAs in all of the English policy documents and, similarly, in the House of Commons Health Committee Report into the workforce and education.¹⁸¹ At a local level we did identify a few NHS trusts in England with plans to employ PAs (e.g. see University Hospitals of Leicester NHS Trust *Annual Operational Plan 2011–12*¹⁸²). The only mention of PAs in Welsh documents was in reference to the health workforce in rural areas, but no commitment to develop or support the role of PAs in this context was made.¹⁸³ In contrast, there was more evidence of recognition for PAs in Scotland where they were cited in central government policy documents both as an example of workforce efficiency¹⁸⁴ and as a potential addition to the remote and rural health-care workforce.¹⁸⁵ To this end, NHS Grampian, as the lead NHS organisation for workforce development, was working actively with the University of Aberdeen to establish and recruit to a PA education programme.¹⁸⁵ There was little reference to PAs in other types of workforce review documents which were intended to inform decision-making bodies.

Support for PAs was, however, evident in the medical colleges. The support of the Royal College of Anaesthetists for PAs (A) was noted earlier in *Chapter 1*, as was the support of the Royal College of General Practitioners and the Royal College of Physicians (RCP) in establishing competency and curriculum frameworks. More recently, the Royal College of General Practitioners referred to PAs in their review of general practice³⁴ and also included PAs in their membership via their General Practice Foundation. The Royal College of Physicians of Edinburgh also offered foundation membership to PAs.¹⁸⁶ PAs were also cited by the Director of the Medical Workforce Unit at the RCP¹⁸⁷ as one of the solutions to the problems facing medical workforce planning, medical training and complying with the European Working Time Directive.¹⁸⁸

Against this backdrop of limited recognition in policy, we go on to report the findings from the scoping survey.

The scoping survey

This section reports on the findings of the scoping survey, which addressed the question of what supports or inhibits the use and development of PAs in primary care. Fifty people were identified and approached as described earlier (see *Chapter 2, The scoping survey*). Thirty people agreed to the invitation and 25 participated in an interview. While not necessarily representing their organisation's views, they provided perspectives as individuals active in the work of a range of organisations at national and regional levels (*Table 9*). It should be noted that most of them were in very senior positions and that they often held multiple positions and roles. For example, one GP participant was a senior partner in a general practice, a role that involved caring for patients, leading the practice and also employing staff. In addition, this participant had involvement in a Clinical Commissioning Group (CCG), the emerging local education and

TABLE 9 Scoping survey participants

Types of organisations	Number of individuals interviewed
Regional and national level of the NHS in England and Wales	5
Organisations representing patients	2
Organisations involved in workforce analysis, planning and development within and without the NHS	3
Organisations providing primary care general medical services and clinical commissioning	4
Organisations providing medical education and advice at regional and national level on medical workforce planning	3
Organisations representing doctors	2
Organisations representing nurses and nurses working in primary care	4
Organisations representing PAs	2
Total	25

training board (LETB) and Department of Health national working groups as a member of the Royal College of General Practice. A participant from an organisation representing patients was the leader of this organisation, was involved in consultative processes with both the Department of Health and professional regulatory bodies and was a member of a steering group for research into hospital workforce changes. All of the participants had had some involvement in aspects of health workforce development: planning, redesign, review or research, provision and/or quality assurance of education and training programmes or regulation. Some were authors of reports on aspects of health-care workforce that were used in national- and regional-level policy and planning decisions.

The interviews were undertaken in 2011 and early 2012. The backdrop to which all the participants referred was the major debates on the reorganisation to the NHS as described in the 2010 White Paper,⁶ consulted on through the NHS Future Forum work¹⁸⁹ and enacted in the Health and Social Care Act 2012.¹⁹⁰

Health-care workforce changes

Health-care workforce redesigns and changes were seen as ongoing and inevitable by all respondents. They identified the current and future drivers which included the demographic and epidemiological changes in the population; the need to contain health-care costs and the impact of the general economic environment; the technological changes in medical treatments and communications; public and patient expectations in health-care delivery; and employment legislation and changes to professional education and regulatory requirements, specifically with regard to medicine and also the implementation of the European Working Time Directive.¹⁸⁸

Most informants had either observed or been involved in some way in shifts in work roles between occupational groups and envisaged this movement continuing. For example, the participants from patient organisations described the growth in employment of HCAs in NHS hospitals, who were undertaking what had been previously registered nurses' activities. Some described the shift in terms of 'the blurring of boundaries' between occupational roles, while others described planning for some groups to gain competencies (assessed in some way) to take over roles or tasks of other occupational groups, as in this exemplar:

So we take the approach of developing registered professionals into, you know, roles that will support medics or even, you know, replace some of the work of the junior doctors because with less junior doctors being around, you know, we've got a real capacity issue so registered professionals are currently filling that gap.

Participant 17: regional workforce development organisation

Workforce changes in primary care

In considering additional factors that impacted on workforce developments in primary care, participants noted the policy drive to deliver more care in primary care settings, reduce unplanned hospital admissions and increase the availability and accessibility of primary care. In addition, one GP predicted changes in the actual GP workforce, for example increased part-time working, and their possible impact:

I think in general practice there's going to be a much greater feminisation of the workforce, so I mean that's going to cause a tension because of people, you know, working out of normal working hours and kind of family and caring commitments making that very difficult, so you might almost get two types of workforces, those who work evenings and nights and those who work, you know, main work days.

Participant 5: GP and primary care organisation

There seemed to be general agreement as to the direction of travel of developments in the workforce in primary care. These included (1) greater numbers of staff (medical, nursing, allied health professions, support staff and administrative staff) to provide the range of services moving from hospital to primary care settings and accessible for longer hours, 7 days a week, (2) increased availability in primary care of medical specialists in ambulatory sensitive conditions, (3) increased subspecialism by GPs, and (4) increased stratification in some occupational groups, for example more clinical nurse specialists and advanced NPs, fewer registered nurses and more HCAs.

Experience and knowledge of physician assistants

Aside from those involved in organisations concerned with PAs, about half of the participants had no direct experience of an aspect of the PAs movement in the UK. Those without prior knowledge, such as participants from patient organisations, could easily translate the concept and sought additional information to check their understanding. Of those who had direct experience, this ranged from involvement in early pilot projects of PAs or staff like them to consultations of professional bodies on the Department of Health-agreed national competencies for the PA programme,⁶⁴ to engagement with provider organisations on the commissioning of places on PA programmes. This did not necessarily translate to knowledge of any current developments in the PA movement in the UK.

And you have to look back, not so long ago, but we had this thing called the 'NHS Plan Modernisation Agency' and with it, there were all these calls for workforce development. And one of the calls was for England to develop the role of physician assistant to increase capacity and capability within both secondary and primary care. Now, as a response to that, a working party was set up looking at the education programme that SHAs would commission from HEIs for the physician assistant, and I was on that working party . . . but I had assumed that we had very few out there now.

Participant 9: nursing profession organisation

Participants also commented that they thought there was little awareness or knowledge of PAs among the public or, indeed, professionals.

So you know if you talk about physician assistants I actually don't think many people in this country really understand what they are.

Participant 15: GP and medical profession organisation

Factors influencing demand for and employment of physician assistants

Around half of the participants saw potential for the PA role in primary care, although there were caveats expressed, as outlined below. Other participants were more neutral in their opinions, requiring more information and evidence. None expressed a completely negative view of the potential for PAs to be employed in primary care settings.

For those who could envisage a role for PAs in primary care, that role tended to be one of triage or dealing with patients with minor, self-limiting illnesses in general practices and other first-contact settings such as walk-in centres. The explanations for this were that this was the area of patient pressure on the practices, but also that the role could free up the doctors' time to deal with patients' more complex problems or with other types of activities such as commissioning. Some participants reported that PAs were increasingly being employed in secondary care settings.

Something like seven out of ten of the PAs working in the UK now are in secondary care . . . something like 19 trusts are now employing PA's across the UK. There are none in Wales that I know of and none in Northern Ireland but the vast majority are in England.

Participant 16: PA organisation

This echoed views reported to one of the research team members when interviewing senior staff involved in the New Zealand pilots of PAs (see *Chapter 1*).

The factors that participants considered were particularly likely to create demand for PAs were lack of medical applicants to work in particular areas or types of primary care services; the need to have continuity in medical team personnel; and the need to free medical personnel from the more routine aspects of patient care to either undertake their medical training or undertake other types of work. Some participants debated whether it was nurses at advanced level or clinical nurse specialists that were required or whether or not it was PAs. Most considered that they needed further information before taking a view, although one participant from a professional nursing organisation considered that the nurse added value in ways the PA would not.

Having had a long conversation with one of the PAs [at professional meeting] to actually do a direct comparison of what were the pros and cons of an ANP [advanced nurse practitioner], because they couldn't understand what an ANP was and say 'Well, why would you need ANPs, you've got physician's assistants' so we were like diametrically opposed and I'm going 'Well, why do you want physician assistants because we can get that and more from an advanced nurse practitioner'.

Participant 11: nursing professional organisation

Participants from medical education and medical professional organisations could see particular problems for consultant teams created by the changes in postgraduate medical training, which roles such as PAs could address. One participant noted that in a LETB, representatives of trusts that had experience of training and employing PAs were voicing requirements for a greater supply of PAs.

. . . the consultants there who've hired now four physician assistants, they were losing training roles because their trainees couldn't get in, because they were having to do the ward work and couldn't get into surgery. With physician assistants in place they have the ward covered, they're not hiring locums, they're now getting more training posts because they can actually train those people.

Participant 24: medical education organisation

In contrast, in a different region of England, a participant from a workforce planning organisation reported a lack of interest by trusts in PAs specialising in anaesthesia.

Yeah, I mean we constantly look at the potential around PAs in the region and have had little uptake really locally. We've had a few events where we've explored what physician assistants are but none of the trusts have wanted to go forward with them.

Participant 17: regional workforce development organisation

Participants also raised questions and offered views as to why PAs might not be employed in primary care settings. Foremost were questions (not in any order) as to the cost and value for money compared with other staff groups, the lack of legislated authority for PAs to be an independent prescriber and the lack of oversight by a statutory regulatory body. Opinions seemed to vary as to whether or not there was a shortage of doctors applying to general practice to which PAs might offer an alternative but that may have reflected regional variations in settings. Participants had different views as to whether or not PAs represented value for money when compared with doctors. Most used the evidence from studies of NPs, reporting that compared with doctors (particularly in general practice) their consultations with patients were longer, resulting in no financial gain to the service. They considered that the evidence about PAs would be similar.

Practices have tried nurse practitioners and generally they take twice as long to see the patients and don't come to the conclusion or the management as quickly. So you actually often end up when you look at the, and there's been published papers to show it, when you look at the cost actually the nurse practitioner doesn't become any cheaper.

Participant 15: GP and medical professional organisation

The participant from the patients' organisation also raised issues of opportunity costs to patients in consulting a PA who could not prescribe.

It seems to me that if the physician assistant can't actually prescribe then, you know, you're duplicating . . . you're repeating what has happened with, you know, some of the walk-in centres experience, where people have gone, you know, thinking I won't need to bother with the GP. They see a nurse at the end of which the nurse says, 'Well I think you'd better go and see your own GP service.' . . . So actually how much, how effective is delegation if people just bounce back through again because the GP's the only one who can make a particular decision?

Participant 12: patient organisation

Issues of acceptance and patient preference were mentioned by a range of participants. A number cited experience and research that demonstrated patient preference for consulting with a doctor rather than a nurse, although some also pointed out that many patients, particularly those with long-term conditions, were also discerning as to the expertise level they required and found acceptable.

Concerns were also expressed that the PAs were not a professional group regulated by legislation, although, as one participant from a patients' organisation pointed out, the existence of a regulatory body would not necessarily result in regular checks of individual competence. The absence of such a body was considered by some, but not all GPs, as a barrier to employment:

No, I didn't realise that [there was no regulatory body for PAs], not in a million years would I employ someone.

Participant 5: GP and primary care organisation

Participants from the PA organisations reported the existence of a voluntary register for UK PAs which recorded individual PAs' credentials. In addition, it was reported that UKAPA had tried to be included in the remit of the Health Professions Council but, following the government's announcement not to regulate any further groups,¹⁹¹ this was not currently possible.

Finally, a number of participants made comment as to the risk-averse, essentially conservative attitudes of many NHS managers and employers towards innovation. In comparison, one GP participant noted how 'nimble' general practices were like small independent businesses in the speed at which making decisions and testing innovations could occur, particularly when compared with large NHS trusts. Others observed the need for evidence and information so that employers and commissioners could make decisions. Some participants considered more widely the factors in diffusion in innovation and offered a broader

analysis that included a NHS cultural aversion to the importation of ideas from other countries such as the USA.

So, I think this is an opportunity to try and move some of these ideas. You know, they may not be right of course. So, 'Do they feel right?' but I don't think physician assistants have ever had enough scope to run a NICE [National Institute for Health and Care Excellence] trial on their VFM [Value for Money] and impact. Which is probably part of the thing that drags you back down. It's almost like you'd need to reach that tipping point even in terms of evidence or just acceptability to get it done. And the weird thing is that 'and not invented here, culture', [you] can't point to 175,000 American physician assistants and say, 'Oh yeah, it does work' you know, cos it's not here.

Participant 20: workforce development organisation and national and regional level

The scoping survey suggested that there was awareness of potential benefits of the role but also recognition of the current drawbacks and a desire for more information.

This section has reported on the findings of the scoping survey as to perceived factors influencing the use and development of PAs in primary care at the macro and meso levels. We now turn to the evidence as to the employment of PAs in England in primary care.

The national physician assistant survey

The online electronic survey was completed by 16 PAs working in primary care in 2010. Using the UKAPA estimate at that point of time of 25 PAs employed in primary care, this gave an estimated response rate of 64%. Four surveys had missing responses. Fifteen respondents were female, eight were aged between 30 and 39 years and five were aged over 50 years. Half of the respondents ($n = 8$) were graduates of PA courses in the UK, the others of US courses. Two respondents omitted the question about their employment setting. The remainder were all employed in general practice, with three reporting additional employment in walk-in-centres, urgent care and primary care out-of-hours services. Most had worked in their current practice for over 1 year, with two PAs reporting working for over 5 years in the same practice. Two worked in settings described as rural, two in urban non-deprived settings and eight in settings described as urban and deprived. The patient list size of the employing practices ranged from under 3000 to over 20,000. Three PAs worked in practices that had only partner GPs. Nine PAs reported working in practices that employed salaried doctors and eight in practices that also employed NPs. The most frequently reported clinical activity was seeing patients (classified as same day/urgent and non-urgent) in booked surgery appointments. In addition, this was reported as the greatest number of hours of their working week engaged in this activity. The next most frequent activity was reported as reviewing test results. Only seven undertook booked appointments with patients for chronic disease management activities. A range of other activities were reported by individual respondents including home visits, cryotherapy, teaching, clinical audit and supervision of other staff such as HCAs. This is an adapted version of findings reported in detail in Drennan *et al.*¹⁹² Some respondents also volunteered to be potential participants in the second phase of the study.

This chapter has provided the findings from the macro and meso levels of the study. The report now turns to the findings at the micro level through the comparative case studies.

Chapter 4 Case studies: evidence from the practice as an organisation

This chapter reports on findings from the comparative case studies, using data from the GP and practice staff interviews, the work diaries and the observations in the practice clinical meetings. The first section considers the data from PA employing practices in addressing, first of all, questions of deployment, the place of the PA in the work of the practice team, supervision, professional relationships, and views on the perceptions of patients. It then moves to consider the data from the GPs and practice managers in both PA-employing and non-PA-employing practices as to their views on the factors that shape staffing decisions in general practice, including the employment of PAs. Interviews were conducted with the GP, the practice manager, the PA, a nurse or NP and a receptionist in all of the PA-employing practices (except one practice where we were unable to interview a receptionist). A lead GP and the practice manager were interviewed in five of the six non-PA-employing practices (the sixth declined to participate in this element).

The deployment and role of physician assistants in practices

The PAs were all employed in practices that also employed other professionally qualified staff, including salaried GPs, NPs and practice nurses (*Table 10*). The PAs in the study had a variety of work experience and training backgrounds, including some who were UK and some US trained.

Physician assistant activities: an overview from the work diaries

The work diaries (confirmed in interviews with PAs) indicated that the majority of the PAs' working hours were spent in providing clinical consultations (direct patient contact in face-to-face or telephone appointments), although the proportion of the time they reported on this ranged from 58% to 92% (*Table 11*). The majority of these hours were in same-day appointment sessions but PAs also undertook booked appointment sessions. These were mostly for the follow-up of patients with long-term conditions.

The non-clinical activities could be related to either patient consultations, such as arranging referrals or processing laboratory results, or other professional activities such as attending practice meetings or training days. The most frequently reported non-clinical activities by PAs were dealing with test results and referrals to other professionals. Some PAs also reported attending training and carrying out clinical governance activities and condition/case-specific duties (such as child protection work). It was evident that the wider the range of non-clinical activities, reported by individual PAs, the greater the proportion of time spent on these activities compared with clinical activities (as with PA 10) (see *Table 11*).

TABLE 10 The professionally qualified health-care staff in the PA practices

Practice study ID	Patient list size	Practice partners (WTE)	Employing salaried GP(s)	Employing NP(s)	Employing nurse(s)	Employing PA(s)
1	5001–10,000	1–3	Yes	No	Yes	Yes
5	5001–10,000	1–3	Yes	No	Yes	Yes
6	> 10,000	4–6	No	Yes	Yes	Yes
10	< 5000 plus walk-ins	4–6	Yes	Yes	Yes	Yes
11	> 10,001	1–3	Yes	No	Yes	Yes
12	5001–10,000	1–3	Yes	Yes	Yes	Yes

TABLE 11 Proportion of reported hours spent by PAs in clinical and non-clinical activities

PA	Time reported				
	Total hours reported on	Clinical activities		Non-clinical activities	
		Hours	Per cent of reported time	Hours	Per cent of reported time
1 ^a	125	111	88.8	14	11.2
5 ^b	37.75	21.75	57.6	16	42.4
6	No diaries received				
10 ^c	11.75	74.5	62.7	44.25	37.3
11 ^c	8.75	7.75	88.6	1	11.4
12 ^d	36.25	33.5	92.4	2.75	7.6

a Based on 4 weeks' diaries.

b Based on 3 weeks' diaries.

c Based on 1 day's diary.

d Based on 1 week's diary.

From the staff interviews, it was evident that each practice deployed the PAs according to a number of parameters. These included deployment that fitted with the practice organisational requirements, for example to telephone triage in a practice that used that system, or by clinical competence as judged by the senior or lead GP, as in this exemplar:

[The PAs] don't usually see under-1s but depends on [their] experience.

GP 11–5

This is further explored in the following sections, where the variety in the scope of practice reported to be undertaken by the individual PAs is clear.

Same-day appointment clinical consultations

The deployment of PAs in the practices was primarily to provide clinician time for same-day/urgent appointments. The range of scope of practice was evident in the manner in which same-day appointment patients were assigned to a PA or to a GP. In some practices, it was evident that the receptionists treated PAs as the doctors assigned to that type of surgery, as noted here:

He [the PA] sees a surgery of patients morning and afternoon every day, which are almost entirely unselected. We have selected out under ones because he is not trained for those, but other than that he sees the full range of problems that present.

GP 1–2

In other practices, more nuanced systems had been developed so that the GPs and PA were seeing different types of patients, with the GP more likely to see either the more complex patients or those with more chronic conditions, as in this exemplar:

So the doctors and the physician assistant, the nurses between them have developed a, like a list, a triage type list. So if someone rings up and says 'I've got this, that or the other', they [the reception staff] can look on the list and decide whether it should see a doctor or a physician assistant or a nurse practitioners, depending on who's on. So they're a sort of triage but not in-depth triage, just pointed in the right direction.

Practice manager 6–4

The practices varied in the length of the appointment slots they assigned to PAs. Most – but not all – assigned longer slots (15 minutes) to PAs than to GPs (10 minutes), but often shorter appointment times than those allocated for nurses.

Chronic disease management consultations

The extent to which PAs were involved in the ongoing management of patients with chronic diseases also varied among practices. For example, in one practice the PA undertook the diabetic review clinic, among other chronic condition review clinics. Another PA estimated that about 50% of the patients he saw were 'regular routine follow-up of chronic patients' (PA 5–3).

Some of the practices had nuanced ways of separating the work the PA undertook in chronic disease management from that of the nurses in the practice. For example, in most practices the nurses were described as not seeing patients with depression or other mental health problems or with musculoskeletal problems, whereas the PAs would attend to those types of patients. In general, the division of labour appeared to be based on clinical expertise and confidence, as in this example:

When the physician assistant that we have here, when she started a lot of my chronic disease patients [were] then allocated to [the PA], especially COPD, she does spirometry, which she's been trained for . . .

Practice nurse 10–3

It was observed by a number of participants that the difference between nurses and PAs in their chronic disease management was often recognisable through the point at which the patient was referred back to the doctor. PAs were described as often managing more problems and transition points, whereas the nurses referred back for any problem or change. The differences in activity between the PA and the NP were exemplified in this description:

She [the PA] does all the things the nurse practitioner will do on the day but she also does a couple of other things because she's covered the training. So she is happy to see straightforward depressions, which the nurses, none of our nurse are prepared to at present . . . And she is happy to see back pains also which the nurses haven't covered so they don't do that. Another difference is the PA will do some of her own referrals [to secondary care] whereas the nurse practitioner would refer the patient to the doctor who would be responsible for doing the referral.

GP 6–2

More evident in the descriptions were situations in which PAs and nurses flexibly covered the work required in the practice as the demands of each day unfolded. These were reported by PAs, nurses and practice managers; for example, PAs might cover the work of nurses absent through sickness, while one nurse described assisting with booked chronic disease management review patients in the absence of a PA.

Income-generating work

In addition, some practices were also developing their PA to undertake work that contributed specifically to the practice income as part of either Quality and Outcomes Framework (QOF)⁹³ indicators, such as maintaining the register of people with learning disabilities, or clinical activities that attracted specific payments under local or nationally agreed enhanced service elements of the General Medical Services

(GMS) or Personal Medical Services (PMS) contract,²³ for example initiation of insulin in primary care. Each of the activities referred to by the PA in this exemplar is an activity associated with specific payments:

What else do I do? I'm responsible for the warfarin patients, I do all the bridging for surgery [changing the warfarin pre-surgery to another drug and restarting post a surgical operation]. I do contraceptive implants and there's only one or two in the practice who do that so that's quite a big role . . . and I do a lot of paperwork, so I run the palliative care meetings 3-monthly . . . the GP would normally do that but I've taken that off their hands. And I'm now starting to do initiation of insulin in primary care. We had one GP that was doing that but he retired.

