Evaluation of the Physical Activity Care Pathway London Feasibility Pilot – Final Technical Report

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Preface

This evaluation project was commissioned by the Department of Health and commenced in June 2007. The wider context at this time included the Government's focus on developing strategies to address the needs of the most inactive adults in England. The development of a Physical Activity Care Pathway for implementation within primary care settings was a key feature of this work programme and the Department of Health confirmed their commitment to this agenda by commissioning an 18 month pilot evaluation study.

During 2008 the national focus on disease prevention and health promotion increased. Significant documents were launched, including Healthy Weight Healthy Lives: a strategy for the prevention of obesity, NICE guidelines on physical activity and the environment, and NICE guidance on promoting physical activity in the workplace. In addition, the government commenced work on the development of a new policy on physical activity to revise and update 'Choosing Activity: the national action plan for physical activity' published in 2004. In February 2009 'Be Active Be Healthy' was launched and included, as one action, the phased dissemination of the Physical Activity Care Pathway.

At the time of publication of this evaluation report, work is underway to refine the care pathway protocols and resources, including the development of training tools, revisions to the patient and health practitioner resources and the development of guidelines for commissioners.

Acknowledgements

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Finally we would like to thank all the health practitioners and the practices involved in Wave One and Wave Two of this feasibility study, without which this project could not have taken place. The PCTs involved in this study were: Brent, Hammersmith and Fulham, Haringey, Hillingdon, Hounslow and Feltham, Islington, Kingston, Newham, Southwark, Tower Hamlets and Wandsworth.

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EXECUTIVE SUMMARY

Participation in regular physical activity is associated with the prevention of chronic disease and the promotion of health and well-being (Department of Health, 2004). Despite the positive benefits of physical activity, only 40% of men and approximately 30% of women are sufficiently active to benefit their health and the estimated costs of physical inactivity in England are £8.2 billion annually (Craig & Mindell, 2008; Department of Health, 2004; Foresight, 2007).

Promoting physical activity through primary care is recognised as an important approach to health promotion. Based on guidance from the National Institute for Health and Clinical Excellence, brief interventions which are tailored to provide advice and encouragement to support behaviour change are effective at increasing physical activity levels (NICE, 2006). Motivational interviewing has also been identified as an approach to facilitate behaviour change (Scales & Miller, 2003).

In 2007, the Department of Health developed a draft Physical Activity Care Pathway. The Physical Activity Care Pathway involves four key steps: assessment of patients' physical activity levels, brief intervention, signposting to local physical activity opportunities and follow-up consultations. This technical report presents the final results from the feasibility trial conducted by the BHFNC based at Loughborough University.

The trial was undertaken with 14 general practices recruited in two waves to allow for a rolling start to the project and also for lessons learnt from Wave One to inform and improve delivery and implementation in Wave Two. Patients were recruited either 'opportunistically' in routine practice or via disease registers. Patient eligibility was assessed using the following criteria: aged 16 – 74 years, absence of contra-indications, and appropriateness to discuss physical activity with the patient given the context of the consultation. Patients meeting these criteria were assessed for physical activity using the General Practice Physical Activity Questionnaire (GPPAQ; Department of Health, 2006). Patients who were not meeting the current physical activity recommendation, namely 30 minutes of

moderate intensity physical activity on five or more days of the week (Department of Health, 2004), were invited to take part in the care pathway.

The brief intervention (BI) delivered by a primary care health professional involved assessing patients ratings of importance and confidence towards physical activity, goal setting, risk stratification and signposting to local physical activity opportunities. The BI was conducted using motivational interviewing principles and aimed to facilitate patients motivation to change their physical activity behaviour. Patients classified as 'high risk' were signposted only to supervised activity such as an exercise referral scheme. 'Low' and 'medium risk' patients could be signposted to less structured activities.

The Let's Get Moving patient resource pack was developed by the Department of Health with support from Natural England and used in the consultation to facilitate the brief intervention discussion. Follow-up consultations with patients were recommended at three and six months and included the re-assessment of self-report activity levels, goal setting, and providing general support to patients.

The evaluation objectives of this feasibility study included: assessing the relative success of different patient recruitment methods; the feasibility of delivery by different health professionals; identifying characteristics of patients recruited into the care pathway; economic analysis of the care pathway to the NHS; and collation of feedback from practitioners about their experiences of implementation.