PA 6–3

Authority and lack of authority to order tests, refer and prescribe

There was a reported difference between PAs in different practices and between PAs and nurses as to the recognised authority to order pathology and radiological tests and also to make referrals to secondary care. In general, the PAs were described as having been given more authority to order tests and make referrals to secondary care (although some needed countersigning in some areas by the GP) than the nurses, who mainly described usual practice as referral back to the GP, as described in this exemplar:

Interviewer: *Can you authorise an X-ray referral?*

Practice nurse 5-1: *No that goes on our prescription board [a way of leaving items such as prescriptions for the doctor to sign] and the doctor will sign it. Obviously it is a trust thing, they know what I can do and trust me.*

Interviewer: *And if they needed investigations of any other kind, would there be something you authorise or . . . ?*

Practice nurse 5-1: *Bloods. I would obviously do that myself and authorise myself. I think X-rays, most other things, scans and things would be the doctor or PA.*

Interviewer: *And if they need a hospital referral?*

Practice nurse 5-1: *Yeah doctor or PA because they wouldn't take any notice of me at the hospital.*

Physician assistants are not authorised to prescribe medicines in the UK. The lack of ability to prescribe was reported to cause frustration and additional time to the PAs, the GPs and the patients. Each practice had developed systems to try to minimise the delay caused by getting the GP to sign prescriptions. This varied from a system of knocking on the GPs' consulting room door, messaging by computer, hovering in corridors to speak to the next available GP, and leaving the prescription in a designated place for the next available doctor to review the notes and sign, to offering to send the signed prescription to the local pharmacist later for collection. It was evident that the GPs developed trust in the clinical competency of the PAs over time, which had the effect of reducing the amount of time they spent reviewing consultations before signing prescriptions, as illustrated in this exemplar:

When I first qualified and also when any new doctor starts there'll be a period where when they are signing my prescription you would tend to give them a lot more information about what you are doing . . . explain a bit more what it's about, because they have got to learn to trust you and understand it, because ultimately they are signing the prescription, . . . so it's just about building up a trust and an understanding of your competencies which is fair enough.

PA 10–2

In the PA-employing practices, the nurses with the qualifications to prescribe medications were in the minority. Consequently, most of the nurses, whether with a title of nurse practitioner, senior practice nurse or practice nurse, were using the same systems as the PA to obtain GP signatures on patient prescriptions.

Supervision of physician assistants' clinical practice

The GPs, practice managers and PAs all described an induction process of establishing the PAs' competency in clinical work, confidence in working in the practice team and with practice systems through additional training and supervision sessions offered by the GP.

When they [PA] first start they sit in with all the doctors, they sit in with the nurses, sit in reception, go out with the district nurses . . . and they meet quite regularly with the mentor [GP] and so they will watch the mentor deal with patients. Then they will do consultations with the mentor observing and then . . . and then they'll pick cases, [the PA] will then bring cases for discussion.

Practice manager 12-3

There was agreement from most participants, across all professional roles, as to the importance of ongoing supervision and mentorship. The PAs tended to report a mixture of informal advice as and when needed in clinical sessions together with regular more formal supervision sessions, as illustrated in these exemplars:

There'll always be somebody who is instructed as my mentor for the day . . . and it tends to be the person's on call. So if I have any problems during the day I go and see them and if I want them to see a patient with me then they will.

PA 6-3

Dr [name] routinely and regularly looks at my work and patient care notes to see if there is anything he needs to reassess or talk to me about.

PA 5-3

It was evident from the GPs that they valued what they described as the PAs knowing their own limitations in clinical practice, and that this added to the GPs' confidence that the PA was a safe clinician.

A number of practice managers described how the appointment slots for the supervising GP were tailored to ensure that there were free slots to compensate for interruptions and discussions. One noted that in the event that all of the GPs were absent from the premises, for example doing home visits, the PA would not see patients during that time period.

Relationships with other practice staff

Knowledge of PAs among other practice staff, prior to the employment of the first PA, was reported to be negligible. Some practice managers were more involved than others in decisions to seek a PA to employ. It was reported by some GPs and practice managers that a few previously employed nurses, usually named as NPs, saw the PAs as a threat to their role and were less than enthusiastic about the employment of the PA. The PAs themselves noted that very occasionally they had felt that a NP was hostile to them. The nurses and NPs interviewed for the study did not raise any negative views about PAs. Most were positive about the role as an asset in managing the workload of the practice, in being complimentary in skills or

knowledge to themselves and as a source of information on some things, as illustrated in the following exemplar:

So I think the advantage of having a PA is that she's on the wavelength of the doctor . . . I feel I am better placed dealing with the chronics [patients] and she's better placed dealing with she's doing with the others, the non-urgent referrals, with the follow ups and things like that.

NP 12–4

On the other hand, many of the practice staff and nurses observed that the PA could sometimes be seen to be aligned with the nursing staff, or sometimes as a bridge between nursing and medical staff.

Participants described a range of working relationships with the medical staff, dependent in part on the configuration of the practice, the experience of the PA and the turnover of medical staff such as GP registrars, salaried doctors, and locums. In some practices, there were close working relationships between the named mentor and the PA. In the observed clinical meetings it was evident that the PAs were considered integral to the practice team. They contributed information, opinions, and potential solutions and took proactive roles in administration and patient management.

Patients and the physician assistant role

Most of the practices described the ways in which they assisted their patients in understanding this new type of clinical professional. There was a range of ways in which practices informed patients of the PAs within the practice team. This included posters in waiting rooms, leaflets, and information on their practice leaflet and website. Some of the PAs reported that they ensured that each patient understood that they were a PA, not a doctor, with a 'script' introducing themselves on starting the consultation. Others reported that they did not have time to do that with each patient. The reception staff in some practices reported how they described the role to patients and the responses, as in this exemplar:

We always say he [the PA] is qualified and he's covered by a GP, if he is not sure about anything he will call the GP who is supervising him. So it's 'yeah ok' or 'well no I'd rather see a doctor' and then I would say 'well he is covered by a doctor, he is qualified, he can generate prescriptions though he can't sign them and he will always call a doctor in'. And some of them are happy and some of them aren't. We don't push it.

Receptionist 1–3

Some practice staff stated that they were not sure if the patients quite understood about PAs, particularly if the PA was American, with the patient assuming that it was a US medical role. Others suggested that there were always some patients who did not receive or retain the information as to who they were consulting.

Most patients were reported to be content to see the PA, although some were reported to prefer to see the GP; this was also described as occurring with NPs. A number of the participants described the GPs as educating patients as to the consulting competency of PAs and NPs. Participants also reported groups of patients requesting to see individual PAs, as in this exemplar:

We've had people really want to see the PA. They're high-quality clinicians as well and effective communicators . . . they are clinically sound and people want that continuity.

GP 12–1

The report now turns to the staff resource evidence from the study.

Comparative staff resources

Key comparisons of staff resources between practices with and without a PA are shown in *Table 12*. Owing to the small number of practices, and to preserve anonymity, results are not presented at the individual practice level. There is variation within both groups of practices (those with and without PAs) with respect to list sizes, proportions of older patients, IMD, and numbers (WTE) of GPs, nursing, management and other support staff, reflecting the practice matching that occurred when the sample of practices was selected for inclusion in the study.

There is large variation in the number of patients per GP, particularly in the group of practices without PAs. Data on staffing were provided by practices and could not be verified by other means. Two practices without PAs had one NP each. Two practices with PAs employed two NPs each. Average costs per patient per annum varied between practices; those with the lowest number of patients per GP tended to have the highest average costs.

Comparisons between national headcount data¹²⁵ and the practices included in the study are shown in *Table 13*. While the staffing ratios of practices without PAs are similar to national averages, the practices with PAs have higher proportions of salaried GPs. However, there was substantial variability in ratios within groups and the findings need to be treated with caution. Large proportions of staff (in all roles) were reported to be working part-time and headcounts are likely to provide an inaccurate picture in a small sample.

TABLE 12 Comparison of staff resources (WTE) and costs of practices with and without PAs

Variables	Practices employing PAs (n = 6)		Practices without PAs (n = 6)	
	Range	Mean	Range	Mean
List size (number of patients)	4316–15,000	9357	4385–13,635	9637
Percentage of patients > 65 years	8.5–22%	13.7%	4.9–22.3%	16.0%
IMD (high is more deprivation)	11.05–48.2	23.7	6.4–33.39	17.2
Number of GPs (partners and salaried)	3–9.3	5.3	2.4–7.1	4.9
Patients per GP	1233–2304	1818	719–4292	2339
PAs	1 (n = 5); 2 (n = 1)		0	
NPs	0 (n = 3); 1.4 (n = 1); 1.0 (n = 2)		0 (n = 4); 1 (n = 2)	
Nurses, others in patient care (PN, HCA, phlebotomists)	1.2–6.5 (n = 6)	3.4 (median)	1.5–4.6	2.6
Management, other professional	1.35–2.75 (n = 6)	2.2 (median)	1.1–4.5	2.3
Secretarial, reception, clerical	4.6–11.6 (n = 6)	7.8 (median)	4.6–10.1	7.6
Total annual staff cost (£M)	0.96–14.15	1.57	0.8–2.07	1.39
Average cost per patient (£)	146–273	176	68–405	170

TABLE 13 Comparison of practices in the study with national staffing ratios¹²⁵ headcounts

Ratio	National average	Practices without PAs (n = 6)	Practices with PAs (n = 6)	
			PAs counted as GP	PAs counted as nurses
Proportion of all GPs who are salaried (%)	24	28	49	56
Nurses and direct care staff per GP	0.95	0.91	0.73	1.04
Administrative/clerical ^a staff per GP	2.3	2.5	1.9	2.2

^a Includes managers.

Decisions about medical and practice staffing

This section uses data from both practices employing PAs and those not employing PAs. Those in non-PA-employing practices often had little knowledge of PAs but most had experience and knowledge of NPs as other mid-level practitioners.

Those GP partners interviewed who had been in general practice since the 1980s commented on the change in the work of practices and the increased need for other types of staff, noting in particular the rise in numbers of nurses, HCAs and administrative staff in different guises. All commented that they could see future changes to the primary care workforce as a result of shifts in demography, pressures on finance for health care, new medical and communication technologies and consequent reductions for hospital inpatient stays but possible increases in local care facilities.

It was evident that GP partners considered multiple factors when making decisions about both new partners in the practice and employed staff. The practice managers echoed these factors, although involvement in decision-making in some aspects, for example on partnerships, was described as mainly the domain of the partners. The factors included (in no order of priority) practice income levels, clinical expertise required to meet patient profile, quality of life of GP partners, GP partners' own previous experiences in working with different types of staff, efficiency (including cost) in meeting patient demand and/or contract requirements, availability or shortage of GPs and experienced practice nurses to work in their area, other interests beyond the GMS/PMS contract activities (such as training), innovation and research, and the 'fit' of individuals within relatively small practice partnerships and staff teams.

All participants reported trying to use staff most efficiently to cover the work required, as in this exemplar:

There is an active attempt to feed work down to the person most appropriate to do it if you see what I mean, I mean it's pointless paying your mostly highly paid and qualified staff to do tasks that can be done by others.

GP 7-2

While there appeared to be a consensus that the workforce would change, there was no consensus on the likely replacement of doctors by NPs or PAs in substantial numbers. GPs and practice managers drew on both personal experience and published evidence in their arguments. Some suggested that GPs were required to appropriately identify the very small percentage of urgent and complex problems presented which NPs or PA were not trained to identify. Others argued that using the GP as the first contact, particularly in triage systems, was more effective and cost-efficient owing to their expertise levels and ability to take risk.

A further argument was made that the lower productivity levels of nurses and PAs compared with GPs made them more costly. This productivity issue was not just about the appointment times, as illustrated here:

Does [cost] come into it, yes it certainly does. I mean if you could have an experienced PA performing a largely similar role to a salaried doctor then clearly the practice is able to employ more staff to achieve, to provide consultations to patients because the money goes further. However, you have to set against that the fact that there's supervision time, there's education time that's required for PAs, there's the fact that they aren't fully registered here.

GP 11–2

One GP noted that making these types of judgements was based on the individual capabilities of PAs and the requirements of a practice and, consequently, it was hard to generalise to an occupational group. Others pointed to the wider considerations to be made in decisions about practice staffing, as in this exemplar:

I think probably it's the cost actually, more than anything else, to be honest. We used to have one [NP], but we just can't afford it anymore so the idea with having partners is that they all sort of carry the can more and work more for less really, that's the bottom line at the moment, to be honest.

Practice manager 8–2

Those who commented that there was a place for replacing doctors with PAs also commented that there were problems to be overcome. Chief among these was the lack of regulation for PAs combined with the consequent lack of authority to prescribe (as described in the exemplar above). A second issue was the lack of a 'supply' or 'pool' of UK PAs to recruit from, combined with reported problems in attracting US PAs (including visas and higher salaries in the USA). The participants were not convinced that NPs would be a viable group to employ in general practice, in terms of both shortage of supply and their training, as illustrated in this exemplar:

The last time we advertised for a nurse practitioner, it took us about four or five months to recruit. It took ages to recruit because a lot of people will call themselves nurse practitioners, but when you actually look into their qualifications and skills they haven't got what you need in practice . . . Here, they have to make their own decision and that makes it a different ball game.

Practice manager 7–1

Chapter summary

This chapter has considered the deployment and role of PAs and their relationships within the practices. It then considered the comparative staff resources and the factors that influence the decisions by GPs in staffing their practices. Differences of staffing configurations between PA- and non-PA-employing practices appear to reflect the divided opinions among GPs, primarily, as to the place, viability and/or cost consequences of PAs or other mid-level practitioners in the general practice team.

Chapter 5 Case studies: evidence from the consultation records and linked patient surveys

Patient consultation records were collected for all patients attending a same-day appointment (the index event) in the allocated study periods in each of the participating general practices (see *Chapter 2, Consultation record review and linked patient survey*). These records were analysed to describe and compare PA and GP activity in the following ways: the work activity of PAs and GPs, the consultation process outcomes and the primary study outcome of reconsultation for the same problem within 14 days of the index event. A subset of these patients received a patient satisfaction survey, any responses to which could be linked to the patient's consultation records and, therefore, to the study outcome. Cost-effectiveness analyses have also been applied using the process, outcome and satisfaction results.

This chapter addresses each of these components in turn: the consultation records overall (sample numbers, demographics and health characteristics, consultation process outcomes and rate of reconsultation); the patient satisfaction survey (sample numbers, representativeness of the survey subsample and of respondents and satisfaction measures); and analysis of cost-effectiveness.

Consultation records

The consultation records overall are described in terms of the sample numbers, demographics and health characteristics, consultation process outcomes and rate of reconsultation.

Consultation records sample numbers

The sample initially identified for inclusion in the study consisted of 2260 patients, reduced to 2086 after exclusions, for analysis. *Figure 3* presents a flow chart of the inclusion and exclusion of the patient consultations forming the study sample.

In total, 932 consultations with PAs and 1154 with GPs were included for analysis. The number of patient consultations per practice ranged from 90 to 255 among the PA practices and from 136 to 304 among the GP practices.

These differences reflect the amount of time the practice could commit to the study, the proportion of patients seen who were under the age of 16 years and the proportion of eligible patients to whom a survey was offered.

Work activity of physician assistants and general practitioners in the consultation record sample

The work activity of PAs and GPs in the sample for the index events is described in this section through the demography of the consulting patients and a characterisation of the health problems of the sample.

The demography of the consulting patients

The sample is described in terms of the patients' age, sex, ethnicity and IMD,⁹⁴ constructed from the domains of income deprivation, employment deprivation, health deprivation and disability, education, skills and training, barriers to housing and services and the living environment of their home postcode.

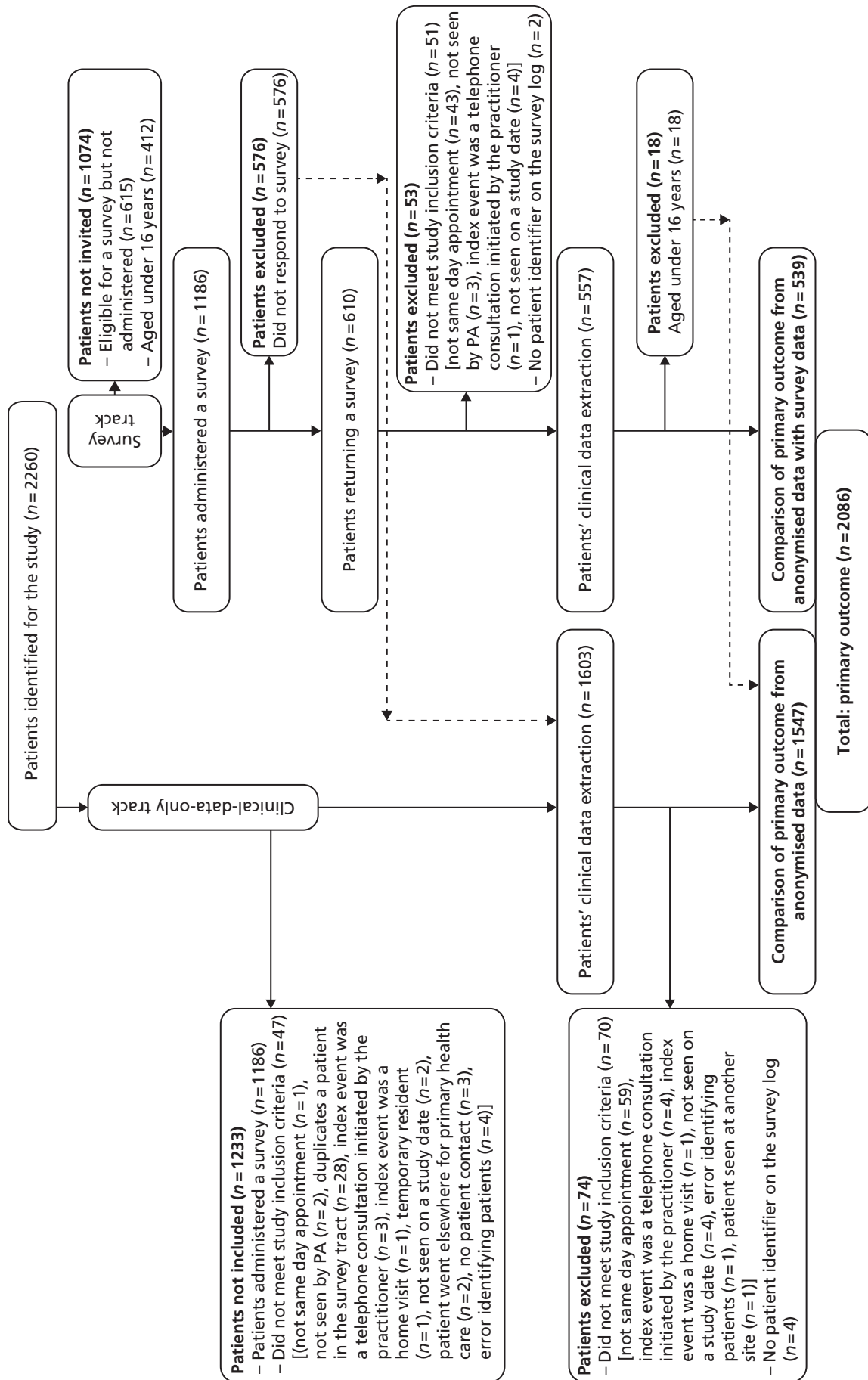


FIGURE 3 Flow chart of inclusion and exclusion to the consultation records and patient survey.

The patients consulting both PAs and GPs show a wide range and a fair spread across the age range and in IMD (Table 14). PAs see significantly younger patients than the GPs in this sample [$t = -7.971$; 95% CI -10.567 to -6.394 ; degrees of freedom (df) 2081; $p < 0.001$] but see patients with higher deprivation ($t = 9.496$; 95% CI 4.902 to 7.454; df 2075; $p < 0.001$).

Female patients are over-represented in the whole sample but no difference is seen in the pattern of male and female patients consulting PAs or GPs (Table 15) (Fisher's exact test 0.823).

The ethnicity of patients is spread across the census categories, although the majority of the sample are classified as white British (Table 16). A large minority of the patients in the sample had no ethnicity recorded by their practice. Comparison of those in the white British ethnicity category with any other ethnicity groups (where this is known) suggests that PAs see slightly more patients in the white British category than do GPs, although this does not reach statistical significance (Fisher's exact test 0.049).

TABLE 14 Age and IMD of the consultation record sample

Descriptive statistics	Age at index event			IMD		
	All	PA consultation	GP consultation	All	PA consultation	GP consultation
<i>n</i>	2083	929	1154	2077	929	1148
Missing	3	3	0	9	3	6
Mean	39.15	34.35	42.93	18.57	21.99	15.81
SD	24.50	23.20	24.87	15.06	16.61	13.04
Minimum	0	0	0	1.04	2.04	1.04
Maximum	97	91	97	64.68	64.68	60.61
Percentiles						
25	19	15	23	7.31	8.19	5.62
50	40	35	44	12.39	15.23	10.16
75	58	51	64	29.50	35.87	24.53

TABLE 15 Sex of the consultation record sample

Sex	All, <i>n</i> (%)	PA consultation, <i>n</i> (%)	GP consultation, <i>n</i> (%)
Female	1234 (59.2)	548 (58.8)	686 (59.4)
Male	850 (40.7)	382 (41.0)	468 (40.6)
Total	2084 (99.9)	930 (99.8)	1154 (100.0)
Missing	2 (0.1)	2 (0.2)	0 (0)
Total	2086 (100.0)	932 (100.0)	1154 (100.0)

TABLE 16 Ethnicity of the consultation record sample

Ethnicity (2011 census categories)	Consultation type		
	All, n (%)	PA, n (%)	GP, n (%)
White-British	948 (45.4)	420 (45.1)	528 (45.8)
White-Irish	22 (1.1)	10 (1.1)	12 (1.0)
Any other white background	101 (4.8)	44 (4.7)	57 (4.9)
Mixed-white and black Caribbean	6 (0.3)	5 (0.5)	1 (0.1)
Mixed-white and black African	17 (0.8)	11 (1.2)	6 (0.5)
Mixed-white and Asian	3 (0.1)	1 (0.1)	2 (0.2)
Any other mixed background	16 (0.8)	5 (0.5)	11 (1.0)
Asian or Asian British-Indian	14 (0.7)	8 (0.9)	6 (0.5)
Asian or Asian British-Pakistani	10 (0.5)	7 (0.8)	3 (0.3)
Asian or Asian British-Bangladeshi	3 (0.1)	3 (0.3)	0 (0)
Any other Asian background	57 (2.7)	15 (1.6)	42 (3.6)
Black or black British-Caribbean	50 (2.4)	25 (2.7)	25 (2.2)
Black or black British-African	95 (4.6)	52 (5.6)	43 (3.7)
Any other black background	10 (0.5)	4 (0.4)	6 (0.5)
Chinese or other ethnic group-Chinese	5 (0.2)	3 (0.3)	2 (0.2)
Any other ethnic group	27 (1.3)	25 (2.7)	2 (0.2)
Subtotal	1384 (66.3)	638 (68.5)	746 (64.6)
Missing	702 (33.7)	294 (31.5)	408 (35.4)
Total	2086 (100.0)	932 (100.0)	1154 (100.0)

Characterisation of the health problems of the consultation record sample

The sample's health problems are characterised through the number of problems the patient presented with at the index event, the patient being registered on one or more QOF⁹³ disease registers, the number of repeat prescriptions issued to the patient in the year preceding the index event, the number of attendances at the general practice in the 3 months preceding the index event, and a classification of the severity and acuity of the presenting patient as a whole through a combination of their presenting problems (building on de Jong *et al.*⁹⁶) and their presence on QOF registers. This is referred to as the 'PA study condition classification'.

The number of problems the patient presented with and which were recorded in the index event ranged from one to eight in both PA and GP patient consultations, though 73.9% of the sample presented with just one problem and another 17.9% with two problems. The remainder of the patients, in steadily diminishing numbers (each with less than 5% of the sample), had from three to eight different problems recorded in the index consultation (*Table 17*). No difference is observed between the PA and GP consultations.

Patients in the sample presented with being on up to seven QOF registers, though 60.8% were on no registers, another 20.5% were registered on just one, and the remainder, in much smaller numbers (each with less than 10% of the sample), were on between two and seven QOF registers (see *Table 17*).

TABLE 17 Number of problems patient presents with, number of QOF registers, number of repeat prescriptions and number of previous visits to the practice

Descriptive statistics	Number of problems patient presented with at the index event			Number of QOF registers the patients were recorded on			Number of repeat prescriptions recorded in year preceding the index event			Number of visits to practice in the 3 months before the index consultation		
	All	PA	GP	All	PA	GP	All	PA	GP	All	PA	GP
<i>n</i>	2086	932	1154	2084	932	1152	2085	931	1154	2085	931	1154
Missing	0	0	0	2	0	2	1	1	0	1	1	0
Mean	1.39	1.40	1.38	0.73	0.55	0.87	2.24	1.81	2.60	2.44	2.12	2.70
SD	0.81	0.85	0.78	1.16	0.99	1.26	3.39	3.02	3.63	2.93	2.83	2.99
Minimum	1	1	1	0	0	0	0	0	0	0	0	0
Maximum	8	8	8	7	6	7	27	17	27	30	30	25
Percentiles												
25	1	1	1	0	0	0	0	0	0	0	0	0
50	1	1	1	0	0	0	1	0	1	2	1	2
75	2	2	2	1	1	1	2	2	3	3	2.4	3

The majority of the patients in the sample had between zero (27.1%) and three (11.2%) visits to the practice in the previous 3 months (see *Table 17*). The remaining upper quartile of patients was spread, in steadily decreasing numbers, between 4 and 30 previous visits to the practice.

The number of repeat prescriptions patients were recorded as having been prescribed in the year preceding the index event ranged from none for 45.9% of the sample, one for 14.2% and two for 10.0% up to 26 and 27 repeat prescriptions for one person each in the sample (see *Table 17*).

Descriptively, GPs appear to be consulted by patients whose average number of QOF registers is higher, who have attended the practice more often in the 3 months preceding the index event and who have had a higher number of repeat prescriptions in the year preceding the index event than those patients consulting PAs.

The 'PA study condition classification' sought to address severity, acuity (medical immediacy) and complexity of the presenting complaint(s) in the context of other health characteristic information about the patient, and placed some patients in each classification of acute, chronic, minor/symptoms, prevention and processes for both PAs and GPs. One thousand, one hundred and forty-seven Read code descriptors existed for the presenting problems of the 2086 patients at their index events. Nineteen per cent ($n = 213$) of these were listed by de Jong *et al.*⁹⁶ in their classification of acute or minor problems. The largest grouping was the minor/symptoms category (*Table 18*). Significant differences were found between patients consulting PAs and GPs, with PAs tending to see more patients with problems classified as 'minor/symptoms' than GPs, while the GPs saw more patients classified as 'chronic' or 'acute' ($\chi^2 = 34.51$; $df 4$; $p < 0.001$).

The 'PA study condition classification' appears to be correlated with patient age. The patients classified as having a 'chronic', 'acute' or 'process' presentation have a higher mean age than those classified as having a 'minor/symptoms' or 'prevention' presentation (*Table 19*).

These findings suggested that all analyses of process and outcome would benefit from statistical adjustment for the 'PA study condition classification' and for the patient's age as a baseline.

Consultation process outcomes

The process outcomes within the consultation have been measured as follows: the number of procedures carried out in the consultation; number of investigations or tests carried out or ordered; number of prescriptions from the index event; number of referrals made to other services; general advice given; advice on the management of medicines; advice on the use of over the counter medicines; and the issue of Fitness to Work certificates.

TABLE 18 Physician assistant study condition classification

Consultation type	PA study condition classification					
	Acute	Chronic	Minor/symptoms	Prevention	Process	All
PA, n (%)	34 (3.6)	305 (32.7)	586 (62.9)	1 (0.1)	6 (0.6)	932 (100.0)
GP, n (%)	61 (5.3)	504 (43.7)	579 (50.20)	3 (0.3)	7 (0.6)	1154 (100.0)
All, n (%)	95 (4.6)	809 (38.8)	1165 (55.8)	4 (0.2)	13 (0.6)	2086 (100.0)

TABLE 19 Patient age (years) by 'PA study condition classification'

Descriptive statistics	Age at index event				
	Acute	Chronic	Minor/symptoms	Prevention	Process
<i>n</i>	95	809	1162	4	13
Missing	0	0	3	0	0
Mean	47.42	54.05	28.13	21.25	41.31
SD	20.272	20.087	21.804	10.372	17.918
Minimum	4	2	0	6	1
Maximum	86	95	97	29	67
Percentiles					
25	32	40	7	10.5	31
50	44	56	26	25	44
75	67	70	44	28.25	56.5

Numbers of patient consultations recording process outcomes

The number of patient consultations with each these process measures recorded is shown in *Table 20*.

The data show that:

- Very few procedures were carried out at the index consultation by either PAs or GPs (mean 0.1, median 0 for PAs; mean 0.1, median 0 for GPs). The types of procedure reported in the data are described in *Table 21*.
- Investigations and tests are much more common than procedures for both PAs and GPs, although the largest single group remains those patients for whom no investigation or test was recorded (mean 0.36, median 0 for PAs; mean 0.34, median 0 for GPs). The types of investigation or test reported in the data are described in *Table 22*.
- The number of prescriptions from the index event was most commonly none or one for both groups (mean 0.89, median 1.00 for PAs; mean 0.78, median 1.00 for GPs).
- For referrals, a large majority of patients had no onward referral made at the index event (mean 0.9, median 0 for PAs; mean 0.11, median 0 for GPs) and the commonest type of referral was to secondary medical care. The types of referral reported in the data are described in *Table 23*.
- General advice is the most commonly recorded activity of the processes measured in this study, being reported for approximately half of the patient consultations, followed by advice on medication management and the use of over-the-counter medicines in a large minority (see *Table 20*).

Comparison of physician assistant and general practitioner consultations in recording process outcomes

The above descriptive accounts of the processes recorded in the consultations give some indication of where there may be similarity or difference between the actions of PAs and GPs.

Unadjusted analyses suggest no difference in the number of procedures carried out, the number of investigations or tests ordered or undertaken, or the issuing of Fitness to Work certificates, but suggest that patients consulting a PA are more likely to receive a prescription for medicine; PAs are more likely to make a referral to another service; and PAs are more likely to record giving general advice, advice on medication management and advice about over-the-counter medications (*Table 24*).

Once adjusted for covariates of relevance to each of the process outcome measures (detailed in *Table 24* footnotes) and for clustering in the data at practice level, the unadjusted differences in the number of prescriptions, number of referrals and the giving of advice about over-the-counter medications diminish

TABLE 20 Presence of process outcome measures in the patient consultations

Consultation process measure	Consultation type		
	PA, n (%)	GP, n (%)	All, n (%)
Number of diagnostic tests ordered at index consultation			
0	686 (73.6)	863 (74.8)	1549 (74.3)
1	174 (18.7)	210 (18.2)	384 (18.4)
2	59 (6.3)	64 (5.6)	123 (5.9)
3	13 (1.4)	11 (1.0)	24 (1.2)
4	0 (0)	5 (0.4)	5 (0.2)
Number of procedures carried out during the index consultation			
0	924 (99.1)	1140 (98.9)	2064 (99)
1	8 (0.9)	13 (1.1)	21 (1.0)
Number of prescriptions from index event			
0	349 (37.5)	513 (44.5)	862 (41.3)
1	396 (42.5)	464 (40.2)	860 (41.2)
2	139 (14.9)	121 (10.5)	260 (12.5)
3	35 (3.8)	36 (3.1)	71 (3.4)
4	10 (1.1)	15 (1.3)	25 (1.2)
5	2 (0.2)	5 (0.4)	7 (0.3)
Number of referrals made from index consultation			
0	849 (91.1)	1023 (88.7)	1872 (89.8)
1	78 (8.4)	129 (11.2)	207 (9.9)
2	5 (0.5)	1 (0.1)	6 (0.3)
General advice given at the index consultation			
Yes	479 (51.4)	264 (22.9)	743 (35.6)
No	453 (48.6)	889 (77.1)	1342 (64.4)
Advice on medication management given at the index consultation			
Yes	159 (17.1)	145 (12.6)	304 (14.6)
No	773 (82.9)	1008 (87.4)	1781 (85.4)
Advice given about over-the-counter medications at the index consultation			
Yes	191 (20.5)	109 (9.5)	300 (14.4)
No	741 (79.5)	1044 (90.5)	1785 (85.6)
Fitness to Work certificate issued at index consultation			
Yes	29 (3.1)	45 (3.9)	74 (3.6)
No	902 (96.9)	1108 (96.1)	2010 (96.4)

TABLE 21 Types of procedures carried out by PAs and GPs at the index event

Procedure conducted at index consultation	Consultation type		
	PA, n (%)	GP, n (%)	All, n (%)
No procedure	924 (99.1)	1140 (98.9)	2064 (99.0)
Injection/vaccination	3 (0.3)	0 (0)	3 (0.1)
Wound care	2 (0.2)	5 (0.4)	7 (0.3)
Removal of sutures	0 (0)	1 (0.1)	1 (0)
Cryotherapy	0 (0)	1 (0.1)	1 (0)
Electrocautery	0 (0)	1 (0.1)	1 (0)
Therapeutic injections	0 (0)	1 (0.1)	1 (0)
Ear irrigation (syringe/clean)	2 (0.2)	1 (0.1)	3 (0.1)
Nebuliser	1 (0.1)	3 (0.3)	4 (0.2)
Total	932 (100.0)	1153 (100.0)	2085 (100.0)

TABLE 22 Type of investigations or tests ordered or undertaken at the index event

Investigation or test ^a	Consultation type		
	PA (n)	GP (n)	All (n)
No diagnostic test	686	857	1543
Blood test ordered	68	117	185
Blood test taken	10	13	23
Urine test – dipstick	61	33	94
Urine test – sent to lab	42	32	74
Cervical smear/LBC	2	2	4
ECG	16	14	30
24-hour ECG	1	5	6
Echocardiogram	0	4	4
<i>Helicobacter pylori</i> test	1	4	5
Spirometry/peak flow	18	23	41
Stool sample	14	7	21
Swab	28	20	48
Ultrasound	9	25	34
Radiography	5	8	13
Screening tool or questionnaire	41	62	103
CT scan	0	4	4
MRI	1	2	3
Pregnancy test	3	2	5
Nail, hair or skin sample	4	0	4
Other test	0	5	5
Total	1010	1239	2249

CT, computed tomography; ECG, electrocardiogram; LBC, liquid-based cytology; MRI, magnetic resonance imaging.

^a Patients can have more than one diagnostic test; the percentage of the sample with this test is, therefore, not presented.

TABLE 23 Type of referral made at the index event

Referral ^a	Consultation type		
	PA (n)	GP (n)	All (n)
No referral	849	1023	1872
Secondary medical care or treatment	38	69	107
Allied health professionals and dental	10	28	38
Health promotion/public health services	0	2	2
Psychological therapies	5	7	12
GP within the same practice	23	4	27
For a procedure within the same practice	11	15	26
Community nursing services	0	1	1
Other	1	2	3
GP with special interest	0	3	3
Total	937	1154	2091

a Patients can have more than one diagnostic test; the percentage of the sample with this test is, therefore, not presented.

TABLE 24 Unadjusted and adjusted analyses for difference between PA and GP patient consultations on all process outcome measures

Consultation process measure	Unadjusted		Adjusted		
	χ^2	p-value	Rate ratio	95% CI	p-value
Number of procedures carried out during the index consultation ^{a,b}	0.37	0.66	0.85	0.34 to 2.15	0.734
Number of diagnostic tests ordered at index consultation ^c	5.61	0.23	1.08	0.89 to 1.30	0.439
Number of prescriptions from index event ^d	16.46	0.006	1.16	0.87 to 1.53	0.309
Number of referrals made from index consultation ^{b,e}	8.07	0.018	0.95	0.63 to 1.43	0.797
Consultation process measure	χ^2	p-value	OR	95% CI	p-value
General advice given at the index consultation ^f	182.49	<0.001	3.30	1.689 to 6.4532	<0.001
Advice on medication management given at the index consultation ^f	8.32	0.004	1.72	1.0831 to 2.73	0.022
Advice given about over-the-counter medications at the index consultation ^{f,b}	50.99	<0.001	1.74	0.62 to 4.88	0.295
Fitness to Work certificate issued at index consultation ^g	0.93	0.34	–	–	–

Adjustment made for clustering at practice level (all analyses) and:

- a Practice_type, PA study condition classification.
- b Analyses also include cases only with a 'PA study condition classification' of acute, chronic and minor/symptoms, excluding the cases classified as prevention or process whose small numbers caused the model to fail to converge.
- c Practice_type, PA study condition classification, age, number of problems, number of QOF, sex, IMD.
- d Practice_type, PA study condition classification, age, number of problems.
- e Practice_type, PA study condition classification, age.
- f Practice_type, PA study condition classification, age, number of times at practice in previous 3 months, number of problems.
- g Adjusted statistical tests for difference in the issue of fitness to work certificates were not attempted owing to the very small numbers of patient consultations involved.

and are no longer statistically significant (see *Table 24*). Key in the adjustment of difference is the 'PA study condition classification' of the case as acute, chronic, minor/symptom, prevention or process. After statistical adjustment, PAs remain more likely to document giving general and medication management advice to patients (see *Table 24*).

Consultation process: length of consultation and advice taking

Length of consultation

The length of consultation recorded by the 'patient enter' and 'patient leave' functions of the practices' electronic databases were available for 1812 (86.9%) consultations. Missing data were predominantly from three practices and for specific reasons: in one GP practice the surgery session management data (i.e. functional data other than the patient's clinical record) had already been removed from the database before study data collection took place; in one GP practice the 'patient enter' time for telephone consultations was the time the patient telephoned to request an appointment, not the time they spoke with the GP; and in one PA practice the 'patient enter' time was infrequently used.

For the 1812 consultations with a time available, PA consultations were seen to have a significantly longer mean consultation time, 5.5 minutes in excess of the GP consultations (95% CI 4.8 to 6.2 minutes; $p < 0.001$ by *t*-test), in unadjusted comparisons (*Table 25*).

Differences are seen by practice (*Figure 4*), although the lack of obvious pattern by newly qualified or experienced PAs, missing data about the length of experience in primary care of all the GPs and the variety

TABLE 25 Length of consultation in minutes

Descriptive statistics	Consultation type	
	PA consultations	GP consultations
<i>n</i>	896	916
Missing	36	238
Mean	16.79	11.28
Percentiles		
25	11.00	7.00
50	15.00	10.00
75	21.00	14.00

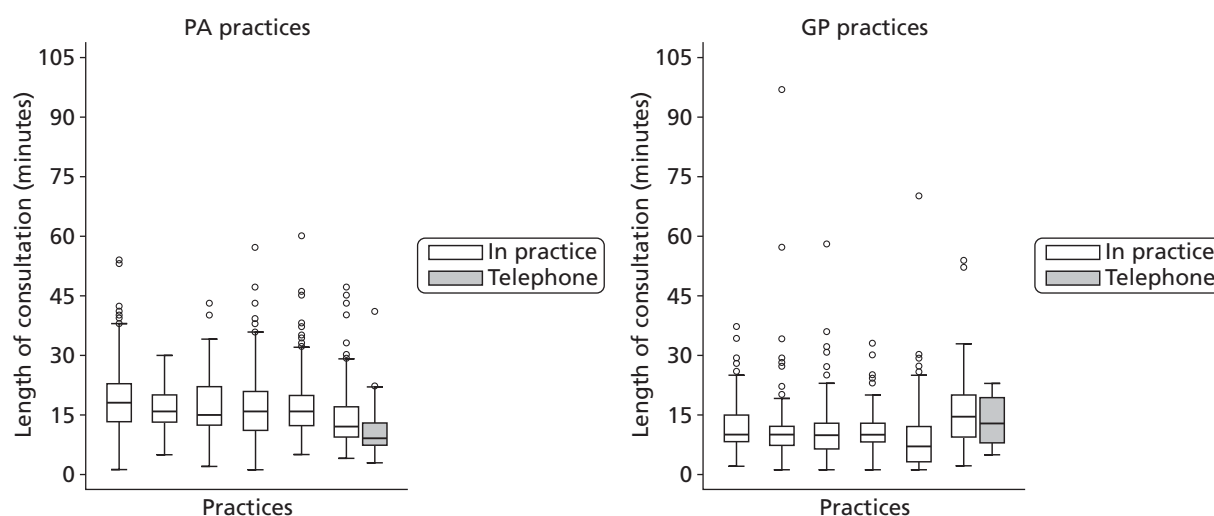


FIGURE 4 Box plot of length of consultation by practice.

of practice organisation of appointment times and type of work make adjustment for potentially confounding factors untenable.

In practice 11 (the furthest right in the box plot for PA practices), the mean length of consultation is obviously shorter than that in the remainder of the PA practices. Here, the PA undertakes both telephone and in-person consultations. Telephone consultations have a mean of 10.4 minutes (SD 8.9 minutes; range 3–41 minutes) and in-person consultations have a mean of 14.5 minutes (SD 5.7 minutes; range 4–47 minutes), being closer to (but still shorter than) the remaining PA practices. Similarly, in practice 8 (the furthest right in the box plot for GP practices), telephone consultations are also routinely carried out for same-day appointments, and the mean length of consultation for these is lower than that for in-practice consultations (although length of consultation data were available for only three such cases).

After adjustment for the 'PA study condition classification', age, age squared and the number of problems, the mean difference remained statistically significantly different for practice type (PA or GP) and for the interaction of practice type with age. This difference in length of consultation between PAs and GPs, however, varies by patient age, increasing with age before tailing off at the older ages. The marginal effects at different ages are shown in *Table 26*.

The average participant in this study has an age of 38.7 years, where there is a marginal (averaged over all covariates) effect of 5.8 minutes (95% CI –3.54 minutes to –8.06 minutes). All of these are significant differences.

Advice taking

Physician assistants recorded that advice was taken from a supervising doctor in 53 (35.3%) of their index consultations, whether this was at the time of the consultation or later routine quality assurance by the doctor. This was highly significantly different from the GPs, where there was just one case of taking advice documented ($\chi^2 = 68.581$, $df = 1$, $p < 0.001$).

Consultation outcome: reconsultation within 2 weeks

The study's primary outcome is considered in terms of the numbers of patients reconsulting and the rate of reconsultation, a comparison of rates between PAs and GPs, the type of professional seen at the reconsultation and the planning of reconsultations.

Rate of reconsultation for the same problem

Reconsultation within 2 weeks of the index event was found following 664 (31.8%) of the 2086 index consultations. For 22.6% ($n = 150$) of those reconsulting, the return visit was for a different/unrelated problem and these cases are not further analysed. For the remaining 514 consultations, the reconsultation was judged, from Read codes⁹⁵ and free-text consultation record data, to have been for the same (85.0%, $n = 437$) or a closely related (linked) (14.8%, $n = 76$) problem, while one case had insufficient data to allow

TABLE 26 Marginal effects of length (minutes) of consultation at different patient ages

Patient age (years)	Difference in length (minutes) of consultation between GPs and PAs (marginal effects)
20	5.33
30	5.58
40	5.84
50	6.09
60	6.34
70	6.59
80	6.85

a decision to be made. Those who did reconsult did so between 1 and 20 times in the 2 weeks following the index event. In the majority of cases at least one of the patient's reconsultations for the same or a linked problem was at the practice ($n = 417$, 81.1%), the remaining 97 patients reconsulting only at local urgent care facilities.

The following sections describe the unadjusted and adjusted rates of reconsultation for PAs and GPs for the data split into three groupings (not mutually exclusive): reconsultation anywhere for a condition classified as the same or linked to the index consultation, reconsultation anywhere for a condition classified only as the same as the index consultation, and reconsultation only at the practice for a condition classified as the same as the index consultation. The latter is the primary outcome measure for the study (see *Chapter 2*).