This feasibility study included both quantitative and qualitative data collection. Practice data was collected on the administrative tasks involved in delivering the care pathway and de-identified patient level data were collected on recruitment and progression through the care pathway. These data were used to inform the economic analyses. Interviews and focus groups were undertaken with health professionals to capture their experiences and recommendations.

Since the experiences of the Wave One practices involved in this pilot study led to significant modifications of the care pathway protocols for Wave Two, only data collected from Wave Two were included in the main analyses. Wave Two involved

six practices recruiting patients over a 12 week period. Three practices recruited patients 'opportunistically' and three practices recruited via hypertension disease registers.

Key Results:

- This study has provided a very good insight into the feasibility of implementation of the care pathway and suggestions have been proposed for modifications to the care pathway protocols.
- 526 patients were assessed for eligibility for the care pathway; 148 from disease register practices and 378 from 'opportunistic' practices, representing recruitment rates of 16% and 6% respectively.
- The GPPAQ was completed with 449 patients: 14% of patients were classified as 'active', 13% were 'moderately active', 24% were 'moderately inactive' and 50% were 'inactive'.
- 83% (n=367) of patients screened using GPPAQ were interested in the care pathway and the brief intervention consultation.
- Of the 367 patients who were interested in a brief intervention, data were recorded for 315 patients (14% loss of data).
- 96% of patients (n=301) who received the brief intervention were identified as 'ready to change' and received the full BI consultation, including signposting.
- Risk stratification classified 74% of patients as 'low risk' and 24% as 'medium risk'. Only 4 patients (1%) were classified as 'high risk'.
- Of the 300 patients who received signposting, the most frequently signposted activities were 'local authority leisure services' (n=118) and 'self-directed outdoor activities' (n=89). The least frequently signposted activities were 'exercise referral and condition specific classes' (n=4).
- 101 patients attended a follow-up consultation, which took place, on average, 15 weeks (range 4 – 23 weeks) after the brief intervention.
- Total associated costs to the NHS for all components of the care pathway (excluding the cost for training and supporting health professionals) ranged from £620 (Bromley-by-Bow) to £3,388 (Churchill). When the costs of the

training and ongoing practice support are included the overall costs range from £2,445 to £6.933.

- Mean cost per patient to deliver all components of the care pathway (excluding the cost for training and supporting health professionals) range from £48 to £308. Mean cost per patient to deliver the care pathway, including the cost for training and supporting health professionals, range from £124 to £630.
- Feedback from practitioners indicated that the design of the care pathway and the specific focus on how to promote physical activity, helped practitioners raise the topic and emphasise the importance of physical activity to patients.
- The patient-centred method of the brief intervention, with the use of motivational interviewing techniques, was viewed as beneficial and was considered to be helpful in increasing the likelihood of patients changing their physical activity behaviour.
- Feedback from practitioners revealed that many aspects of the care pathway approach to the promotion of physical activity were liked, considered to be feasible, and were perceived to be well received by patients.
- Although this study was not designed to demonstrate the effectiveness of the care pathway to deliver short or long term behaviour change, health practitioners perceived a range of patient benefits including weight loss, “breathing better”, reduced blood pressure and improved mental health and well-being.

Recommendations:

- It is recommended that an effectiveness trial is undertaken to determine the impact of the revised care pathway protocols on patients’ physical activity behaviour.
- An effectiveness trial should incorporate a full economic analysis including a systematic assessment of the health outcomes of the Physical Activity Care Pathway.

- To maximise involvement and availability for patients, training of all staff in the practice should be considered thus allowing multiple staff members to be available to undertake screening, brief interventions and follow-up consultations.
- Two days of training appears necessary to develop the knowledge, skills and confidence to enable practitioners to deliver the care pathway. In addition, practitioners valued the on-going support which was provided throughout the project. Wider implementation will require sufficient resources to adequately train and support health practitioners.
- Patient recruitment to the care pathway should be extended to include other disease registers, and could also be: incorporated into disease management clinics; integrated into 'preventative clinics' (e.g., men's health and women's health clinics); delivered via group consultations on physical activity (similar to smoking cessation).
- Increased publicity of the Physical Activity Care Pathway, for example in the practice and the local community, was suggested as a potentially useful additional component to increase patient interest and uptake.
- The care pathway EMIS templates should be embedded into existing templates to maximise ease and usage.
- An agreed standard risk stratification criteria should be developed.
- Clear guidance is required on how the Physical Activity Care Pathway should be embedded into standard practice, particularly in terms of the implications the PACP may have on existing systems and infrastructure, for example exercise referral schemes.
- Health practitioners suggested that the care pathway protocols should be revised to include just one follow-up appointment at six months to align with other re-call protocols.
- Publishing the Let's Get Moving resource in a variety of languages would facilitate delivery of the brief interventions in languages other than English and would also make the resource accessible for non-English speaking populations.
- Financial backing, for example via QOF, may be needed for practitioners to embed the Physical Activity Care Pathway into standard practice.

1 Background literature to the development of the care pathway

Participation in regular physical activity is well established to be an important factor in the prevention of chronic disease and the promotion of health and well-being (Department of Health, 2004). Adults who are physically active have 20 – 30% reduced risk of premature death and up to 50% reduced risk of developing major chronic diseases such as coronary heart disease, stroke, diabetes and some cancers (Department of Health, 2004). Regular physical activity also reduces the risk of depression and has positive benefits for mental health including reduced anxiety and enhanced mood and self-esteem (Department of Health, 2005).

Despite the positive benefits of physical activity, the Health Survey for England, 2006, reported that 60% of men and approximately 70% of women are insufficiently active to benefit their health (Department of Health, 2008). The estimated costs of physical inactivity in England are £8.2 billion annually, which does not include the contribution of inactivity to obesity, which in itself has been estimated at £2.5 billion annually (Department of Health, 2004; Foresight, 2007).

In 2002, the Government proposed to increase the proportion of the adult population in England who participate in 30 minutes of moderate intensity physical activity on five or more days per week to 70% by the year 2020 (DCMS, 2002). This would require participation levels in England to double in just over 15 years. Current goals focus on increasing physical activity by helping two million more adults to be more physically active by the year 2012 (DCMS, 2008).

Promoting physical activity through primary care is an increasingly popular approach to health promotion. Health professionals come into frequent contact with the whole community and are considered to be a credible source of health advice, hence could potentially be instrumental in helping patients initiate behaviour change (Graham et al., 2003).

The Choosing Health White Paper (Department of Health, 2004) stated that the Government were committed to developing a care pathway for obesity. The aim of the Obesity Care Pathway was to provide evidence-based guidelines to support health professionals identifying and treating children, young people and adults who are overweight or obese (Department of Health, 2004). Care pathways are a comprehensive package designed to enhance health care provision, usually for a specific disease or illness. There now exists a number of care pathways for the management or treatment of conditions such as cardio-vascular disease, stroke and diabetes.

In 2007, the Department of Health, in collaboration with NHS London and Natural England developed a draft Physical Activity Care Pathway (PACP). The primary aim of the Physical Activity Care Pathway was to enable front line health professionals to help sedentary adults and those at risk of adverse health outcomes associated with low activity levels to become more physically active. For a full description of the care pathway refer to Chapter 2.

Brief interventions in primary care

Central to the design of the draft Physical Activity Care Pathway is the use of a brief counselling session known as a brief intervention (BI) to assist eligible and interested patients who are not sufficiently active to identify and plan how they may increase their physical activity levels.

In 2006 the National Institute for Health and Clinical Excellence issued Public Health Intervention Guidance on physical activity, identifying brief interventions within primary care as effective (NICE, 2006). This review included evidence from 11 studies of brief interventions focussed on physical activity, three of which were undertaken in the UK. The Guidance concluded that brief interventions are effective at increasing physical activity levels in the short term (6 – 12 weeks), long term (over 12 weeks), and very long term (12 months or more). Brief interventions can vary in duration and in content from general advice to a more individually tailored discussion of factors that influence participation. In general, the aim is to provide advice and encouragement to support behaviour change.

The NICE review concluded that health care professionals should take the opportunity, whenever possible, to identify inactive adults and advise them to aim for 30 minutes of moderate intensity activity on at least five days of the week. Health care practitioners were recommended to use their judgement to determine the appropriateness of discussing physical activity with patients, taking into account the nature of the consultation and the patients medical condition and / or personal circumstances (NICE, 2006).