The rate of reconsultation at the practice for the same problem is 0.22 (1 in every 4.5 patients) for those consulting a PA and 0.20 (1 in every 5 patients) for those consulting a GP per fortnight (*Table 27*).

Comparisons of the rates of reconsultation between PAs and GPs

Comparison of the mean number of reconsultations for the same or linked, same or same at practice problems for PA or GP index consultations shows equivalence against the study's primary outcome for PAs and GPs, with no difference found in the rates of reconsultation for the two groups, unadjusted or adjusted for potential confounding factors (*Table 28*).

Type of professional seeing patients at their first or only reconsultation

For those patients who did reconsult with the same problem (at the practice or an urgent care facility), the largest group consulted a GP at their only or first reconsultation, although PAs are also found to see 35% of their reconsulting patients again themselves (*Table 29*).

Planning of reconsultations

Some of the PAs and GPs documented that the reconsultation was planned, that is to say it was intended that the patient would return in a specified time period. This documented planning differed between PAs and GPs, with PAs documenting planning more follow-up in the practice than GPs, with *Table 30* detailing

TABLE 27 Rates of reconsultation

Index consultation type	Rate of reconsultations for a linked or the same condition per fortnight	Rate of reconsultations for a linked or the same condition at the practice per fortnight	Rate of reconsultations for exactly the same condition per fortnight	Rate of reconsultations for exactly the same condition at the practice per fortnight
PA				
Mean	0.373	0.277	0.317	0.236
Percentiles				
25	0	0	0	0
50	0	0	0	0
75	0	0	0	0
GP				
Mean	0.354	0.244	0.286	0.198
Percentiles				
25	0	0	0	0
50	0	0	0	0
75	0	0	0	0

TABLE 28 Unadjusted and adjusted analyses for difference between PA and GP rates of reconsultation

Consultation process measure	Adjusted ^a		
	Rate ratio	95% CI	p-value
Reconsultation for a condition the same or linked to the index consultation at the practice or an urgent care facility	1.240	0.861 to 1.789	0.247
Reconsultation for a condition the same or linked to the index consultation at the practice only	1.328	0.926 to 3.968	0.123
Reconsultation for a condition the same as the index consultation at the practice or an urgent care facility	1.314	0.843 to 2.049	0.228
Reconsultation for a condition the same as the index consultation at the practice only	1.385	0.928 to 2.066	0.111

a Adjustment made for clustering at practice level, PA study condition classification, age, number of times at practice in previous 3 months, and including cases only with a 'PA study condition classification' of acute, chronic and minor/symptoms, excluding the cases classified as prevention or process whose small numbers caused the model to fail to converge.

TABLE 29 Practitioner seen by the patient at their only/first reconsultation for the same problem

Reconsultation	Index consultation	
	PA, n (%)	GP, n (%)
GP	96 (49.5)	210 (92.1)
PA	67 (34.5)	0 (0)
Nurse	9 (4.6)	8 (3.5)
NP	6 (3.1)	3 (1.3)
ED doctor	2 (1.0)	7 (3.1)
Foundation doctor	5 (2.6)	0 (0)
Practice nurse	4 (2.1)	0 (0)
GP trainee	3 (1.5)	0 (0)
GP locum	1 (0.5)	0 (0)
Midwife	1 (0.5)	0 (0)

ED, emergency department.

TABLE 30 Planning of the reconsultation at the index event

Consultation type	Reconsultation for the same condition at the practice or urgent care facility		Reconsultation for the same condition at the practice only	
	Unplanned	Planned	Unplanned	Planned
PA, n (%)	85 (57.0)	64 (43.0)	83 (56.8)	63 (43.2)
GP, n (%)	119 (70.0)	51 (30.0)	102 (65.4)	54 (34.6)
Total, n (%)	204 (63.9)	115 (36.1)	185 (61.3)	117 (38.7)

this for reconsultations for the same problem at the practice or urgent care facility ($\chi^2 = 5.779$, df 1, $p = 0.019$) and for reconsultations for the same problem at the practice only ($\chi^2 = 2.315$, df 1, $p = 0.080$).

When comparison of the rate of reconsultation for the same problem at the practice or urgent care facility between PAs and GPs is further adjusted for whether or not the reconsultation was documented as planned, the previous finding of no difference in reconsultation rate remains true (rate ratio 1.183; 95% CI 0.914 to 1.531; $p = 0.202$).

Patient survey

Evidence from the patients' perspectives was collected from patients whose same-day appointment consultation was entered into the case studies, as described in *Consultation records*, above. All adult patients recruited were able to offer their perspective through the completion of a survey.

In this section, we describe first of all the sample, then the response rate, and then turn to the responses.

The patient survey sample

The sample identified for inclusion in this element of the study consisted of 1020 adult (aged 16 years or over) patients ($n = 490$ PA consultations, $n = 590$ GP consultations). *Figure 3* (see *Chapter 4*) details the identification of cases for inclusion/exclusion in the study, including the patient survey route of entry into the study. The survey sample differed from the overall sample of patients' consultation records primarily by the exclusion of children aged under 16 years. *Table 31* presents descriptive data of the survey sample against the overall consultation record sample for age, *Table 32* for IMD, *Table 33* for sex and *Table 34* for ethnicity.

TABLE 31 Age (years) of the consultation record sample, survey sample and survey respondents

Descriptive statistics	Age at index event								
	Survey sample			Consultation record sample			Respondents		
	All	PA	GP	All	PA	GP	All	PA	GP
<i>n</i>	1017	427	590	2083	929	1154	538	219	319
Missing	3	3	0	3	3	0	1	1	0
Mean	48.86	45.25	51.47	39.15	34.35	42.93	52.99	48.78	55.89
SD	18.311	16.808	18.914	24.50	23.20	24.87	17.956	16.945	18.082
Minimum	16	16	16	0	0	0	16	18	16
Maximum	97	90	97	97	91	97	94	90	94
Percentiles									
25	35	32	36.75	19	15	23	39.00	36.00	42.00
50	47	44	51.00	40	35	44	53.00	48.00	58.00
75	64	57	68.00	58	51	64	67.00	63.00	70.00

TABLE 32 Index of Multiple Deprivation of the consultation record sample, survey sample and survey respondents

Descriptive statistics	IMD								
	Survey sample			Consultation record sample			Respondents		
	All	PA	GP	All	PA	GP	All	PA	GP
<i>n</i>	1015	427	588	2077	929	1148	537	219	318
Missing	5	3	2	9	3	6	2	1	1
Mean	20.123	21.666	19.002	18.57	21.99	15.84	16.28	17.582	15.377
SD	15.044	15.787	14.392	15.06	16.61	13.04	13.44	14.033	12.96
Minimum	1.04	2.04	1.04	1.04	2.04	1.04	1.04	2.04	1.04
Maximum	64.68	64.68	60.61	34.68	64.68	60.61	56.55	56.55	56.55
Percentiles									
25	8.18	8.63	7.47	7.31	8.19	5.62	7.10	8.19	5.55
50	13.82	15.23	13.47	12.39	15.23	10.16	11.45	12.32	10.16
75	31.05	34.97	29.50	29.50	35.87	24.53	21.64	20.46	22.10

Response rate and respondents

Of the 1020 eligible patients given a survey, 52.8% ($n = 539$) responded with a completed survey, with 51.2% ($n = 220$) of those surveyed and consulting a PA responding and 54.1% ($n = 319$) of those surveyed and consulting a GP responding.

Tables 31 to 34 present descriptive data of the survey respondents against the survey sample for age, IMD, sex and ethnicity. These data suggest that survey recipients are older than the overall sample (explained by the exclusion of those aged under 16 from the sample) and that respondents are an older group still; that the IMD of survey recipients is higher than that of the overall sample but that of respondents is lower (indicating less deprivation among respondents); that sex is consistent across the consultation, survey and respondent samples; and that ethnicity appears to show the biggest difference between groups with survey recipients and survey respondents showing an increasing proportion of participants classifying their ethnicity as white British (although the reduction in missing data for these groups is dramatic and may have influenced the proportions).

The survey responses

The survey measured the patients' experiences against a number of measures as follows: how good the PA or GP was at giving enough time, asking about symptoms, explaining tests and treatments, involving the patient in decisions about their care, treating the patient with care and concern, and taking problems seriously; confidence and trust in the PA or GP seen; satisfaction with the care received from the PA or GP at the index consultation; satisfaction with the general care at the general practice; willingness to recommend the general practice; and willingness to see a PA rather than a GP.

TABLE 33 Sex of the consultation record sample, survey sample and survey respondents

Sex	Consultation record sample			Survey sample			Respondents		
	All, n (%)	PA, n (%)	GP, n (%)	All, n (%)	PA, n (%)	GP, n (%)	All, n (%)	PA, n (%)	GP, n (%)
Female	1234 (59.2)	548 (58.8)	686 (59.4)	621 (60.9)	268 (62.3)	353 (59.8)	322 (59.7)	128 (58.2)	194 (60.8)
Male	850 (40.7)	382 (41.0)	468 (40.6)	397 (38.9)	160 (37.2)	237 (40.2)	217 (40.3)	92 (41.8)	125 (39.2)
Total	2084 (99.9)	930 (99.8)	1154 (100.0)	1018 (99.8)	428 (99.5)	590 (100.0)	539 (0)	220 (100.0)	319 (100.0)
Missing	2 (0.1)	2 (0.2)	0 (0)	2 (0.2)	2 (0.5)	0 (0)	0 (0)	0 (0)	0 (0)
Total	2086 (100.0)	932 (100.0)	1154 (100.0)	1020 (100.0)	430 (100.0)	590 (100.0)	539 (100.0)	220 (100.0)	319 (100.0)

TABLE 34 Ethnicity of the consultation record sample, survey sample and survey respondents

Ethnicity	Consultation record sample			Survey sample			Respondents		
	All, n (%)	PA, n (%)	GP, n (%)	All, n (%)	PA, n (%)	GP, n (%)	All, n (%)	PA, n (%)	GP, n (%)
White British	948 (45.4)	420 (45.1)	528 (45.8)	605 (59.3)	279 (64.9)	326 (55.3)	432 (80.1)	181 (82.3)	251 (78.7)
Any other ethnicity	436 (20.9)	218 (23.4)	218 (18.8)	243 (23.8)	89 (20.7)	154 (26.1)	102 (18.9)	35 (15.9)	67 (21.0)
Missing	702 (33.7)	294 (31.5)	408 (35.4)	172 (16.9)	62 (14.4)	110 (18.6)	5 (0.9)	4 (1.8)	1 (0.3)
Total	2068 (100.0)	932 (100.0)	1154 (100.0)	1020 (100.0)	430 (100.0)	590 (100.0)	539 (100.0)	220 (100.0)	319 (100.0)

Table 35 describes the responses in total and by consulting with PA and GP groups and the unadjusted and adjusted comparison between PA and GP groups.

The majority of respondents were satisfied or very satisfied with their consultation with both PAs and GPs. The measures for which lower percentages of respondents reported themselves to be very satisfied were 'explaining about tests and procedures' and 'involving you in decision-making'. There was no difference between PAs and GPs.

Positive correlation, significant at $p < 0.01$, was found between general satisfaction with the index event consultation and all other measures of satisfaction collected in the survey: giving enough time, asking about symptoms, listening, explaining tests and treatments, taking problems seriously, involving the patient in decision-making, treating the patient with care and concern, confidence and trust and willingness to see a PA. The majority of these measures were also correlated.

No statistically significant correlation was found between any measures of satisfaction and the study's primary outcome, that is, the rate of reconsultation with the same problem.

Economic analysis

The mean consultation time was higher for PAs than for GPs (16.79 minutes vs. 11.23 minutes), an unadjusted difference of 5.5 minutes. This reflects the appointment times set in the study practices, which were 10 minutes for GPs and 15 minutes for PAs (20 minutes in one practice). Controlling for other covariates (set at their mean values), the difference in consultation times for the average patient (age 38.7 years) increased to 5.8 minutes (17.03 minutes vs. 11.23 minutes) minutes. This increase reflects, in part, the fact that, compared with GPs, a higher proportion of PA consultations are for minor symptoms (mean consultation time 13.5 minutes) and a lower proportion are for chronic and for acute conditions which require longer consultation times (14.35 minutes and 17.3 minutes respectively).

Although GPs see more patients per hour (three patients for every two seen by PAs), their salary and related costs are more than twice those of PAs (see *Appendix 8*), and so PA consultations are still less costly. Using national figures,¹¹⁹ GP and PA consultations cost £3.08 and £1.67 per minute (based on consultations of 11.7 minutes at £36 and 15 minutes at £25), giving consultation costs within this study (for the adjusted consultation lengths of 17.03 minutes and 11.23 minutes) of £34.36 and £28.14, respectively, a saving of £6.22.

In adjusted analyses that controlled for variations in the case mix of GPs and PAs, no significant differences between the professionals were found in rates of reconsultation, referring, prescribing, ordering investigations or undertaking procedures, and so no attempt was made to cost these activities.

Physician assistants provided significantly more general and medicines management advice than GPs, and this may have contributed to the longer mean length of PA consultations. Providing advice may be valued by patients and contribute to self-management, but this was not reflected in feedback from patients, which suggested no differences between the skills of GPs and PAs regarding explanations of tests and treatments.

Physician assistants thus appear to deliver similar outcomes from same-day consultations as GPs, at lower cost. However, the apparent cost advantage of PAs is eroded when broader factors are taken into consideration. GPs spend time on training and supervising PAs; in addition, GP consultations are interrupted for signing PA prescriptions and when PAs seek advice about patients (23 occasions in this study vs. 1 by GPs). No data were available to enable an assessment of the extent to which such factors affect comparative consultation costs.

TABLE 35 Unadjusted and adjusted analyses for difference between PA and GP patient consultations on all patient survey questions

Consultation process measure	Response option					Crude		Adjusted	
	Very good, n (%)	Good, n (%)	Neither good nor poor, n (%)	Poor, n (%)	Very poor, n (%)	Doesn't apply, n (%)	p-value	OR (95% CI)	p-value
Judgement of practitioner for									
Giving time									
PA	161 (74.5)	49 (22.7)	6 (2.8)	0 (0)	0 (0)	0 (0)	0.97	0.97 (0.48 to 1.94)	0.93
GP	232 (74.4)	68 (21.8)	8 (2.6)	3 (1.0)	0 (0)	1 (0.3)			
Asking regarding symptoms									
PA	153 (71.5)	52 (24.3)	8 (3.7)	0 (0)	1 (0.5)	0 (0)	0.39	1.19 (0.62 to 2.29)	0.60
GP	231 (74.0)	61 (19.6)	13 (4.2)	1 (0.3)	1 (0.3)	5 (1.6)			
Listening									
PA	157 (73.0)	49 (22.8)	9 (4.2)	0 (0)	0 (0)	0 (0)	0.20	1.30 (0.63 to 2.68)	0.47
GP	242 (77.3)	60 (19.2)	7 (2.2)	2 (0.6)	0 (0)	2 (0.6)			
Explaining tests, etc.									
PA	135 (63.1)	48 (22.4)	14 (6.5)	1 (0.5)	0 (0)	16 (7.5)	0.63	1.07 (0.84 to 2.08)	0.84
GP	197 (64.2)	66 (21.5)	15 (4.9)	2 (0.7)	1 (0.3)	26 (8.5)			
Taking seriously									
PA	156 (72.6)	46 (21.4)	11 (5.1)	0 (0)	1 (0.5)	1 (0.5)	0.57	1.12 (0.66 to 1.93)	0.67
GP	229 (73.4)	58 (18.6)	13 (4.2)	3 (1.0)	1 (0.3)	8 (2.6)			
Involving in decisions									
PA	120 (56.1)	53 (24.8)	12 (5.6)	4 (1.9)	0 (0)	25 (11.7)	0.53	1.10 (0.73 to 1.67)	0.65
GP	185 (59.7)	64 (20.6)	24 (7.37)	2 (0.6)	1 (0.3)	34 (11.0)			
Treating with care									
PA	156 (72.9)	48 (22.4)	10 (4.7)	0 (0)	0 (0)	0 (0)	0.67	1.09 (0.59 to 2.01)	0.79
GP	226 (72.9)	64 (20.6)	10 (3.2)	3 (1.0)	0 (0)	7 (2.3)			

continued

TABLE 35 Unadjusted and adjusted analyses for difference between PA and GP patient consultations on all patient survey questions (continued)

Consultation process measure	Response option		No, not at all, n (%)	Don't know/can't say, n (%)	Unadjusted		Adjusted		
	Yes, definitely, n (%)	Yes to some extent, n (%)			Mann-Whitney p	OR (95% CI)	Mann-Whitney p	OR (95% CI)	p-value
Confidence and trust in the PA/GP									
PA	175 (80.6)	39 (18.0)	2 (0.9)	0 (0)	0.05	1.55 (0.61 to 3.96)	0.36		
GP	271 (87.1)	36 (11.6)	3 (1.0)	0 (0)					
General satisfaction with the care									
PA	164 (75.9)	40 (18.5)	11	0	0.82	1.00 (0.42 to 2.36)	0.99		
GP	241 (76.5)	61 (19.4)	10 (3.2)	1 (0.3)					
Satisfied with seeing the PA again?									
PA	136 (62)	62 (28.3)	8 (3.7)	2 (0.9)	N/A				
GP	241 (76.5)	61 (19.4)	10 (3.2)	1 (0.3)					
Willing to see a PA instead of the GP?									
PA	136 (62)	62 (28.3)	8 (3.7)	2 (0.9)	N/A				
GP	241 (76.5)	61 (19.4)	10 (3.2)	1 (0.3)					
N/A, not applicable.									

Summary of key findings from the consultation records

The analyses of the workload activities, consultation processes and consultation outcomes of the PAs' and GPs' consultations and the subsequent economic analyses have suggested that:

- PAs and GPs in the sample attend patients with differing demographic and health characteristics, with GPs being consulted by an older patient group with a higher incidence of measures of comorbidity.
- From the clinical record of the consultation, PAs and GPs conduct many processes within the consultation similarly but PAs record that their patients receive more general and medication management advice.
- PAs' consultations are significantly longer than those conducted by GPs in the study.
- PAs take and document advice from supervising doctors in just over one-third of consultations.
- The outcomes of consultations as measured by reconsultation rates do not differ between the PAs and the GPs in the sample.
- Patient satisfaction with both PAs and GPs is high, with no difference in responses in the two groups.
- PA consultations are less costly than those of GPs, taking salary, caseload and length of consultation/ productivity into account.
- PAs appear to deliver similar outcomes from same-day consultations as GPs, at this lower cost.
- Any apparent cost advantage of PAs is eroded when the training and supervision of PAs by GPs and interruptions to GP consultations by advice-seeking PAs are considered.

Chapter 6 Case studies: evidence from the clinical review of consultation records and video observations

This chapter reports on how effective the PAs were at delivering the core business of primary care: the clinical consultation. In the previous chapter, analysis of the study's primary outcome – the rate of reconsultation for the same problem – was seen not to differ between PAs and GPs. Against this background, clinical review was carried out of the medical records of the index consultation where there was a repeat consultation for the same problem to assess the quality of medical records made at the index consultation and appropriateness in light of any subsequent attendance. Clinical review was also carried out with direct (video) observation of the consultation to assess competence at consulting. The methods for each of these were reported in *Chapter 2*. This chapter addresses each of these aspects of clinical review in turn.

Quality of consultation records and appropriateness of the index consultation

The quality of the medical records made at the index consultation and the appropriateness of any subsequent attendance are reported.

Sample numbers

Selection of cases with a reconsultation for the same or a linked problem (at the practice or any urgent care facility) identified 511 cases for review. After exclusions, 475 cases (93%) were used to explore the quality of the medical record as a surrogate for consultation quality and appropriateness (*Table 36*).

Review of reconsultations for the same condition at the practice or urgent care facility

The assessment of the quality of computerised medical record entries for the key consultation components (using Weed's SOAP classification^{101,102} as described in *Chapter 2, The clinical review of reconsultations records*), for cases with a reconsultation for the same problem ($n = 388$) at the practice or urgent care facility within 14 days, is presented in *Table 37*.

The PAs were judged to record the key consultation components more frequently in the computerised medical record, with each element reaching statistical significance for the difference. The PAs recorded appropriate index consultation records nearly 80% of the time (145 out of 183), whereas GPs made appropriate records in just under 50% of the time (99 out of 205; $p < 0.001$) (see *Table 37*).

TABLE 36 Inclusion of cases for clinical review

Clinical review process	Reconsultation for the same or a linked problem, <i>n</i> (%)
Eligible for review	511 (100)
Used in training the review raters	12 (2.3)
Missed by researchers	2 (0.4)
Review not completed (in full)	22 (4.7)
Review completed	475 (93)

This difference remained the same across all of the elements of the medical record that were observed. GPs had an excess of appropriate over inappropriate records only for investigations. The risk ratio of a PA making an appropriate record compared with a GP was 1.64 (95% CI 1.40 to 1.93; $p < 0.001$; see *Table 37* for raw data), that is to say those consulting a PA are 64% more likely to get an appropriate medical record, as judged by the reviewers.

Review of reconsultations for a linked condition at the practice or urgent care facility

The assessment of the quality of computerised medical record entries as above for cases with a reconsultation for a linked condition ($n = 75$) at the practice or urgent care facility within 14 days is presented in *Table 38*.

The same judgement of the difference between the medical record entries of PAs and GPs for a linked problem as for the same problem was made: just over 90% of PA records (90.06%, 29 out of 32) and just under 60% of GP records (58.1%, 25 out of 43) were thought appropriate. Again, PAs were much more likely to make appropriate records, in all domains. The numbers are smaller, which may reflect in fewer significant differences between professions. The risk ratio of a PA making an appropriate record for these 'linked' consultations compared with a GP was 1.56 (95% CI 1.18 to 2.06; $p < 0.001$, see *Table 38* for raw data), that is to say those consulting a PA are 56% more likely to get an appropriate medical record, as judged by the reviewers.

Review of all repeat consultations

The PAs made better records of their consultations, and the reviewers felt that they indicated safe practice. They did not feel that any of the consultation records represented unsafe practice.