In terms of the content of advice given to patients, NICE recommended taking the individual patients' needs and preferences into account, setting behaviour change goals in collaboration with the patient, and the provision of supporting written materials with links to local opportunities to be active. Follow-up with patients was recommended at three and six months (NICE, 2006).

The findings from NICE build on earlier systematic reviews of interventions to promote physical activity that also recommended strategies in primary care (Health Development Agency, 2004). This review highlighted that the provision of on-going support increases the likelihood of sustained behaviour change in the longer term (Hillsdon & Thorogood, 1999).

Brief interventions are often undertaken 'opportunistically' within a scheduled appointment although they can be structured to target and invite a specific patient population group, such as those with specific long term illness (e.g., diabetes or hypertension). The draft Physical Activity Care Pathway evaluated in this project incorporated both approaches for patient entry (a full description of the Physical Activity Care Pathway is provided in Chapter 2).

Critical to the delivery of brief interventions is the manner in which they are implemented. There is interest in using motivational interviewing as an approach to support behaviour change. The following section provides a brief overview of this approach.

Motivational interviewing

Brief interventions often utilise Motivational Interviewing (MI) as a method of facilitating health behaviour change. MI has been described as a directive, client-centred style of counselling that helps clients to explore and resolve their ambivalence about changing behaviour (Rollnick & Miller, 1995). The term *adaptation* of motivational interviewing (AMI) is used to describe interventions that incorporate motivational interviewing alongside non-motivational interviewing techniques, as well as interventions which involve motivational interviewing principles that have been specifically adapted for use by non-specialists (Rollnick et al., 1992). AMI is often a briefer version of MI but it draws upon the fundamental principles, methods and communication style of MI in order to facilitate behaviour change.

Four methods form the typical style of an MI consistent conversation, namely: 1) open questions, 2) affirmations, 3) reflections and 4) summaries. These are often remembered by the acronym OARS (for a more detailed description of MI principles and methods see Miller & Rollnick, 2002; Rollnick et al., 2008). Generally, the style of conversation falls into three main categories: a) guiding; b) following; or c) directing. Traditional healthcare practice often utilises a directing approach where the healthcare professional is 'the expert' and provides the patient with an appropriate solution. Practitioners using MI use a guiding style, and a skilful practitioner will shift from this style to more of a 'following' style as they move through a collaborative conversation with a client.

The application of MI or AMI into healthcare settings is growing as is support for the use of AMI within primary care settings to assist patients in changing lifestyle related risk factors such as physical activity (Scales & Miller, 2003). Earlier work by Hillsdon et al. tested a physical activity intervention in primary care and compared the effectiveness of a brief intervention utilising motivational interviewing, with direct advice (considered 'usual care') and a no intervention control group (Hillsdon et al., 2002). The results showed that giving direct advice to people to increase their physical activity was no more effective than giving no advice. However, the

brief intervention incorporating MI techniques was found to have a greater impact on activity levels.

A recent randomised controlled trial assessed the effectiveness of a primary care physical activity counselling (AMI based) intervention (Hardcastle et al., 2008). Patients were randomised into an intervention group that received standard nutrition and exercise information plus up to five counselling sessions with a physical activity specialist or registered dietician trained in the principles of AMI or a control group that received only the standard information. The results showed that the intervention group significantly increased their walking and overall physical activity level compared to the control group, which suggests the primary care setting can be used effectively by practitioners trained in AMI to promote physical activity.

Dunn et al. (2001) conducted a systematic review of brief interventions implementing the use of MI based methods across several risk behaviours (substance abuse, smoking, HIV risk, and diet / exercise). The review concluded that incorporating MI consistent methods to help change problem behaviour can be effective. Of the four domains reviewed, diet / exercise studies showed the most consistent outcomes with increases in exercise in terms of size and direction. One study included in the review found that among primary care patients, those receiving MI maintained an increase in physical activity for up to three months (Harland et al., 1999).

Summary

In summary, physical activity is a major public health issue and there is interest from the Government to determine the feasibility and effectiveness of interventions to promote physical activity in a primary care setting. Research work has shown promise that integrating motivational interviewing techniques into brief interventions may be an effective and worthwhile approach. These principles along with the recommendations from the NICE review of brief interventions have been incorporated into the new draft Physical Activity Care Pathway.

2 Description of the Physical Activity Care Pathway

The design of the Physical Activity Care Pathway involves four key steps:

- assess patients; level of physical activity and interest in behaviour change to identify eligible and interested patients;
- conduct a brief intervention on physical activity using motivational interviewing techniques, supporting resources and signposting to opportunities for physical activity;
- deliver local physical activity opportunities (undertaken by partners);
- provide follow up consultations at three and six months.

Figure 1 shows the Physical Activity Care Pathway as a step-by-step schema and illustrates a patient's journey through the pathway. The underlying rationale for the care pathway was that the clear steps would offer a mechanism for practitioners to routinely promote physical activity in primary care.

Patient entry into the care pathway

The draft Physical Activity Care Pathway initially incorporated a broad approach to patient entry, including new patient registrations, health screening, and existing condition clinics (e.g., asthma). For the purposes of this feasibility trial, patient entry routes were restricted to two approaches: 'opportunistic' (within a scheduled appointment); and via disease registers.

Practices participating in this feasibility study were allocated to either 'opportunistic' or disease register recruitment, based on the number of patients on their diabetes and hypertension disease registers. Practices with low numbers of patients on the disease registers were assigned to the 'opportunistic' recruitment methodology.

<u>Opportunistic recruitment</u>

Practices utilising the 'opportunistic' recruitment methodology were encouraged to consider every patient for the Physical Activity Care Pathway during routine consultations. The protocol for 'opportunistic' recruitment sites required the health

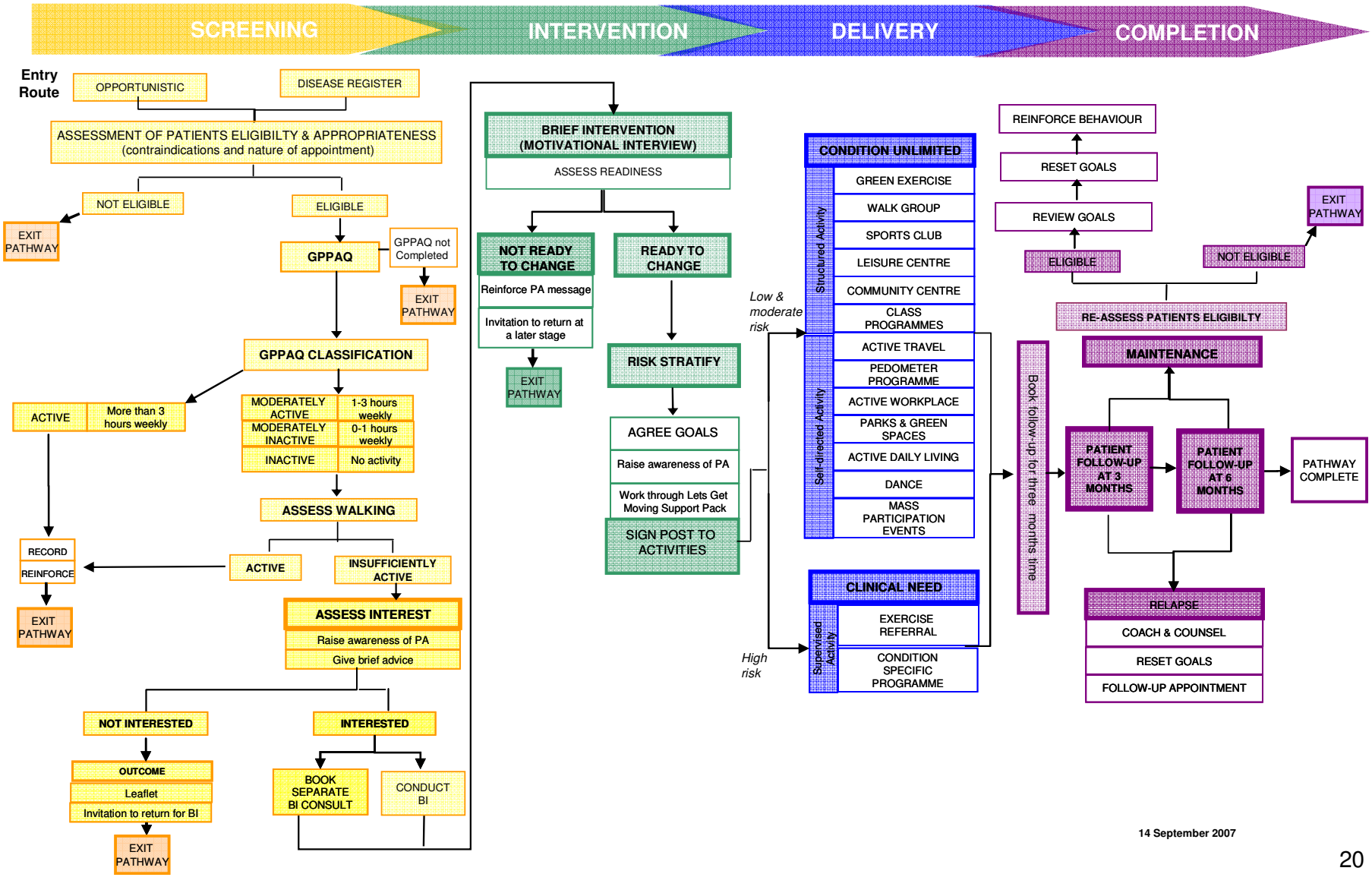
practitioners to consider the eligibility of every patient who attended a consultation during the time that the feasibility study was taking place and to screen each patient for potential eligibility for the care pathway.