TABLE 37 Reviewers' judgement of appropriateness of the documentation of the index event for reconsultation for the same problem at the practice or an urgent care facility

Consultation type	Judgement of appropriateness, n (%)																	
	Subjective information			Examination			Investigation			Prescription			Problem			Overall		
	Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate	
PA	37 (20.2)	146 (79.8)		48 (26.2)	135 (73.8)		29 (15.8)	154 (84.2)		48 (26.2)	135 (73.8)		32 (17.5)	151 (82.5)		38 (20.8)	145 (79.2)	
GP	132 (64.7)	72 (35.3)		138 (67.3)	67 (32.7)		90 (43.9)	115 (56.1)		104 (50.7)	101 (49.3)		84 (41.0)	121 (59.0)		106 (51.7)	99 (48.3)	
Total	169 (43.7)	218 (56.3)		186 (47.9)	202 (52.1)		119 (30.7)	269 (69.3)		152 (39.2)	236 (60.8)		116 (29.9)	272 (37.1)		144 (62.9)	244 (70.1)	
Unadjusted difference	$\chi^2 = 77.611$, df 1, $p < 0.001$			$\chi^2 = 65.402$, df 1, $p < 0.001$			$\chi^2 = 35.791$, df 1, $p < 0.001$			$\chi^2 = 24.361$, df 1, $p < 0.001$			$\chi^2 = 25.454$, df 1, $p < 0.001$			$\chi^2 = 39.663$, df 1, $p < 0.001$		

TABLE 38 Reviewers' judgement of appropriateness of the documentation of the index event for reconsultation for a linked problem at the practice or an urgent care facility

Consultation type	Judgement of appropriateness, n (%)																	
	Subjective information			Examination			Investigation			Prescription			Problem			Overall		
	Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate		Inappropriate	Appropriate	
PA	12 (37.5)	20 (62.5)		6 (18.8)	26 (81.3)		7 (21.9)	25 (78.1)		8 (25.0)	24 (75.0)		5 (15.6)	27 (84.4)		3 (9.4)	29 (90.6)	
GP	24 (55.8)	19 (44.2)		20 (46.5)	23 (53.5)		17 (39.5)	26 (60.5)		22 (51.2)	21 (48.8)		18 (41.9)	25 (58.1)		18 (41.9)	25 (58.1)	
Total	36 (48.0)	39 (52.0)		26 (34.7)	49 (65.3)		24 (32.0)	51 (68.0)		30 (40.0)	45 (60.0)		23 (30.7)	52 (69.3)		21 (28.0)	54 (72.0)	
Unadjusted difference	$\chi^2 = 2.465$, df 1, $p = 0.161$			$\chi^2 = 6.243$, df 1, $p = 0.015$			$\chi^2 = 2.630$, df 1, $p = 0.136$			$\chi^2 = 5.233$, df 1, $p = 0.032$			$\chi^2 = 5.939$, df 1, $p = 0.022$			$\chi^2 = 9.604$, df 1, $p = 0.002$		

Effectiveness of blinding/reviewers' judgement of who conducted the consultation

The blinding of records to remove any indication of whether the consultation was with a PA or a GP was considered to be successful. Reviewers were unable to judge whether the index event had been consulted by a PA or GP in both the review of cases for the same condition and those for a linked condition.

For cases with a reconsultation for the same problem, reviewers gave an opinion in nearly all cases (98.2%, 381 out of 388); in the remainder of the consultations the reviewers stated that they were unable to decide. Where they could decide, there was low sensitivity and specificity; they judged 57% of PA consultations reviewed for the same problem to have been those of a GP ($\kappa = 0.196$; *Table 39*).

For cases with a reconsultation for a linked condition, reviewers were similarly unable to judge whether the index event for these linked reconsultations had been carried out by a PA or GP, though they gave an opinion for all 75 cases. In the case of linked consultation, the reviewers judged 66% of PA consultations for a linked problem to have been those of a GP ($\kappa = 0.141$; *Table 40*).

TABLE 39 Judgement of whether a PA or GP had carried out the consultation for consultations with a reconsultation for the same problem

Consultation type	Reviewers' judgement whether the index consultation conducted by a PA or a GP?	
	PA, <i>n</i> (%)	GP, <i>n</i> (%)
PA	77 (43.0)	102 (57.0)
GP	48 (23.8)	154 (76.2)
Total	125 (32.8)	256 (67.2)

TABLE 40 Judgement of whether a PA or GP had carried out the consultation for consultations with a reconsultation for a linked problem

Consultation type	Reviewers' judgement whether the index consultation conducted by a PA or a GP?	
	PA, <i>n</i> (%)	GP, <i>n</i> (%)
PA	11 (34.4)	21 (65.6)
GP	9 (20.9)	34 (79.1)
Total	20 (26.7)	55 (73.3)

Overall, 58.3% (123 out of 211) of the consultations actually with a PA were thought on the basis of the records to have been with a GP. Thirty-nine per cent (57 out of 145) of the consultations that the reviewers thought were by a PA were actually by a GP. The raters were neither sensitive nor specific: diagnostic OR 2.36 (95% CI 1.58 to 3.53; Pearson chi-squared $p < 0.001$), sensitivity 42% (95% CI 35.1% to 48.3%) and specificity 77% (95% CI 71.4% to 82%).

Inter-rater reliability

Ten clinical review cases were rated by all four reviewers independently immediately following the review raters' training exercise. The assessment of inter-rater reliability using Fleiss's kappa¹⁰³ for the assessment of the quality of computerised medical record entries for the key consultation components is presented in *Table 41*.

Taken against the consideration that a kappa score of 0.0–0.2 is 'poor', of 0.21–0.4 is 'fair', of 0.41–0.6 is 'moderate', of 0.61–0.8 is 'good' and of 0.81–1.0 is 'very good',¹⁰⁴ the inter-rater reliability of the reviewers here was very good when assessing the quality of the computerised medical records, but very poor agreement on the type of practitioner (reviewers blinded to this) carrying out the consultation.

Comparison of reconsultation rates with judgements of appropriateness

The rate of reconsultation for PAs and GPs was presented in *Chapter 5* (see *Rate of reconsultation for the same problem*), indicating that there were no differences in the rate of repeat consultations within the 2 weeks following the index consultation by type of professional seen at the index consultation.

TABLE 41 Inter-rater reliability for reviewers' judgements of key consultation components

Key consultation component	κ	95% CIs
Subjective information	0.76	0.51 to 1.00
Examination	0.69	0.43 to 0.94
Investigation	0.90	0.65 to 1.00
Prescription	1.00	0.75 to 1.00
Problem	1.00	0.75 to 1.00
Appropriateness	1.00	0.75 to 1.00
PA or GP	0.12	-0.15 to 0.39

After adjustment for the judgement of appropriateness (and practice clustering), the rate of reconsultation for the same problem at the practice or urgent care facility, or at the practice only, does not suggest any statistically significant difference between the rates for PAs or GPs:

- same problem at the practice or urgent care facility: rate ratio 1.124, 95% CI 0.918 to 1.374, $p = 0.257$ (see raw data in *Table 42*)
- same problem at the practice only: rate ratio 1.217, 95% CI 0.981 to 1.506, $p = 0.074$ (see raw data in *Table 43*).

Post-analysis observations of reviewers

At the post-review workshop, the GP raters, no longer blinded, felt that they had clearly mistaken the more thorough medical records made by the PAs for those of GPs. They wondered the extent to which this might reflect training: PAs might have more emphasis on systematic data recording; GPs might tend to make a more global assessment of the patient. Finally, they also speculated on the extent to which time to write records might be an issue (i.e. PA 15-minute consultation vs. GP 10-minute consultation).

TABLE 42 Comparison of reconsultation rates with judgements of appropriateness for cases reconsulting with the same problem at the practice or urgent care facility

Practice type	Number of reconsultations for exactly the same condition							Total
	0	1	2	3	4	5	18	
PA practice								
Was the index consultation appropriate?								
Inappropriate, <i>n</i> (%)	3 (7.3)	26 (63.4)	11 (26.8)	1 (2.4)	0 (0)	0 (0)	0 (0)	41 (100.0)
Appropriate, <i>n</i> (%)	24 (13.2)	119 (65.4)	26 (14.3)	6 (3.3)	4 (2.2)	2 (1.1)	1 (0.5)	182 (100.0)
Total, <i>n</i> (%)	27 (12.1)	145 (65.0)	37 (16.6)	7 (3.1)	4 (1.8)	2 (0.9)	1 (0.4)	223 (100.0)
Non-PA practice								
Was the index consultation appropriate?								
Inappropriate, <i>n</i> (%)	17 (13.7)	79 (63.7)	21 (16.9)	5 (4.0)	1 (0.8)	1 (0.8)		124 (100.0)
Appropriate, <i>n</i> (%)	25 (19.5)	76 (59.4)	15 (11.7)	10 (7.8)	2 (1.6)	0 (0)		128 (100.0)
Total, <i>n</i> (%)	42 (16.7)	155 (61.5)	36 (14.3)	15 (6.0)	3 (1.2)	1 (0.4)		252 (100.0)
Total								
Was the index consultation appropriate?								
Inappropriate, <i>n</i> (%)	20 (12.1)	105 (63.6)	32 (19.4)	6 (3.6)	1 (0.6)	1 (0.6)	0 (0)	165 (100.0)
Appropriate, <i>n</i> (%)	49 (15.8)	195 (62.9)	41 (13.2)	16 (5.2)	6 (1.9)	2 (0.6)	1 (0.3)	310 (100.0)
Total, <i>n</i> (%)	69 (14.5)	300 (63.2)	73 (15.4)	22 (4.6)	7 (1.5)	3 (0.6)	1 (0.2)	475 (100.0)

TABLE 43 Comparison of reconsultation rates with judgements of appropriateness for cases reconsulting with the same problem at the practice only

Practice type	Number of practice reconsultations for exactly the same condition						Total
	0	1	2	3	4	9	
PA practice							
Was the index consultation appropriate?							
Inappropriate	7 (17.1)	30 (73.2)	4 (9.8)	0 (0)	0 (0)	0 (0)	41 (100.0)
Appropriate	46 (25.3)	113 (62.1)	17 (9.3)	4 (2.2)	1 (0.5)	1 (0.5)	182 (100.0)
Total	53 (23.8)	143 (64.1)	21 (9.4)	4 (1.8)	1 (0.4)	1 (0.4)	223 (100.0)
Non-PA practice							
Was the index consultation appropriate?							
Inappropriate	47 (37.9)	64 (51.6)	11 (8.9)	1 (0.8)	1 (0.8)		124 (100.0)
Appropriate	42 (32.8)	73 (57.0)	10 (7.8)	3 (2.3)	0 (0)		128 (100.0)
Total	89 (35.3)	137 (54.4)	21 (8.3)	4 (1.6)	1 (0.4)		252 (100.0)
Total							
Was the index consultation appropriate?							
Inappropriate	54 (32.7)	94 (57.0)	15 (9.1)	1 (0.6)	1 (0.6)	0 (0)	165 (100.0)
Appropriate	88 (28.4)	186 (60.0)	27 (8.7)	7 (2.3)	1 (0.3)	1 (0.3)	310 (100.0)
Total	142 (29.9)	280 (58.9)	42 (8.8)	8 (1.7)	2 (0.4)	1 (0.2)	475 (100.0)

Assessment of competence from video observation

Here, an assessment of competence at consulting is made from an analysis, based on real videotaped consultations, using a validated rating scale.

Sample numbers: physician assistants and general practitioners who volunteered to be video recorded

A further 62 consultations were video recorded: 21 (33.9%) with four PAs and 41 with five GPs. The number of consultations varied between 3 and 13 for the GPs and their patients who consented to be video recorded, and between two and seven for PAs (*Table 44*). These consultations were then reviewed by at least two reviewers.

TABLE 44 Number of consultations for each HCP

HCP	PA	GP	Total
GP1	0	8	8
GP2	0	12	12
GP3	0	3	3
GP4	0	5	5
GP5	0	13	13
PA1	6	0	6
PA2	7	0	7
PA3	2	0	2
PA4	6	0	6
Total	21	41	62

Leicester Assessment Package scores: how the physician assistant consultations compared with the general practitioner consultations

Grades were given by four raters using six of the seven main categories of the assessment package. These data were not normally distributed: median, interquartile range (IQR) and Mann–Whitney *U*-test to compare GPs and PAs are presented in *Table 45*. Higher median scores were found for GPs than for PAs across all the dimensions of competence in the LAP. GPs were generally rated above 50% for each element of the LAP; PAs' median scores were mainly 60%, with some at 40%, although the lower range score was the same for GPs and PAs on all competence dimensions bar problem solving. It was noted by the assessors that the PAs gave the computer more attention and may be writing better medical records.

The weighted scores showed similar differences; GPs scored higher across all competencies (*Figure 5*). The median overall percentage for the practising GPs was 58.6% (25th centile 50.7%; 75th centile 69.7%). For PAs, the median percentage was 47% (25th centile 30.6%; 75th centile 60.0%). These data were not normally distributed; the differences were statistically significant [Mann–Whitney *U*-test (two-tailed) $p = 0.012$].

TABLE 45 Median score and IQR, out of 5, for each element of the LAP

Competence	Weight	PAs, median (IQR) ($n = 45$)	GPs, median (IQR) ($n = 85$)	p -value, Mann–Whitney <i>U</i> -test
Interview/history taking	20%	3.0 (2.0–3.5)	3.5 (2.0–4.0)	0.011
Physical examination	10%	3.0 (2.0–3.0)	3.5 (3.0–4.0)	0.003
Patient management	20%	2.0 (2.0–3.0)	3.0 (2.0–3.5)	< 0.001
Problem solving	20%	3.0 (1.5–3.5)	3.5 (3.0–4.0)	< 0.001
Behaviour/relationship with patients	10%	3.0 (2.0–4.0)	3.5 (2.0–4.0)	0.009
Anticipatory care	10%	2.0 (2.0–3.0)	3.0 (2.0–3.0)	0.024
Record keeping	10%	Not assessed	Not assessed	Not assessed

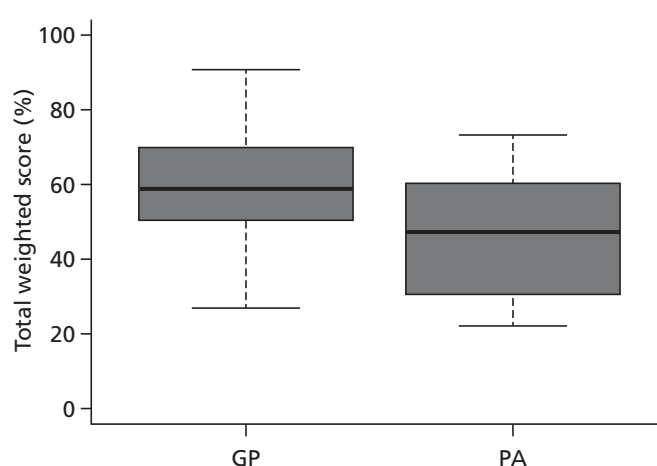


FIGURE 5 Range of results with the LAP: a box plot comparing PAs and GPs.

The raters did not consider any of the health-care professionals to be unsafe to practise.

Inter-rater reliability

The Cohen and Fleiss kappa,¹⁰³ also referred to as 'Cohen's kappa', was used to measure inter-rater reliability. Across all the ratings, kappa just fell into the poor agreement category¹⁰⁴ ($\kappa = 0.193$); there was fair agreement¹⁰⁴ for the GP assessments ($\kappa = 0.225$), but poor agreement¹⁰⁴ for the PA assessments ($\kappa = 0.121$).

Workshop with raters

At the workshop, the GP raters, no longer blinded, felt that the following themes should be taken into account when comparing records:

- PAs were much more systematic in their approach to record writing, and GPs were much more likely to make global assessments in their records. Possibly there were differences in training with regard to records and what to record when assessing patients.
- Raters felt that there was a difference in caseload between GPs and PAs, with the GPs having a more complex caseload. However, the PAs were effective in managing a core part of the primary care caseload, and the nature of emergent histories was such that many of the cases were complex.
- Raters felt that the longer PA consultations may allow the creation of better medical records.
- The only aspect of PA consultations that raters would criticise was that some PAs did not correct the patient calling them doctor. Clearly, the patient was comfortable with this misapprehension; however, this appeared undesirable and reminiscent of when medical students were introduced as 'young doctors'.
- The need to get prescriptions signed appeared to fit into the workflow in the consultation, much as in the way that GPs support nurse prescribing.
- Raters reiterated their view that they did not identify any patient safety problems, and that PAs demonstrated expertise across a range of consultations.

Chapter summary

This chapter has described findings of the clinical review of, first of all, medical records where there was a repeat consultation for the same problem within 2 weeks and, secondly, direct (video) observation of the consultation to assess competence at consulting. In summary, this chapter has reported that:

- The PAs were judged competent at consulting across a wide range of presentations, and appeared to fit well into the primary health-care team.
- PAs produced more appropriate and systematic medical records than GPs in this sample (80% vs. 50% appropriate).
- Raters did not correctly identify PA records.
- GPs scored higher on the LAP for consultation competence; the raters did not consider any of the health-care professionals to be unsafe to practise.

Chapter 7 Case studies: evidence from interviews with patients consulting a physician assistant

The patient experience with PAs and GPs was explored through the patient surveys (reported in Chapter 5). The patient experience and understanding of the PA, a role which was new to the UK, was also explored through semi-structured interviews by telephone with a sample of those consulting PAs, as described in Chapter 5 (see *The patient survey*). This chapter reports on the findings from the interviews.

Participants

All of those invited to participate in a survey and consulting a PA ($n = 430$) were invited to participate in an interview. The response to the invitation to participate in an interview is shown in Figure 6, resulting in 34 interviews with patients (described in this chapter as participants) who had consulted a PA. Participants were purposively recruited from each of the six PA employing practices. One interview was face to face in a practice setting and 33 were conducted by telephone, lasting between 10 and 20 minutes. Four interviews were subsequently excluded from the analysis.

Eighteen (60%) participants were male and 12 (40%) were female. Participants' age spanned 63 years (from 27 to 90 years) with a mean age of 58 years. The majority of participants were of white British ethnicity (Table 46).

The experience of consulting a physician assistant

Overall, the majority of participants described their experience of consulting a PA as positive, finding them praiseworthy and 'doing a good job'. Some reported less satisfactory experiences and understanding of the role. Explanations for the positive and less positive views were identified and are reported here in three interlinked themes: (a) understanding and conceptualising the role of the PA, (b) trust and confidence in the PA role and (c) the impact of the PAs' lack of authority to prescribe. Each of these themes also features in explanations of the contingent willingness of participants to consult a PA in the future, which was found in the interviews. The themes are described separately and then drawn together in a summary, with further discussion and interpretation undertaken in Chapter 8.

Understanding and conceptualising the role of the physician assistant

The participants' accounts of consultations with PAs revealed diversity in terms of being familiar with the PA who they consulted in this study. A small number of participants confirmed that this had been their first contact, while others had had varying levels of previous contact; for example:

I've actually seen [PA name] in the past, I had earache sort of, I don't know, some time last year and I've actually seen him before.

Participant 15

Some participants also described prior interaction owing to the PA's previous treatment of a spouse or child. Three participants described an ongoing relationship with the PA as their clinician in the treatment of a long-term condition.

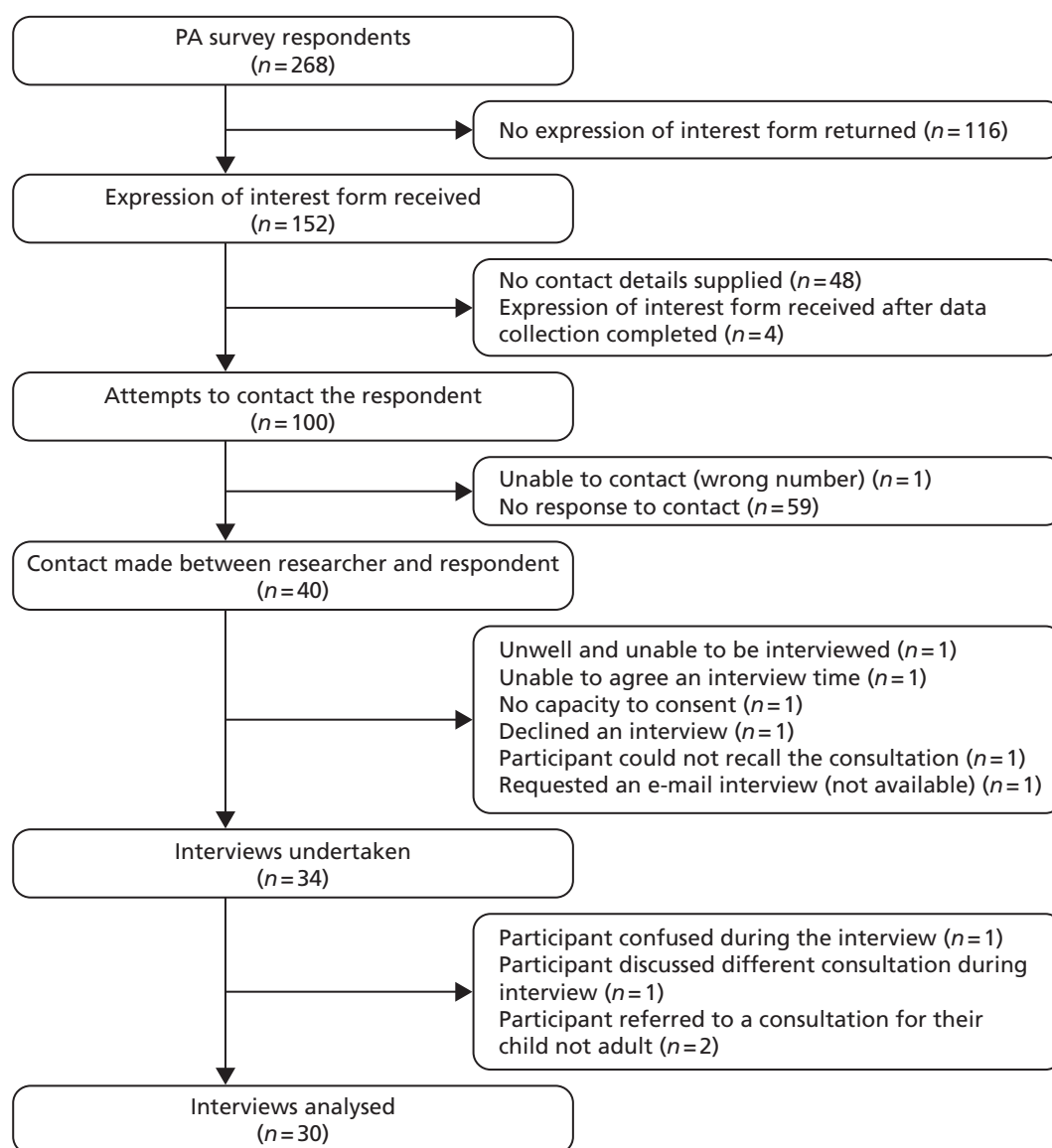


FIGURE 6 Flow chart of invitation and response to participate in an interview.