Disease Register recruitment

Disease register sites were limited to recruiting patients from either a diabetes or hypertension register. These disease registers were selected for a number of reasons, including the potential cost benefits of increasing physical activity among patients with these conditions. In addition, the relatively large size of these registers compared to other registers such as stroke or COPD, meant the potential to recruit a large number of patients in a relatively short time frame was higher.

Disease register recruitment sites recruited patients via a letter of invitation. Those practices with existing systems in place for recalling patients via a letter were invited to add an invitation to the Physical Activity Care Pathway to this letter (referred to as 'existing letter' in this report). Other practices recruiting patients via disease registers were provided with an electronic letter template which could be modified and used. Practices were encouraged to 'pre-screen' the disease register prior to sending out invitation letters to ensure that letters were not sent to patients who were contra-indicated or not in the appropriate age bracket to take part in the care pathway.

Figure 1. Primary Care Physical Activity Care Pathway (London pilot)



14 September 2007

STEP1 Patient assessment for eligibility and interest in the care pathway

The assessment for eligibility for the care pathway was undertaken in three stages.

Stage One

The initial criteria for patient eligibility for the care pathway were:

- aged 16 – 74 years;
- no contra indications (as defined by the list included in Appendix 1);
- appropriateness of a discussion on physical activity taking into account the nature of the consultation and the patients medical condition and / or personal circumstances.

To assist practitioners in identifying eligible patients they were provided with a checklist of conditions and diseases for which an increase in physical activity would be contra-indicated. The checklist enabled practitioners to quickly appraise a patients suitability for the care pathway. Contra-indications included unstable angina, unstable or acute heart failure and uncontrolled diabetes (for a full list of contra-indications see Appendix 1). For patients with no contra-indications, health professionals used their judgement to determine whether it was appropriate to raise and discuss physical activity with the patient, given the nature of the consultation.

Stage Two

If a patient is deemed eligible (no contra-indications and appropriate to discuss physical activity) the health practitioner used the General Practice Physical Activity Questionnaire (GPPAQ; Department of Health, 2006) to assess the patient's current level of physical activity (for a copy of the GPPAQ see Appendix 2). The GPPAQ is a short, validated tool, intended for use with adults (aged 16 – 74 years) in routine general practice. Administered either as an interview or self completed by the patient, the GPPAQ asks about physical activity at work, physical exercise (swimming, jogging, aerobics), cycling, walking, housework / childcare and gardening / DIY. Responses to the GPPAQ questions can be entered into an Excel spreadsheet which automatically analyses responses and classifies patients based on a physical activity index (PAI). The four categories of the PAI are: 'active', 'moderately active',

'moderately inactive' and 'inactive'. Patients classified as anything less than 'active' were considered eligible for the care pathway.