TABLE 46 Ethnicity of participants interviewed

Ethnic group	Number of participants	Per cent
White-British	24	82.8
White-Irish	1	3.4
Any other Asian background	1	3.4
Black or black British-Caribbean	2	6.9
Black or black British-African	1	3.4
Total	29	100.0

It was in these descriptions of the relationship with the PA that some of the participants revealed how they understood and conceptualised the role of the PA, with many using the word 'doctor' to refer to the PA, as in this example:

Interviewer: Mr X, do you remember is this the first time that you've seen this particular health professional?

Participant 24: By health professional you mean my GP or hospital visits?

Interviewer: The medical, no, the medical care practitioner at your GP surgery.

Participant 24: Err, Dr X [the PA]?

It was evident that there were accurate and inaccurate conceptualisations of the PA role.

Those with an accurate conceptualisation of the role appeared to derive this from previous personal or family experience and/or because the practice routinely informed its registered population about the PA role with leaflets, posters and explanations. These participants conceptualised the PA role in relation to doctors, a 'GP with a difference' (Participant 22), or, as in this more detailed illustration:

They're just like doctors . . . I asked them about physician assistants and they gave me a leaflet and then I had a chat with the person . . . and he explained about his education, and his background . . . and you know I realised then that they're almost doctors, they just can't do everything here that they can, that a doctor could do.

Participant 17

The inaccurate conceptualisations reported included believing that the PA was a professional in training, a nurse, a qualified doctor from another country who could not prescribe in the UK or a qualified medical doctor. Unfortunately, some in this group had not known that the person they had seen was not a doctor until this information emerged during the research interview, and were puzzled as to why they were not given more information, as in this exemplar:

I called him doctor because I thought he was a doctor . . . I don't know why they didn't tell me, I'm not sure whether they didn't want me to think he wasn't a doctor and to think that he wasn't going to do such a good job, but I was very open to whatever he was going to say to me anyway so I wasn't judging him because he wasn't.

Participant 03

These participants reported a varying level of both being informed and being able to recall the information about this new role. There were also those who described receiving information from the practice or the PA but then not understanding the implications of that information, described as in this exemplar:

She did explain, she said I'm from America.

Participant 31

Several participants described a deductive process whereby they had picked up on clues that the PA was not a doctor, and 'worked that out myself' (Participant 29), most obviously with the issue of prescription signing, as in the next example:

Then when I went to her to write out a prescription, she said, 'No, I must get the doctor to sign it.' Then I realised. So, I think that's the right way to go about it because it's better because then if the patients are, 'Oh no, she's not a doctor . . .'

Participant 32

Despite the inaccuracies in conceptualisation and the lack of information for some, most of these participants then turned to describing positive qualities or a desirable outcome from seeing the PA. This mirrored the positive views expressed by those who had an accurate conceptualisation of the role and links to the next theme of trust and confidence in the PA.

Trust and confidence in the physician assistant

The issue of trust and confidence in the PA was raised in most of the interviews, in response either to general questions about the consultation or direct questioning by the interviewer. Where the response was to a direct question, participants generally used unambiguously positive words such as 'certainly' or 'absolutely' or gave a percentage score, for example:

Interviewer: *Did you feel trust and confidence in that episode of care?*

Participant 10: *Definitely. Yeah, 95–99%.*

The reasons for the levels of trust and confidence can be grouped into subthemes: the personal attributes of the PA, demonstration of clinical competence and positive outcomes of the consultation, similarity of the consultation with that with a GP, and trust in their GPs and the wider NHS to provide appropriate, safe and effective care. Each of these is discussed in turn. The section ends by considering explanatory factors given by patients who did not express high levels of trust or confidence.

Attributes of the physician assistant

Evidence of trust in the PA was expressed in a number of different descriptions of their positive qualities or personal attributes, closely related to their communication skills. Their capacity to listen and to respond with clear explanations was commonly reported by participants, as were characteristics such as being 'likeable', 'friendly' 'caring' or like 'doctors used to be'. Furthermore, attributes such as the PA seeming confident or knowing what they were talking about, checking with the patient, and knowing their own boundaries were cited by participants as those that gave them confidence in consulting the PA, as in this exemplar:

I had no hesitation in going to an appointment with him because I'd seen him before, so I was quite happy that he was confident and knew where his boundaries laid and yeah I was more than happy.

Participant 34

Demonstration of clinical competence of the physician assistant

Participants reported trust and confidence in the PA because the PA demonstrated clinical competence and qualities such as those described as being 'professional', 'thorough', 'efficient' and 'confident'. This was very closely linked to judgements made by participants on the basis of the outcome of the consultation. Participants gave examples, such the PA offering appropriate advice, ordering or initiating investigations, treating conditions or making appropriate referrals to other services as a range of positive outcomes of the consultation. Some participants cited examples of PAs identifying additional health issues that needed medical attention as evidence of their clinical competence, as exemplified here:

She pointed something out my dad wasn't aware of. He went with a certain complaint and then when she was examining his body she saw like a sort of a lump in his neck and she was saying, 'Mr X, what's this?' And he was saying, 'Oh, no, this is because of old age,' and she was saying, 'I don't think so, I think I need to refer you because maybe this is linked to what you're complaining about'.

Participant 02

In particular, trust appeared to have grown for participants who reported that the PA had provided advice or treatment that either had already resolved the problem by the time they were interviewed or was anticipated to be an appropriate potential solution.

Well they've never given a diagnosis that I didn't think was a good diagnosis, they've always given the right medicine in my opinion, it's always worked. So I've never, ever had a problem, that's why I feel confident with them. It's as if you're seeing a doctor.

Participant 17

Most participants perceived that their consultation with a PA was either no different from or very similar to a consultation with a GP. This similarity was given as an explanation for trust and confidence in the PA. Participants described being asked the same questions and given the same types of examination and investigations that they would have received from a GP, as in this exemplar:

Yeah, I had no idea that he wasn't a fully qualified GP, and there was nothing in his, the way he spoke to me, the questions he asked, he did an examination, the examination that he did for me was all really professional and exactly as I would expect him to do, which is why, when I walked out of the door I said 'thank you Doctor', because for me he did everything that I was expecting, he gave me the right advice, answered my questions, so I was completely happy with it.

Participant 03

Many participants understood that the PA was in a hierarchical relationship with the GP and their judgement of clinical competence derived from the knowledge that the PA would check with or refer to the GP if it was necessary, as in this exemplar:

I didn't necessarily think that he wasn't a GP if you see what I mean. I know that he isn't because I knew the difference and that the help was next door if he needed it, so I was more than happy with seeing him and that would make me confident to see him again.

Participant 34

Trust in their general practitioners and the wider NHS

Participants also expressed trust in the PA derived from their trust and confidence in their general practice, particularly the senior partners, and also in the wider system of the NHS. Participants trusted their GPs to employ appropriate and competent staff. Examples of their evidence for competence based on trust of the wider NHS system were the direct referral by a PA to a hospital specialist without checking with the GP and the fact PA had had appropriate training and was employed in this way within the NHS.

Limited trust and confidence in physician assistants

Despite a high level of trust and confidence being expressed by many participants, this was not universal. Trust and confidence among participants could be limited or even lost where the participant felt rushed or like an inconvenience, if they were not able to gain an answer about a presenting problem or if the outcome was considered unsatisfactory or contrary to their expectations, as shown here:

I felt it was very much on the surface and I came away, and they gave me this form and I thought at that time, I wasn't happy with that, it didn't work for me . . . I was disappointed with the non-outcome of that visit.

Participant 08

In contrast to those who had trusted the PA because they could check with a doctor, some participants reported having lost confidence when the PA's inability to deal with the medical complaint subsequently led to delays in receiving an appropriate consultation from a doctor, as illustrated by the following participant:

I went in there and I really was nearly in tears with the pain. He [PA] listened to me in fairness, went out of the room because he has to then run it by a doctor. I waited 20 minutes and it came back and his words to me were 'she said you'll have to come back tomorrow'. And I had to walk out of that surgery in agony. Now that isn't satisfactory . . . As I say, he went to a doctor and he done what he probably had to do, he wasn't qualified to do . . .

Participant 14

Some of the reasons given for the presence or lack of trust and confidence in the PA were articulated in terms of comparison with consultations with GPs. One aspect of this was the PAs' lack of authority to prescribe, which is considered next.

The impact of physician assistants' lack of authority to prescribe medications

Participants reported having become aware that PAs were unable to prescribe either through the explanations given to them prior to the appointment or during their consultation. For those participants who described having required a prescription, different methods to organise this had been experienced. Most reported the PA leaving the consulting room to discuss the case with a GP and then return with the signed prescription while the patient waited either in the consulting room or in the waiting room. Some patients also reported collecting the signed prescription from reception then or later, or having it faxed to the pharmacy.

The need for prescriptions to be verified and signed by a GP was reported by most participants to cause no apparent or significant delay. A small number of participants reported delays of 5–10 minutes, with a minority reporting longer waiting times ranging from 15 to 30 minutes. Short delays appeared generally to cause no particular problem to participants and were considered reasonable or understandable. A minority, however, felt that any delay caused by the PAs' lack of prescribing authority was problematic, as exemplified here:

It's quite annoying, actually, because, I mean, I feel that if people can prescribe it they should be able to sign it.

Interview 23

Participants, however, were mostly understanding of this potential limitation and it appeared that a consultation experience that was in other ways a positive one was not viewed negatively because of the need to wait for a prescription.

Each of the above themes features in responses to the final issue explored, which was participants' willingness to consult a PA again.

Willingness to see a physician assistant again

A small number of participants had actively sought an appointment with a PA and gave the following types of reasons: a shorter waiting time to see a PA than a GP, dissatisfaction from prior appointments with GPs and trust in the PA based on previous contact. Most of participants reported that they had not been offered a choice of whether they saw a PA or GP when they booked their same-day appointment. Those who had been offered a choice chose the PA, as this option provided them with an earlier appointment.

Most of the participants stated a willingness to see a PA again for any condition, while one participant stated that they would not wish to consult a PA again as it had resulted in delays in a consultation with a GP.

The willingness of other participants to consult was expressed as contingent on a number of factors. Some participants who were interviewed at a point very close to the time of their consultation with the PA described their willingness to consult as contingent upon the success of their current course of treatment. Others described themselves as willing but differentiated which professional was appropriate to consult according to how serious or complex the problem(s) were that they wished to consult about. Broadly speaking, participants with complex medical conditions or more complex prescribing needs considered it more appropriate and preferred to consult a GP rather than a PA. Minor conditions or complaints were seen as appropriate for consultation with a PA, as in this example:

I think if it was just a general complaint he [relative] wouldn't mind seeing [the PA] but regarding his prescription, he's a bit fussy about his medicine, he would prefer to see a doctor.

Participant 02

Willingness to return to see a PA again also appeared to be influenced by the participants' beliefs about pressures faced by the GP and recognition that not all medical problems required the attention of a doctor, as in this example:

I am very aware that I don't want to take up appointments when it isn't really that necessary. So the thought that there is a role within the surgery where I could go and see somebody who isn't as pressurised as the doctor, to see, to understand, to and go and see them for something that's like not trivial particularly, but I don't necessarily need to see a doctor for then I feel that that role is a really good thing to have in the surgery and I feel that I would be happy to utilise that again, definitely.

Participant 03

For some participants, regardless of how satisfied they were with the PA (or the GP) in a single consultation, maintaining continuity of their care with one professional was considered equally as important as, if not more important than, having a preferred type of practitioner. Consequently, participants who had already consulted a GP or a PA about a particular problem preferred to consult the same practitioner again, to achieve continuity of care:

I'm trying to make her my regular, I say doctor, but my regular person I see at the surgery . . . she seems to understand my needs. I get on really well with her. She listens to me; she makes me feel very comfortable. She seems to, you know, she gives good advice as well. She understands my situation very well, and she's the only one, she's actually the only one at the doctors at the moment that seems to be able to give me that response. As I said, because it's a [type of practice], you're sort of shuttled around from doctor to doctor. You don't really get to make a relationship with anybody.

Participant 21

Other participants also referred to the benefits of their longer-term relationships with the PA and cited this as a reason for willingness to reconsult with a PA. Some gave positive accounts of the PA's ability to recall personal details such as a medical history, the names of extended family members, or work and social circumstances, as well as seeing the PA as part of the community.

Chapter summary: the patient experience

This chapter reports on the exploration of patients' experience in consulting a PA in same-day appointments in general practice, a professional role new to the UK. As in the results of the patient survey (see *Chapter 5, The patient survey*), mainly positive experiences and outcomes were reported. However, the accurate conceptualisation and understanding of this novel role was not universal. Participants were most accurate in their conceptualisation in practice settings where multiple mechanisms had been used to routinely inform patients. One explanation for the positive experiences (and the less positive experiences) lay in the level of trust and confidence the participants had in the PAs. This trust and confidence were not given automatically and derived from multiple, interacting factors. These included the PA's personal attributes (particularly communication skills), their clinical competence as demonstrated by successful treatment or appropriate actions, the similarity of their consultation to that of the GPs and the wider trust participants placed in their GPs and the NHS to provide appropriate care. A willingness, or otherwise, to consult a PA in the future demonstrated a sophisticated decision-making process by participants. This involved not just previous experiences but also judgements about the seriousness of the problem, the rapidity with which it needed medical attention, the medical skill level appropriate to deal with it and the benefits of long-term conditions being dealt with by the same rather than different professionals. This latter factor, continuity of health professional, often appeared to outweigh others. Further interpretation of these findings in the context of the other findings is undertaken in the concluding chapter.

Chapter 8 Discussion and conclusion

This chapter summarises the findings and presents a synthesis of the study. It draws on the discussions in the emerging findings seminar which was held with participants of the study, patient and public representatives and advisory group members in February 2013. We address, first of all, our three study questions:

1. How are PAs deployed in general practice and what is the impact of including PAs in general practice teams on the patients' experiences and outcomes?
2. What is the impact of including the PAs in general practice teams on the organisation of general practice, the working practices of other professionals, relationships with these professionals and the practice costs?
3. What factors support or inhibit the inclusion of PAs as part of English general practice teams at the local and macro levels?

We present a synthesis against a framework of dimensions to judge the quality of health services.⁷³ We then discuss the limitations of the study before turning to our conclusions and summary of recommendations.

The deployment of physician assistants in general practice

Evidence from the national survey (see *Chapter 3, The national physician assistant survey*) and the case studies (see *Chapters 4 and 5*) demonstrated that the PAs provide clinician time for patient consultations in the practice. The majority of these consultations were in same-day appointment surgeries, and the employing GPs expected the PAs to hold their own consultations and, within their competency, as agreed by their supervising doctor, to assess, diagnose and treat the patients they saw. In most practices, the PAs also had forward-booked appointments for follow-up with individual patients and/or review and management of those with chronic diseases. The deployment of PAs in UK primary care to patients attending mainly same-day appointment surgeries has been reported qualitatively before⁷² and confirmed here, similar to the international literature.^{176,193}

The lack of legal authority to prescribe in the UK deterred the GPs and practice managers from deploying PAs to home visits. This concurs with evidence from previous studies in the UK.^{60,61,72} PAs in the USA have prescriptive authority in all states, although the scope may vary in different federal jurisdictions.¹⁹⁴

Most of the PAs spent the majority of their time in direct patient contact, with the non-clinical activities usually being linked to direct patient management (see *Chapter 3, The national physician assistant survey and Chapter 4*). Those undertaking other activities in the practice reported spending a greater percentage of their time on non-clinical activities (defined as any non-patient-facing activity).¹¹⁸ This resonates with the findings in the National General Practice Work Load Survey¹⁸¹ in which NPs, salaried GPs and GP partners were found to spend, on average, 8.2 hours, 7.0 hours and 13.6 hours per week, respectively,¹⁹⁵ on non-clinical activities.

All of the practices gave the PAs longer appointment time slots than GPs (and in one instance double the time) or the same length of appointment slots but with some free slots to allow for consultation or prescription signing with a GP (see *Chapter 4*). Appointment time slots were not reported in either of the previous UK studies.^{60,61} Contextual information as to the length of appointment slots is also missing from previous UK studies of NPs^{91,92} offering same-day appointments in general practice. Of two studies of practice nurses, trained specifically to offer minor illness appointments, one reported that with experience built up over time (unspecified) the nurse worked to 10-minute appointment slots¹⁹⁶ and the other reported that the nurses and doctors were both given 10-minute appointment slots.⁹⁰

There was evidence from the PA and practice staff interviews (see *Chapter 4*) that some practices had decided to deploy their PAs in ways which increased the practice income. Examples included giving the PAs responsibility for ensuring that the activities required under QOF for certain patient registers had been completed and the provision of clinical activities that were promoted and incentivised by local and national commissioners. These were clinical activities that were preventative in nature (e.g. provision of intradermal, long-acting contraceptives) or reduced activity in hospital settings (e.g. initiation of insulin in type 2 diabetes). This has not been described before in the UK setting. Our review of evidence did not identify this in literature from other countries, although the previous restrictions in the USA on claiming reimbursement from federal funds for clinical activities carried out by PAs rather than doctors had been noted as a deterrent to their employment in the past.¹⁴⁹

The impact of including physician assistants in general practice teams on the patients' experiences and outcomes

The patients' experiences

The majority of patients who responded to the survey in this study reported that they were satisfied or very satisfied with their consultation with the PA (see *Chapter 5, Patient survey*). These findings mirror the national results of general practice patient surveys.¹⁹⁷ A high level of patient satisfaction with general practice consultations is not an unusual finding; however, this is the first time that patient satisfaction concerning PAs in the UK has been reported from such a large sample drawn from a variety of general practice settings. This mirrors the findings in medium- and large-scale surveys of primary care patients consulting PAs in the USA.^{155,160,168–171}

Patients consulting a PA described factors such as continuity of clinician and perceived complexity of their illness as important in their willingness to consult the PA again or their preference for consultation with a GP. These types of factors have been evident in other studies regarding patient views on consultations in primary care.^{198,199} A small number of patients indicated their preference to always consult a GP in future consultations (see *Chapter 5, Patient survey*). This is important in that studies investigating patient preferences following consultation with another type of clinical professional (nurse or pharmacist) in UK primary care have reported one-third or more expressing a preference for future consultations with a GP despite high levels of satisfaction with the initial consultation.^{90,92,200,201}

It is noteworthy that, of the patients who were surveyed in practices not employing PAs, 28% were willing or very willing to consult a PA and 20% were neither willing nor unwilling (see *Chapter 5, The survey responses*). This is a lower percentage than in studies carried out in three other countries where PAs are relatively unknown. Those studies, however, were more in-depth, hypothetical studies posing scenarios of different lengths of waiting time to see the PA or a physician in ambulatory care settings.^{173,202,203} One explanation in the UK setting may be that a common feature of general practice since the 1990s has been the employment of other types of staff such as nurses,²⁰ which is not as common in many other countries.

The average length of consultation for same-day appointments with a PA (16.79 minutes) was significantly longer than the average consultation time with a GP (11.28 minutes). The national workload survey has reported 11.7 minutes, 12.1 minutes, 16.4 minutes and 15.5 minutes as the mean consultation lengths with a GP partner, salaried GP, GP registrar and NP, respectively,²⁰⁴ suggesting that the study's data for GPs, at least, are representative. Previous UK studies of PAs do not report length of consultation.^{60–63} Past UK studies of nurses providing this mid-level practitioner activity with same-day-appointment patients also report longer consultation times for GPs. Kinnersley *et al.*⁹² reported a median of 6 minutes (range 4–8 minutes) for GPs and a median of 10 minutes (range 7–14 minutes) for NPs, reducing to 8 minutes (range 6–11 minutes) when the time for obtaining a signature on a prescription was removed. Venning *et al.*⁹¹ reported a mean consultation duration of 11.57 minutes for NPs (SD 5.79 minutes) and 7.28 minutes (SD 4.80 minutes) for GPs. Shum *et al.*,⁹⁰ in a study of practice nurses with additional minor illness training providing same-day appointments compared

with GPs, reported that both were given 10-minute appointment slots and that the nurses had a mean consultation time of 10.2 minutes (SD 5.7 minutes) compared with a GP consultation time mean of 8.3 minutes (SD 6.4 minutes). Further investigation is required as to the variation in consultation lengths by differently skilled and experienced clinicians adjusted for patient case mix and when using surgery systems such as telephone triage.

Patients reported varying levels of understanding and conceptualisation of this new professional role in UK primary care. Similar findings were reported in studies investigating understandings of general householders in the early introduction of PAs in the USA.¹⁷² The practices in the current study had a range of strategies to inform their patients about the role, some more evident than others. Our interviews suggest that those practices using multiple methods, including a script for receptionists and explanation by the PA, were more successful in achieving understanding. This suggests implications for operational practice in general practice and a role for the national PA organisations in sharing best practice.