Although questions relating to walking, housework / childcare, gardening / DIY are included on the GPPAQ, these questions have not been shown to yield data of a sufficient reliability to contribute to an objective assessment of overall physical activity levels and are not included in the calculation of the PAI. It is recommended that the GPPAQ is used in conjunction with a discussion of the responses to these questions, and in particular walking, to determine whether the patient is meeting the Chief Medical Officer's (CMO) recommendation of 30 minutes of moderate activity on five or more days of the week (Department of Health, 2004). For the purposes of the care pathway pilot, patients who included walking in their questionnaire were probed by the practitioner as to the duration and intensity of their walking. If after this further discussion, practitioners believed that the patient's walking was of a moderate intensity, duration and frequency to consider them sufficiently active, the patient's activity behaviours were then praised and encouraged and they exited the pathway as with other active patients. It is recognised that this new recording of patients physical activity levels is an additional step which was not included in the GPPAQ protocols.

Stage Three

For those patients meeting all four eligibility criteria (aged 16 – 74 years, no contra-indications, it is appropriate to discuss physical activity with the patient, and the patient is less than 'active' on the GPPAQ), the health professional assessed the patients' level of interest in attending / receiving a brief intervention consultation. The brief interventions could be undertaken as either an extension of the screening consultation or booked as a separate appointment.

STEP 2 The Brief Intervention (BI)

The purpose of the BI consultation was for the practitioner to utilise a client-centred approach, using motivational interviewing methods, to enhance patients' willingness and confidence to change their physical activity behaviour.

The content of the consultation consisted of the patient and practitioner:

- further discussing the patients physical activity levels;

- assessing the patients ratings of importance and confidence to undertake a more physically active lifestyle;
- discussing barriers to physical activity and ambivalence to change;
- setting physical activity related goals.

The brief intervention consultations were conducted using motivational interviewing methods. This involved asking open-ended questions, utilising affirmations, reflective listening, and using summary statements to help facilitate patients motivation to change their physical activity behaviour.

During the BI, health practitioners explored patients' physical activity behaviour by asking patients about the number of days and the total amount of time spent being physically active in the past week. The purpose of these questions was to gain a better understanding of the amount of activity which patients undertake and to help initiate discussions around increasing physical activity levels.

Confidence to change and the perceived importance of increasing participation in physical activity were assessed using two simple 'rules'. The rulers were scaled 1 – 10 and were used as a technique to incorporate the basic elements of motivational interviewing, including appreciating ambivalence, eliciting change talk, empowering, and collaborating. The rulers were specifically designed to provide an indication of patients' views on how ready they were to change as well as attitudes and intentions to change their physical activity behaviour. Copies of the importance and confidence rulers were included in the Let's Get Moving patient resource and have been set out in Appendix 3. Using the self-rated scores of importance and confidence, the health practitioner was asked to stimulate further discussion on physical activity focussing on perceived barriers to leading a more physically active lifestyle. Health professionals were also encouraged to establish physical activity goals in collaboration with the patient.

For the purposes of the care pathway, a new set of risk stratification criteria was developed based on existing criteria used in exercise referral schemes underway across London and the Irwin and Morgan (2003) traffic light system (see Appendix 4).

As practitioners had access to patient record systems, they were able to assess whether patients were 'high', 'medium' or 'low risk' based on their disease status, thus allowing the practitioner to signpost patients to appropriate physical activity options. Patients stratified as 'high risk' were signposted to supervised activity such as an exercise referral scheme or a condition specific activity class, however these patients could only be signposted if they met the acceptance criteria for these services. Patients stratified as 'medium' or 'low risk' were signposted to a variety of local physical activity opportunities, including local authority leisure services, local health walk groups, and active travel. Although 'high risk' patients were restricted to clinically supervised activity, the underlying principle of the signposting step was that decisions were made in collaboration with the patient.

The Let's Get Moving resource was used to facilitate the brief intervention discussion. In brief, the resource contained information on the benefits of physical activity, the concept of 'moderate intensity' activity, goal setting, and local physical activity opportunities. The resource also contained details of a local physical activity co-ordinator who could provide additional information and support. Further details of the Let's Get Moving resource can be found in Chapter 4.