The patients' outcomes

All of the patients in this sample were attending 'same-day appointments', that is having a problem or symptom that required consultation that day as decided by the patient or the practice using telephone triage. GPs were consulted by an older patient group with a higher incidence of measures of comorbidity than those patients consulting the PA (see *Chapter 5, Consultation records*). PAs tended to be consulted by more patients with problems classified by the study as 'minor/symptoms', while GPs were consulted by patients whose problems were more likely to be classified in this study as 'acute' or 'chronic', that is to say having greater medical acuity or complexity in terms of comorbidity (see *Chapter 5, Characterisation of the health problems of the consultation record sample*). Previous UK and international studies of PAs in primary care have not included a measure of severity or acuity of presenting medical problems. One recent US study also has evidence that PAs see patients who are less medically complex than those seen by doctors,¹⁹³ using the patients' diagnostic care group (DCG) score as the measure of complexity. DCG is a predictor of future health-care expenditure based on age, sex and comorbidities.²⁰⁵

After adjusting the data for covariates and clustering, it was found that consultations with PAs resulted in the same rate of reconsultation for the same problem in the 2 weeks after the index event as with GPs: our primary outcome measure. They also resulted in the same rate of process outcomes: procedures, investigations or tests ordered or undertaken, prescriptions, referrals and advice on over-the-counter medicines (see *Chapter 5, Consultation records*). This is the first time that these process and outcome measures have been reported for PAs in the UK primary care setting. One US study from the 1970s showed that two PAs in comparison with nine family practice physicians had higher medication costs, although they also had higher laboratory costs (not found in the present study) and higher rates of good outcomes for patients.¹⁶⁷ A more recent study of a single PA in the Netherlands showed no difference in referral rates to secondary care from the PA compared with those of the GPs.¹⁶⁴ The only other UK evidence of mid-level practitioners, from studies comparing NPs with GPs in same-day consultations in the UK, provides more mixed evidence. Similar to our findings for PAs, Kinnersley *et al.*⁹² reported no difference between NPs and GPs in the issuing of prescriptions and making referrals. Shum *et al.*⁹⁰ also reported that nurses and doctors issued prescriptions for similar proportions of patients. In contrast, Venning *et al.*⁹¹ reported that NPs undertook significantly more procedures, ordered more tests and investigations and were significantly more likely to ask the patient to return within 2 weeks.

The adjusted figures also showed that PAs were more likely than GPs to have documented that the patient had been given general and medicine management advice (see *Chapter 5, Comparison of physician assistant and general practitioner consultations in recording process outcomes*). It could be argued that this may be an artefact of differences in record-keeping styles between doctors and PAs. It could equally be associated with the longer consultation time of PAs. The variation in electronic record keeping in general practice has been noted before²⁰⁶ and the more detailed completion of records by NPs has been observed in comparison with GPs in the UK.²⁰⁷ In the current study, however, differences between professional groups were not apparent to the independent GP assessors, who were blinded to whether

the author of records was a GP or PA (see *Chapter 6*). This finding has not been reported before in the UK or international settings. For another mid-level practitioner group, NPs, a UK study also found that they delivered more advice in longer consultations.⁹² The analysis of the audiotaped consultations with NPs and GPs reported that nurses talked significantly more about treatments, including how to carry out or apply a treatment.²⁰⁸

Clinical assessment of the consultations

The clinical judgement as to the appropriateness of the initial consultation in the light of the patient reconsulting for the same problem within 2 weeks found that the PAs had documented appropriate clinical activities in the majority of consultations (80%) compared with half of the cases by the GPs (see *Chapter 6*). This finding may be an artefact of the documentation as noted in the section above but, again, the blinded reviewers were not able to correctly identify GP records from PA records. This is the first published report establishing the higher rate of documented appropriateness in initial consultations by PAs than by GPs for reconsulting patients. A previous study from the USA reported poor documentation from PAs.¹⁵⁵ The finding of high rates of reconsultation with GPs following an initial consultation in which not all elements of appropriate clinical activity have been documented requires further investigation.

The clinical judgement as to the consulting activities of the PAs compared with GPs, as video-recorded, found the PAs competent and safe at consulting across a wide range of patient presentations. Although GPs achieved higher scores in their upper range, the comparative scores for PAs and GPs were similar in their lower ranges. The structured comparative analysis of consulting styles is the first to be reported in the UK or internationally.

The PAs were competent at consulting across a wide range of presentations, and appeared to fit well into the primary health-care team.

The impact of including the physician assistants in general practice teams on the organisation of general practice, the working practices of other professionals, relationships with these professionals and the practice costs

We address each of the sections of this study question in turn.

Impact on the organisation of the practice

From the scoping survey (see *Chapter 3, The scoping survey*), it was evident that those closely associated with general practice could see a potential role for PAs within general practice teams but were looking for more evidence with regard to impact. From the case study element (see *Chapter 4*), the PA and practice staff interviews revealed that PAs were employed to fit into the organisation of the practice and the aim was for minimal impact per se, as with any other member of staff. The newness of both the occupational group and, in some instances, the individual's qualification had some effect. For those practices new to employing PAs, one effect was the need to ensure that other staff understood this new-to-the-UK role. The next effect was a need to assign a supervising doctor and ensure time for that supervision (whether about an individual patient consultation or as a regular supervision session), and for newly qualified PAs to arrange ongoing professional development. The extent to which the role of the PA developed within each practice appeared to depend both on the interests and knowledge of the PA and on the opportunities presented within the organisation of the practice. This is captured in the discussion of deployment, earlier in this chapter (see *The deployment of physician assistants in general practice*).

Impact on the working practices and relationships with other professionals

In the case studies, it was evident that the PAs had an impact on the working practices of some of the GPs. In some practices, they were employed specifically to release GP time for attending to more complex patients or other aspects of the GP workload. GPs described how more of their work was with patients

with more complex needs and patients outside the scope of practice of the PA (see *Chapter 4*). This was confirmed in the clinical consultations entered into the case study, where it was evident that PAs were consulted by younger patients with a lower incidence of measures of comorbidity compared with those consulting GPs (see *Chapter 5, Consultation records*). A previous UK study of a smaller sample of PAs suggested that PAs saw older patients than GPs but concurred that the PAs saw a similar but less complex case mix to GPs.⁶² This was also evident in the observation of clinical meetings (see *Chapter 4*), in which the GP partners were focused on the care of patients with multiple physical, mental health and social problems and also on ensuring that salaried GPs, GP registrars and nurses were supported in the management of such patients.

The extent to which PAs impacted on the work in each surgery of the supervising doctor varied depending on the experience of the PA and the systems in place to signal the PA's need for consultation about a patient and/or prescription signing. While PAs' lack of authority to sign a prescription was an issue in all of the practices, it should be set in the context that, firstly, in most of the practices the nurses did not have prescribing qualifications and were also dependent on efficient systems (see *Chapter 4*) and, secondly, that most consultations (with either a GP or a PA) did not result in the issuing of a prescription (see *Chapter 5*). The types of actions to minimise the consequences from lack of authority to sign prescriptions have been noted before in the UK context^{61–63,72} and in other countries developing the PA role.^{164,209}

The boundaries between the work of the PA and that of the nurses in the practices were described as delineated and agreed without overlap (see *Chapter 4*), a point also noted in the primary care pilots of PAs in Scotland.⁶¹ The PAs were reported to be flexible in their skills, and so were often able to cover nurse absences, a feature again noted in the earlier study of PAs in England.⁶⁰ It was evident from the interviews with the practice managers and GPs (see *Chapter 4*) that the priority was to deploy available staff most efficiently against the practice service delivery needs and the demands of each day. While some GPs noted that there had been disquiet from some NPs when PAs were first employed, we were able to find evidence of only positive relationships and working practices between PAs and nurses in the case studies. This has been noted before in the UK^{60,61} and in other settings where PAs have been introduced in primary care more recently.²⁰⁹

The impact of including the physician assistants on practice costs

This study has shown that, after controlling for case-mix differences, GP and PA consultations resulted in similar levels of prescribing, referral, tests, procedures, reconsultations and patient satisfaction. The observed difference in consultation times between PAs and GPs (16.8 minutes vs. 11.3 minutes) is very similar to the national data for NPs and GPs (15 minutes vs. 11.7 minutes).¹¹⁹ After adjusting for covariates, a PA consultation for the 'average' patient is 5.8 minutes longer than a GP consultation for the same patient, at a marginal cost of £6.22. Although PAs' consultations are longer than GPs', they document giving more advice to their patients, and the lower costs associated with their consultations mean that they still deliver care more cheaply. This analysis does not, however, take account of extra costs associated with the use of PAs, including GP time in supervising, training and signing prescriptions, which was not quantified in this study.

In the absence of other studies of the relative costs and effectiveness of PAs and GPs in the UK setting, comparative evidence can be drawn from research that has compared GPs with NPs, another mid-level practitioner group. The findings of one randomised controlled trial in English general practice over a decade ago were similar to those in the current study of PAs; the NPs had similar rates of prescribing, referring, testing and reattending as GPs, and they delivered more advice in longer consultations.⁹² Another UK-based comparison of GPs and NPs at about the same time concluded that the clinical care and costs of GPs and NPs were similar; a higher propensity of NPs to order tests and for patients to return for follow-up appointments offset lower consultation costs.⁹¹ A systematic review showed that patients were more satisfied with NPs than with doctors, and while there were no differences in prescribing, referrals and reconsultations, NPs had a higher propensity to order investigations.³⁹ A modelling study based on the review calculated that there was no significant difference in costs from the NHS or practice perspective

because the GP time that goes into the supervision and reconsultations arising from the use of NPs offsets the lower consultation cost per minute of NPs, although sensitivity analysis showed that if the supervisory time input of GPs was halved, NP consultations were cheaper.²¹⁰ In a recent study in the Netherlands, NPs provided equivalent outcomes to doctors for a lower cost; the mean saving per consultation was € 8.21,^{211,212} which is similar to the saving recorded for PAs in this study of £6.22.

Factors supporting or inhibiting the inclusion of physician assistants as part of English general practice teams at the micro, meso and macro levels

The introduction, adoption and diffusion of innovation in health-care services is known to be influenced by determinants in the sociopolitical environment, the characteristics of the organisation, the characteristics of the person and the surrounding team or peers adopting the innovation, and the characteristics of the innovation such as the complexity, the risk and the relative advantage.^{212,213}

At the meso and micro levels, that is to say the organisational and personal levels, the GP partner(s) made the decisions to employ PAs as an innovation in their practice teams (see *Chapter 4, Decisions about medical and practice staffing*). Comparisons between national headcount data and the practices included in the study showed that while the staffing ratios of practices without PAs were similar to national averages, the practices with PAs had higher proportions of salaried GPs, suggesting that there may be differences in approach to staffing decisions. Internal and external organisational factors as well as characteristics of the innovation were considered in making the decision. These included factors such as practice income, costs, productivity of PAs, local availability of GPs and experienced practice nurses; in addition, beliefs about the value of differently skilled professionals in their general practice were evident. General practice in the UK has long employed staff with different skill sets and professional qualifications,²⁰ in contrast to other countries where solo medical practice is the norm.²¹⁴ The effect of the 2004 GMS contract²³ in shifting some work roles between doctors and nurses has been demonstrated in a longitudinal survey.²¹⁵ The changing nature of general practice, primary care, GPs themselves and their views of their roles has been well evidenced.^{216–218} There were divided views among the GPs as clinician managers in our study as to whether a Taylorist approach,²¹⁹ involving the delegation of certain types of patients in unscheduled appointments to mid-level practitioners (PA or NP), achieved greater efficiency or whether greater efficiency and less risk was achieved by the forward deployment of an experienced GP to see all unscheduled patients, with the GP then delegating tasks to others. This difference of views as to the most effective organisation of general practice services is echoed in the GP literature, in which the need for evidence is highlighted.^{20,34} In this study, the difference in opinion about the value of other types of professional seemed to apply irrespective of whether the mid-level professional was a PA or a NP, and opinions on both were compared with opinions about the employment of salaried GPs. The views of GPs and practice managers as to the relative advantage of each type of health professional was set in the local, external context of their availability, both now and in the future. The desire for information and evidence on the value and productivity of PAs to inform GPs decision-making about this innovation in their workforce was evident from those practices that volunteered to participate and did not currently employ a PA.

At the macro level, which encompasses the sociopolitical environment and the organisation of the NHS beyond the individual practice, this study examined both policy influencers' views and policy documents to investigate factors influencing the adoption of this workforce innovation. The scoping survey participants described the wider factors influencing change in the profile of the health-care workforce including primary care (see *Chapter 3, The scoping survey*), as did those working in general practice. These factors included demographic changes, an ageing primary care workforce and restricted public finances for the NHS. These forces have been underlined in subsequent reports pointing to a shortfall in GPs against the increased likely demands for services in primary care settings.^{220,221} All participants could see the place of, and make the argument for, increased numbers of staff working at the mid level, such as PAs and NPs, in

primary care settings. Positive opinions and advocacy for PAs as one innovatory solution were evident from those who had had contact in some way with PAs, while others were more neutral in their opinions. Most participants, including those representing patients, considered that further evidence was required as to the effectiveness and efficiency of PAs to influence the decision for further development and use of them as an innovation in the UK setting. Most participants noted that, for PAs to be further introduced in the NHS, a key macro-level factor was their inclusion in the state regulatory mechanisms, which would both address issues of public safety and open the way for their inclusion in the legislation for authority to prescribe.

The history of health professional groups is one of a dynamic system of shifting role boundaries that are sometimes challenged not only because of cautious responses to innovation but also because each shift has the potential to affect another group's access to resources, rewards and status.²²² The introduction of a completely new health professional group, the PA, has that potential within the UK system. In the main, the nurses interviewed in the scoping survey did not view PAs as a challenge to the nursing profession, although one offered the perspective of NPs, arguing that PAs could be competitors not for jobs but for investment via NHS-funded education and training. The group more likely to see PAs as competitors for jobs were junior doctors, as suggested in our analysis of published commentaries (see *Chapter 3, Review of commentaries*). In this, our study provides evidence that there is stratification within both the medical and the nursing professions,²²³ resulting in different opinions in support of or in opposition to PAs as a new health professional group in the NHS.

At the macro and meso levels, the NHS is a publicly funded system which includes the planning of future national and local health-care workforce and the funding of health professionals' education and training.⁶ A review of workforce planning and policy documents was undertaken to gauge the support for innovation of PAs at this level. In the planning and policy documents in England and Wales, PAs were noticeably absent; this is in contrast to those in Scotland, where high-level policy decisions had been made to support the development of PAs as part of the health-care workforce (see *Chapter 3*).

Evidence synthesis

This study is framed by the dimensions proposed by Maxwell⁷³ for judging health-care services and is applied here to the innovation of PAs in primary care. The dimensions are acceptability, effectiveness (including safety), equity (fairness), and efficiency (including costs of primary health care).

Physician assistants were found to be an acceptable group of health professionals to contribute to primary care teams at the macro, meso and micro levels. They were found to be acceptable and appropriate to professionals, managers, commissioners and patients, although many in these roles sought more information. Caveats included that any employer and PA needed to ensure that patients, the public, administrative staff and the professionals understood the PAs' competency levels and that the PAs' role was dependent on a supervising doctor. Inclusion of PAs in the state regulatory processes for health professions was viewed as important in terms of both their acceptability and the perceived effectiveness. This factor requires support at the macro, sociopolitical level.

Within the universal provision of primary care in the UK, PAs provided clinical care mainly to patients seeking same-day (unscheduled) appointments whose presenting condition was of less medical severity and who were of less medical complexity than those consulting GPs. There was no indication that this was inequitable (unfair) to any group of patients or that patients were not given appointments with preferred GPs (and preferred PAs) if requested. The PAs were working in complementary ways to the activities of the GPs rather than as substitutes.¹⁴

The case study elements demonstrated PAs' effectiveness in providing appropriate and safe care at the same time as not increasing costs to the wider health-care system. The analysis of cost demonstrated that they deliver care more cheaply to the patient case mix they work with than GPs. However, this analysis

was unable to account for all opportunity costs to the GP(s) through consultation interruptions and supervision, although the extent of this was dependent on the expertise level of the PA and the preferred working practices of the GP.

While acceptable, effective, equitable and efficient, PAs do not feature at the macro level in the planning for a primary care workforce or in the regulatory framework for health professionals. The introduction of a new health-care professional is influenced by support at sociopolitical levels as well as at the organisation and individual levels.^{213,224} The policies supporting greater delivery of health care in primary care settings suggest that more mid-level staff will be required irrespective of the type of provider organisation.¹⁹⁰ PAs are drawn from a different labour pool from nurses, being mainly science graduates, and as such are likely to be an additional solution in addressing the future perceived shortages for primary care.^{34,220} They potentially offer more flexibility to a primary care workforce in that they have a shorter education programme than that for GPs. The PA benchmarked and nationally agreed curriculum offers consistency and uniformity among those graduating from courses, unlike NPs in the UK. For there to be a supply of PAs available for recruitment into primary care, there has to be demonstrable NHS workforce planning support, at the very least at the local level in order to allocate opportunities for clinical placements in their educational programmes.

Limitations

This was a mixed-methods study incorporating comparative case studies of a small number of general practices and, as such, has both strengths and limitations. Although two practices reported list sizes per GP that were approximately double the national average of around 2000 per GP, they are not inconsistent with other evidence that shows a rising trend.²²⁵ General practices are very busy, as small organisations, and the study was shaped by the extent to which the practice staff were able to participate in the anticipated way, in the face of competing demands and priorities. The variation in the completion of workload diary sheets was an example of this. There are limitations in the data collection tools. Using the anonymised clinical records reduced the reliance on clinical staff having to undertake additional work and ensured that we collected data that were representative of usual practice. However, this could be open to the challenge that there was a lack of study-prescribed uniformity in data collected. Data collection covered relevant case-mix factors that might confound the analysis of outcomes, and information from a large sample of consultations, that included summer and winter periods for all practices, were gathered. There were limitations to the health economic analysis; for example, data were not available on the time taken for seeking advice or prescriptions from GPs, as described in more detail in *Chapter 5* (see *Economic analysis*). Uncertainties surround the costs of GPs, but use of validated national rates provided a sound estimate of the likely average situation. The costing analysis takes no account of practice income and budgets, which are sensitive issues and for which information was not available.

While the patient satisfaction survey was based on a widely used and validated tool, it is recognised that such surveys tend to produce positive results. The patient interviews went some way towards providing more nuanced data.

The case study element was not a trial which randomised patients to PA or GP, but rather was a pragmatic approach that was adopted based on usual systems in place in the participating practices. The sample size was relatively small, although well powered for the analyses undertaken. Ethical constraints meant that children seen by PAs were not included in the patient satisfaction survey or the observed consultation, and children are a large patient group in primary care. Similarly, the proportion of each record that we were allowed to use was limited. The PAs had no experience of being videoed before, unlike GPs, in whose vocational training it is commonplace, and this factor may have stilted the PAs' behaviours.

The use of Read codes in patient records was limited and variable between professionals and practices. We were not able to find any UK-published general practice patient classification system for medical acuity of

presenting complaint and complexity of the person (including both medical and social aspects). We built on a published patient condition severity classification system developed in the records²⁸ but our additions were novel and require further validation.

Conclusions

Physician assistants were found to be acceptable, effective and efficient in complementing the work of GPs. PAs could provide a flexible addition to the primary care workforce. They offer another labour pool, with a shorter training period than that for GPs or NPs, to consider in workforce planning at local, regional and national levels. However, in order to maximise the contribution of PAs in primary care settings, consideration needs to be given to the appropriate level of regulation and the potential for giving PAs authority to prescribe medicines.

Recommendations

- Physician assistants have the potential to be a competent and flexible addition to current and future primary care staffing teams. Patients, the public and primary care professionals need more information to understand both the role and its potential contribution to the NHS. There may be a role for professional organisations, general practices and local primary care organisations in doing this.
- General practitioners and managers of primary care services should consider the inclusion of PAs within their staffing configurations, and CCGs (and their equivalents outside England) should consider their potential in future service and innovation planning.
- The efficiency of PAs in primary care is likely to be enhanced by the legal authority to prescribe, which can be achieved only by including PAs in the regulatory framework for health-care professionals. This has implications for policy with regard to regulatory frameworks for health professionals in the UK.
- In order for there to be a supply of PAs, there needs to be cognisance of this group in health profession education commissioning at a local and national levels (Health Education for England and its equivalent in other UK countries). Educational commissioners at local and national levels should consider the contribution PAs could make to a future flexible primary care workforce.

Further investigation

This study has highlighted a number of questions that require further investigation. These include:

- the contribution of PAs in other first-contact services as well as secondary services
- the contribution and impact of all mid-level practitioners, PAs and NPs in first-contact services
- the extent and impact of supervision and conferring on patients for mid-level practitioners, PAs and NPs in different types of primary care settings, for example GP practices or urgent care facilities
- the influence of sociodemographic and geographic factors, such as inner-city, remote and rural settings, on the demand for PAs and other mid-level practitioners, in a flexible primary care workforce
- the reliability and validity of classification systems for both primary care patients and their presenting condition and their consequences for health-resource utilisation
- the factors and influences in GP partner and manager decision-making as to staffing and skill mix in general practice, with particular reference to beliefs, preference, evidence and use of financial data.

Acknowledgements

Our thanks go to all the PAs and GPs who volunteered to participate, and to all the practice staff and patients who participated and generously helped the study staff. In the busy world of general practice we appreciated all the support of the study.

This report presents independent research commissioned by the NIHR. The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, Health Service and Delivery Research (HSDR) or the Department of Health.

Contributions of authors

Dr Vari M Drennan (Professor of Health Care and Policy Research) led the study, contributed to all elements of the study, led the overall synthesis of findings and drafted the final report.

Dr Mary Halter (Senior Research Fellow, Health Service Research) project managed the study, and contributed to all elements of the study, leading on the data collection and analysis within practices and with patients and prepared the results for publication. She also contributed important intellectual content to the revisions of the final report.

Sally Brearley (patient and public involvement) contributed to all elements of the study, led on the patient and public involvement including chairing of the emerging findings seminar. She contributed important intellectual content to the revisions of the final report.

Wilfred Carneiro (NIHR Research Management Fellow) contributed to all elements of the study, provided expert health service management knowledge as applied to workforce development, undertook scoping interviews, policy review and prepared results for publication, as well as patient interviews. He contributed important intellectual content to the revisions of the final report.

Dr Jon Gabe (Professor of Sociology) contributed to all elements of the study, provided expert knowledge in sociology applied to health care and qualitative methods, undertook scoping interviews and analysis of qualitative data. He contributed important intellectual content to the revisions of the final report.

Dr Heather Gage (Professor of Health Economics) contributed to all elements of the study, provided expert knowledge in health economics, led on the economic analysis and prepared results for publication. She contributed important intellectual content to the revisions of the final report.

Robert Grant (Senior Research Fellow in Quantitative Methods) contributed to all elements of the study, provided expert advice and undertook the statistical analysis. He contributed important intellectual content to the revisions of the final report.

Dr Louise Joly (Research Associate, Health Care Research) contributed to all elements of the study from February 2012, organised and undertook data collection within the practices, led on preparation of data for analysis, and undertook data analysis. She contributed important intellectual content to the revisions of the final report.

Dr Simon de Lusignan (General Practitioner and Professor of Primary Care and Clinical Informatics) contributed to all elements of the study, provided expert general practitioner and primary care knowledge in clinical record data extraction, and led on the clinical record review and analysis of video observations and prepared results for publication. He contributed important intellectual content to the revisions of the final report.

Acknowledgements of the contributions of others to the study

Kaushik Chattopadhyay (August 2010–July 2011) and Jennifer Yiallourous (January 2011–September 2012) were research associates assisting in the rapid review, liaison with the practices, administration of surveys and data extraction.

Ros Levenson, independent researcher, undertook interviews with all practice staff in 2012 and prepared internal study reports to inform analysis.

Caragh Flannery, researcher, assisted Professor Gage in the health economics analysis.

Ayoub Ali, researcher, assisted Professor de Lusignan in the analysis of clinical reviews and video observations.

Alexander Courtney-Hatcher, Phillip Crisp, Nicholas Duncan and Dr Julia Wood assisted in data management and coding.

Hugh Claridge, Lucy Drennan, Sian Jones and James Norton provided administrative support at different time points.

Publications

Drennan V, Halter M, Brearley S, Carneiro W, Gabe J, Gage H, *et al.* Physician assistants in English primary care teams: a survey. *J Interprof Care* 2012;**5**:416–18.

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Appendix 1 Advisory group membership

Name Representing

Dr Phil Begg Wolverhampton University.

Joel Grey St George's University of London.

David Kuhns Birmingham University.

Prof Jim Parle Birmingham University.

Rob Smith NHS London.

Kathy Tyler Skills for Health.

Jeannie Watkins UKAPA.

Lori Williams UKAPA.

Patient and Public Involvement Group membership

Lawrie Baker.

Joy Mills.

Simon Gardner.

Richard Omari.

Vishy Harihara.

Patricia Page.

Gwen Hunter.

Pauline Stanley.

Elizabeth Lloyd-Dehler.

Josephine Udine.

James Lindsay.

Edna White.

Tom McGill.

Appendix 2 National Institute for Health Research health research management fellow report

Introduction

This report is a reflection of my personal and subjective experience as a National Institute for Health Research – Service Delivery and Organisation (NIHR SDO) management fellow, attached to a multimethods evaluation of a new innovation for the health-care workforce. I was an integral member of the core research team for most of the duration of the research study on a part-time basis.

Background

The management fellow scheme was an innovation undertaken in 2009 by the NIHR SDO with the principal aim of encouraging utilisation of research in NHS health-care management. The wider NIHR SDO programme and the Management Fellow programme were replaced in 2012 by the Health Services and Delivery Research programme. The SDO Management Fellow programme was evaluated in 2012.²²⁶ The aims of the Management Fellow programme were to:

- improve the quality and relevance of the research projects through manager involvement
- develop capacity in the NHS manager community for accessing, appraising and utilising research evidence and
- encourage greater engagement, linkage and exchange between research and practice communities in health-care management.

The specific aims of my fellowship were to:

- utilise my NHS expertise and experience in shaping, undertaking and interpreting stakeholder analysis to ensure there is a NHS management perspective throughout
- enhance my personal and my NHS employer trust's capacity and capability to undertake and utilise service delivery and organisational research.

There was a formal process of being recruited to a Management Fellowship. In the autumn of 2010, I saw an open call for expressions of interest to this management fellowship on an internal e-mail to staff in my NHS trust. I replied to the open call for expressions of interest in the Management Fellowship, and subsequently met with the principal investigator and the project manager for the study. I had a series of meetings with my NHS trust to discuss the aims and objectives of the Management Fellowship. A formal application by the principal investigator, supported by my NHS trust, was submitted to the NIHR SDO programme board. Due diligence was followed through a decision being made to award a management fellowship to this project. The process from an expression of interest to the formal start of the Management Fellowship took over 6 months to complete. As I had agreed to work on a part-time basis on the Management Fellowship over 20 months in order to gain a better experience of the research process and project, it was necessary to revise my duties with the trust and maintain a high degree of flexibility in these duties through the life of the Management Fellowship. At the time of starting and through the span of this Management Fellowship, there have been significant policy reforms¹⁹⁰ and subsequent changes in the landscape to the NHS and within all NHS organisations. The wider study and the Management Fellowship were extended by an additional 4 months owing to unforeseen circumstances. The period of this Management Fellowship was from February 2011 to February 2013.

Work undertaken by the Management Fellow

I undertook and contributed to a wide variety of research and other activities through the duration of the project. My principal research activities included taking a key role and working closely with Professors Gabe and Drennan in shaping the national stakeholder analysis, including identifying, contacting, and undertaking semistructured interviews, and also undertaking analysis of the interviews. I took a lead role in undertaking the commentary review and health workforce and policy analysis. I drafted early versions of discussion papers for these activities, which have informed the content of these sections in the final report. Additionally, I took the lead role in contacting and interviewing patients, and in developing the coding framework for these interviews with other members of the research team.

I worked with other members of the core research team in a range of other elements on this study, including the rapid review of the literature, and in various activities undertaken with patients and staff in the visits to the case study sites. I contributed to ongoing communication with participants of the study through newsletters, and in a seminar to discuss the preliminary research findings in February 2013. Finally, I assisted in the drafting of the final report as a joint author with other members of the research team.

Knowledge mobilisation and transfer activities

During the period of the fellowship, I ensured that relevant information about health policy and operational change within the NHS was communicated to the research team as it applied to the study. I met with visiting national and international health staff to improve their understanding of the NHS, and contacted other professionals to help inform their visit to the UK. I have continued to build relationships with academic and teaching staff in the university and this has resulted in presentations by medical students, development of joint bids for small-scale research projects and sharing of my specific knowledge in the NHS and local community with academic staff to inform their current and future research. Additionally, during the period of this management fellowship, I have been actively engaged in a series of Centre for Workforce Intelligence (CfWI) workshops, sharing my experience as an NHS manager and research fellow, and disseminating relevant CfWI materials with the research team.

I was a member of the advisory group to the formal evaluation of the SDO Management Fellow programme, and participated in a series of meetings to exchange mutual experience and knowledge with other Management Fellows facilitated by the SDO network. I attended the NIHR SDO annual conferences in 2011 and 2012 and participated in knowledge-sharing discussions with other researchers at these events. As I was working in the trust on a part-time basis through the span of this Management Fellowship, I have maintained strong contact with my NHS and other colleagues and have led or been involved in active programmes of work with other staff and researchers related to my specialist field of equalities.

What was learnt from this experience?

The learning from this Management Fellowship has been in several different areas and at different levels. It has been an active and reflective process, with tangible outcomes. New skills learned included the process involved in undertaking interviews, and the coding and analysis of these interviews. The electronic skills involved in identifying various documents through several sections of this study provided additional learning, as did the extraction of information from these documents. New learning was undertaken in the use of NVivo software, with the workforce planning tools in development by the CfWI, and also through participation in a scenario generating activity by CfWI. The use of innovative cloud-based data warehouses and other electronic systems provided a new experience in sharing information with other researchers, as did the use of technical audio and video recording equipment for various elements of the study.

Additional learning was developed by reading documents critically, through formal and informal discussions and correspondence with other members of the research team and faculty staff, attending workshops and seminars on research practices, and by refining my existing communication and analysis skills. I developed an improved understanding of research methods processes, and in the ability to identify source material, assess and appraise peer-reviewed and other materials. As this was my first experience as an early researcher in a major study, I was able to both observe and reflect on the leadership and skills expressed by the principal investigator and other members of the research team. I experienced a more explicit, inclusive and collaborative style of working in the research team, alongside developing an understanding to the unpredictability of circumstances in research, and learning about the adaptability of the research team through the timescale of the project.

Plans going forward

As the Fellowship ends, I plan, where appropriate, to contribute to dissemination activities related to the study and its findings. I will seek to maintain and develop the research relationships with the research team and wider academia, specifically outside of the clinical sciences. In the last 6 months of this project, I have been actively involved in a significant staff innovation related to service improvement in a specific area. I have been able to use my increased knowledge of research to help inform the evaluation of the multiple elements in this innovation. I have facilitated discussions with other researchers to help transfer research knowledge and skills to staff within the service. The learning from this project could have a significant impact upon the patient and staff experience with NHS organisations, and we plan to use appropriate research methods to support the project and share any findings.

As my employing trust prepares for its transition to foundation trust status, it has committed to improving its capacity in research and innovation, and to developing research skills among its staff. The trust is actively engaged in research collaborations in the sector with other organisations. I plan to co-ordinate the content after the establishment of a web-based research portal for patients, the public and staff, where information and participation opportunities related to research activities in the trust and the university will be made available. I also plan, where possible, to continue discussions with other managers with research interests within the trust, explore the development of an informal network with these managers, and support initiatives to other managers in the trust in developing research capacity in service delivery and operational research. Finally, I will maintain contact with the research team and other academics and professionals I met through the span of this fellowship and participate in further dissemination activities related to the research project where appropriate.

As has been described in an evaluation of NHS London 'Darzi' fellowships,²²⁷ the impact of such fellowships can be far reaching on the individual, to the organisations and the wider system. The experience gained through my Management Fellowship will have an impact on my employing trust, which will be expressed in many ways. The opportunities to use the range of my newly acquired skills will need to be discussed with several senior managers and operational leads. The requirements for large sections of the NHS workforce to be adaptable and responsive in these times of change could support the development of my newly acquired abilities and skills over time. My interest in developing my research knowledge and skills further, and adapting these constructively to my workplace will require me to be politically aware, sensitive and work with my trust to make the best use of my abilities in meeting our duties as an organisation and in our public service commitments to the founding principles of the NHS.

Wilfred Carneiro, February 2013.

Appendix 3 Search strategy for PsycINFO

Search ID#	Search terms	Search options
S9	S6 and S7	Limiters – English Language Search modes – Boolean/phrase
S8	S6 and S7	Search modes – Boolean/phrase
S7	S3 or S4	Search modes – Boolean/phrase
S6	S1 or S2 or S5	Search modes – Boolean/phrase
S5	(MH “Family Practice”)	Search modes – Boolean/phrase
S4	Physician* assistant*	Search modes – Boolean/phrase
S3	(MH “Physician Assistants”)	Search modes – Boolean/phrase
S2	General practi*	Search modes – Boolean/phrase
S1	(MH “Primary Health Care) OR (MH “Physicians, Family”)	Search modes – Boolean/phrase

Appendix 4 Patient survey



Study ID: _____

FACULTY OF HEALTH AND SOCIAL CARE SCIENCES

Investigating the contribution of physician assistants (PAs) to primary care in England

Protocol reference: PC245 09/1801/1066

PATIENT SURVEY

We would be grateful if you would complete this survey about your visit to the Physician Assistant on __/__/__ at __.__. Please complete the form answering ALL the questions that apply to you. There are no right or wrong answers. Staff at the practice will NOT be able to identify your individual responses.

Please seal your completed survey form in the prepaid envelope provided and return to the research team by post.

SEEING A PHYSICIAN ASSISTANT AT THE GP SURGERY OR HEALTH CENTRE

Q1 How good was the Physician Assistant you saw on the date specified above at each of the following? *Please put a × in one box for each row*

	Very good	Good	Neither good nor poor	Poor	Very poor	Doesn't apply
Giving you enough time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asking about your symptoms.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Listening to you.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explaining tests and treatments.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Involving you in decisions about your care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treating you with care and concern.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking your problems seriously.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q2

Did you have confidence and trust in the Physician Assistant you saw?

Please put a × in one box

- Yes, definitely
- Yes, to some extent
- No, not at all
- Don't know/can't say

YOUR OVERALL SATISFACTION

Q3

In general how satisfied are you with the care you get at your GP surgery or health centre? *Please put a × in one box*

- Very satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dissatisfied
- Very dissatisfied

Q4

Would you recommend your GP surgery or health centre to someone who has just moved to your local area? *Please put a × in one box*

- Yes, would definitely recommend
- Yes, might recommend
- Not sure
- No, would probably not recommend
- No, would definitely not recommend
- Don't know

Q5

In general how satisfied are you with the care you received from the Physician Assistant on the date written on page 1 of this survey? *Please put a × in one box*

- Very satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dissatisfied
- Very dissatisfied

Q6

Would you be satisfied with seeing the Physician Assistant again who you saw on the date written on page 1 of this survey or prefer to see a GP? *Please put a × in one box*

- Very satisfied to see the Physician Assistant again
- Satisfied to see the Physician Assistant again
- Neither satisfied nor dissatisfied
- Dissatisfied and prefer to see a GP
- Very dissatisfied and prefer to see a GP

SOME QUESTIONS ABOUT YOU

These questions will help us see how experiences vary between different groups of the population. Your answers will be completely confidential.

Q7

Are you male or female? *Please put a × in one box*

- Male Female

Q8

How old are you? *Please put a × in one box*

- | | |
|-----------------------------------|--------------------------------------|
| <input type="checkbox"/> 16 to 24 | <input type="checkbox"/> 55 to 64 |
| <input type="checkbox"/> 25 to 34 | <input type="checkbox"/> 65 to 74 |
| <input type="checkbox"/> 35 to 44 | <input type="checkbox"/> 75 to 84 |
| <input type="checkbox"/> 45 to 54 | <input type="checkbox"/> 85 and over |

Q9

What is your ethnic group?

Please choose one section from A to E below, then select the appropriate option to indicate your ethnic group

A White

British

Irish

Any Other White background



Please write in

B Mixed

White and Black Caribbean

White and Black African

White and Asian

Any Other Mixed background



Please write in

C Asian or Asian British

Indian

Pakistani

Bangladeshi

Any Other Asian background



Please write in

D Black or Black British

Caribbean

African

Any Other Black background



Please write in

E Chinese or other ethnic group

Chinese

Any other ethnic group



Please write in

Appendix 5 Coding for clinical records

Diagnostic tests

Code	Descriptor
0	None
1	Blood test <u>ordered</u> – includes <ul style="list-style-type: none"> • Autoimmune profile • B₁₂ and folate, bilirubin • Calculated creatinine clearance eGFR, coeliac, CRP (C-reactive protein) • Erythrocyte sedimentation rate (ESR), • Ferritin, full blood count (FBC), lipid profile • Haemoglobin A1c (HbA_{1c}), HIV screening • Liver enzymes, liver function tests (LFTs) • Plasma creatinine protein, plasma viscosity, protein, albumin and globulin • Random glucose, renal profile, rheumatoid factor (RF) • Thyroid function test, thyroid peroxidase antibody test, thyroid-stimulating hormone (TSH)/(TSH £) • Urea, urea and electrolytes, uric acid
2	Blood test <u>taken</u> includes as code 1
3	Urine test – dipstick during consultation. Would be used to test for blood, protein, glucose, leucocytes, ketones, urobilinogen and nitrite
4	Urine – sent to laboratory, e.g. microscopy, culture and sensitivity (M, C & S) (sent to laboratory) blood, or glucose, or protein, leucocytes, ketones, urobilinogen and nitrite (sent to laboratory)
5	Cervical smear/liquid-based cytology (LBC)
6	ECG
7	ECG 24-hour
8	Echocardiogram
9	Fundoscopy
10	<i>Helicobacter pylori</i> test
11	Intravenous urogram
12	Spirometry and/or peak flow
13	Sputum sample
14	Stool – microscopy, culture and sensitivity (MCS), ova, cysts and parasites (OCP), occult blood
15	Swab – e.g. genital, cervical, urethral, high vaginal (HVS), ear, non-specific
16	Ultrasound (specific or non-specific)
17	X-ray (specific and non-specific)
18	Screening test or questionnaire tool, e.g. alcohol-use disorder identification test, alcohol consumption questionnaire, fast alcohol screening test, PHQ-9; pre-immunisation questionnaire; Qrisk cardiovascular disease score; use of web-based tools to aid diagnosis, e.g. DermaNet
19	Other – any other test that does not fit into the previous categories. [Items coded here allocated 20 to 24]
20	CT scan
21	MRI scan
22	Pregnancy test
23	Nail, hair or skin sample
24	BM stick

Procedures

Code	Descriptor
0	None
1	Injection or vaccination
2	Wound care (renewal of dressings, removal of steristrips, wound checks)
3	Removal of sutures
4	Cryotherapy
5	Electrocautery
6	Curettage
7	Therapeutic injections used in a variety of conditions
8	Excisions
9	Incisions
10	Other procedures, which the practice is deemed competent to carry out (items coded here were later allocated codes 11 and 12)
11	Ear irrigation (syringe/clean)
12	Administration of nebuliser

Advice (general)

Code	Descriptor
Yes	Advice and information given (not specified) includes leaflets could be on any aspects, e.g. smoking cessation, travel health, self-referral to other services, offers of other health promotion services such as <i>Chlamydia</i> screening
No	Advised to return/call if symptoms persist

Advice (medication management)

Code	Descriptor
Yes	Advice on self-management of prescribed medication here, e.g. advised to use inhalers, 'use of medication discussed'
No	No advice on medication OR advice is to take medication prescribed at the index consultation

Advice OTC (over-the-counter medicines)

Code	Descriptor
Yes	Advice given to buy OTC medications at local pharmacist
No	No OTC advice given

Fitness to Work certificate/MED3 (previously known as sickness certificate)

Code	Descriptor
Yes	Fitness to work/MED3 (sickness certificate) given
No	No Fitness to work/MED3 (sickness certificate) given

Referrals

Code	Descriptor
0	None OR referral for a diagnostic test only, e.g. X-ray (covered in diagnostic test coding)
1	Secondary medical care or treatment: referral to medical consultant, service in hospital, trust or independent sector (NHS funded) includes midwives, sexual health clinic, and palliative care. NB this includes urgent referrals via A&E
2	Allied health professionals and dental, e.g. occupational therapy, physiotherapy, dietician, pulmonary rehabilitation, referral to independent medical services, private referral not NHS funded
3	Health promotion/public health services, e.g. smoking cessation clinic, exercise on prescription
4	Psychological therapies, e.g. cognitive-behavioural therapy, counselling
5	GP within the same practice
6	For a procedure within the practice, e.g. to practice nurse for immunisations, dressing, ECG, COPD review
7	Community nursing services (district nurse or health visitor)
8	Social services
9	Other
10	GPWSI (GP with special interest)

Appendix 6 Research team classification of the presenting problems for the individual patient

Research team classification for the individual patient	Description of the classification for each patient and presenting problem
ACUTE	At least one problem the patient presents with is classified as acute, i.e. listed by de Jong <i>et al.</i> ⁹⁶ or by GP in research team
CHRONIC	Patient has no acute problems AND patient has a record on one or more QOF registers (with any presenting problem/Read code) OR at least one problem the patient presents with is classified as chronic by the GP in the research team
SYMPTOMS	Patient has no acute problems, no record on a QOF register or no chronic problems AND at least one problem the patient presents with is classified as symptoms, i.e. the Read code ⁹⁵ is in chapter R or 1 ⁹⁵ or the Read code is in chapter 2 ⁹⁵ and does not diagnose the problem
MINOR	Patient has no acute problems, no record on a QOF register, no chronic problems or no symptoms AND the problem is classified as acute by de Jong <i>et al.</i> ⁹⁶ or by GP in research team
PREVENTION	Patient has no acute problems, no record on a QOF register, no chronic problems or no symptoms or no minor problems AND has presented for a health promotion or screening activity (e.g. cervical smear test as categorised) by the GP in the research team
ADMINISTRATIVE PROCEDURE	Patient has no acute problems, no record on a QOF register, no chronic problems or no symptoms or no minor problems AND has presented for an administrative procedure (e.g. insurance forms that require medical information) as categorised by the GP in the research team

Appendix 7 Appropriateness of the consultation review

Clinical Review ID.....Reviewer initials.....

Patient information

Year of birth:	Data provided by research team
Gender:	Data provided by research team
Ethnicity:	Data provided by research team
Number of QOF disease registers:	Data provided by research team
QOF disease registers name:	Data provided by research team
Number of repeat prescriptions:	Data provided by research team
No of consultations in previous 3 months:	Data provided by research team

Was the first consultation process conducted appropriately – taking into account that one or more subsequent consultation took place in the following two weeks. i.e. *With the benefit of hindsight was the first consultation as good as could reasonably be expected of an NHS GP in UK practice*

Please tick either appropriate or inappropriate for each aspect of the consultation in the table. The first consultation is labelled '**index**' or '**initial**' with the subsequent labelled '**Other 1, Other 2, Other X....**)

Please write any comments you have regarding 'important missing information' or 'issues' in the appropriate boxes

Weed's SOAP		Appropriate	Inappropriate	Rationale for rating/ Important missing information	Comments/Issues
S	Subjective information				
O	Examination				
A	Investigation				
P	Prescription				
P	Problem				

Clinical Review ID.....

Was the first consultation (the index consultation) conducted appropriately overall according to the available documentation and in the light of the subsequent consultations?

Please tick appropriate, inappropriate or unable to decide

Appropriate

Inappropriate

Unable to decide

If unable, please give reasons (e.g. poor or limited documentation, the way in which problems are conceptualised)

Do you think the index clinician was a Physician Assistant or a General Practitioner?

Please tick one box

Physician Assistant

General Practitioner

Unable to decide

Appendix 8 Unit costs used in calculation of practice-level costs

Staff category	Staff role	Unit costs (per year)	Notes
Medical	GP	£172,223	Unit costs include wages/salaries, on-costs, qualifications (except HCA and phlebotomist), training (GP only), capital and non-staff overheads, from Curtis ¹¹⁹
	PA	£81,453	
	NP	£81,453	
	Practice nurse	£49,860	
	HCA	£33,534	
	Phlebotomists	£27,889	
Administrative and clerical	Practice and surgery managers	£72,097	Remuneration levels were generated from job vacancy advertisements for appropriate NHS posts (outside of London). On-costs and overheads were added using rates from NHS clinical staff with equivalent salaries ¹¹⁹
	Specialist advice (IT, finance)	£72,097	
	Deputy practice managers	£40,504	
	Secretaries and receptionists	£33,534	
	Clerical	£27,889	

Appendix 9 List of commentary papers reviewed, by year

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A decorative graphic consisting of numerous thin, parallel green lines that curve from the left side of the page towards the right, creating a sense of movement and depth.

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