STEP 3 Delivery of physical activity opportunities

The care pathway protocols involve health professionals signposting patients to physical activity opportunities within their local community. A wide variety of physical activity options were available, including health walks, sports clubs, pedometer loan schemes and 'green exercise'. This variety was to ensure the pathway was appealing to a wide and diverse population. It was considered particularly important for the care pathway to offer activities based around walking and active living as the Department of Health recognises that for many adults, particularly the most sedentary, activity needs to be built into every day life and routines.

The physical activities were delivered by local partners, including local authorities, sports clubs, and private health and fitness clubs. Where appropriate, patients could be signposted to activities such as self-directed walking, which could be undertaken free of charge and unsupervised. Details of all local physical activity opportunities

were included in the Let's Get Moving resource pack. This information could be referred to by practitioners when signposting patients to physical activity opportunities and was given to patients to take away at the end of the consultation. Patients therefore had details of a menu of options which they could access in addition or as an alternative to the 'signposted' activities.

STEP 4 Follow-up consultations

The care pathway protocols requested that patients who received the brief intervention were invited to attend a follow-up consultation at three and six months. The general content of the follow-up consultations included:

- assessment of patients self-report physical activity levels;
- discussion around the attainment of initial goals;
- setting new physical activity goals (if appropriate);
- discussion around alternative physical activity opportunities which patients may wish to undertake;
- providing general support to patients to help facilitate sustained increases in physical activity.

Follow-up consultations were also conducted using motivational interviewing techniques and were primarily aimed at providing on-going support to patients and their efforts to lead a more physically active lifestyle.

3 Health practitioner training

A two-day training course was developed to orientate health professionals in the delivery and implementation of the care pathway. Following extensive consultation, two days was considered to be the maximum length of time that practice staff could be released for training. The core elements of the training course were:

- an introduction to physical activity (including health benefits and the current CMO recommendations);
- introduction to the National Step-o-Meter programme and pedometer loan pack;
- participation in a health walk to facilitate understanding of the term 'moderate intensity' and how health walks operate;
- a review of the care pathway steps, protocols and resources;
- an introduction to the GPPAQ, including how to complete the GPPAQ and obtain a Physical Activity Index for patients;
- an introduction to motivational interviewing principles and techniques for use in the brief intervention;
- training in the electronic data collection templates to inform the evaluation of the care pathway.

The training session was developed and delivered by two trained MI practitioners who are members of the Motivational Interviewing Network of Trainers (MINT)[1]. In addition, members of the evaluation team attended the training to provide content input on the evaluation of the care pathway and data collection tools and methods. Further details of the content of the training are included in Appendix 5.

Each participating health professional received the two-day training course approximately three weeks prior to commencing the recruitment phase of the care pathway. An evaluation of the Wave One training course informed the content and structure of training for Wave Two. For more details of the evaluation of the training and modifications that were made for Wave Two, see Section 6.

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In addition to the training course, practitioners received a follow-up site-visit at their practice by a member of the evaluation team. Although the site visits were tailored to the individual needs of each practice, they usually consisted of:

- clarification of patient entry protocols;
- uploading of the GPPAQ Excel spreadsheet;
- an opportunity to practice using the GPPAQ;
- uploading of Egton Medical Information System (EMIS) templates to track patients movements through the care pathway ;
- an opportunity to practice using the EMIS templates to record care pathway delivery to inform the evaluation;
- step-by-step tuition on the content and completion of evaluation tools;
- a role play consultation to allow practitioners to build confidence in utilising motivation interviewing.

In addition, the evaluation team provided one-to-one support to practitioners and addressed, where possible, all issues regarding delivery of the care pathway in their individual settings.

4 Physical Activity Care Pathway materials

The care pathway was supported by three sets of materials:

a. a selection of British Heart Foundation (BHF) physical activity leaflets;
b. Health Practitioner Guide and risk stratification sheet;
c. Let's Get Moving patient resource pack with inserts.

British Heart Foundation (BHF) physical activity leaflets

Three BHF physical activity leaflets were incorporated into the care pathway. The relevant leaflets were given to patients identified as 'eligible' but who did not express an interest in making changes to their level of physical activity at the time of the consultation. The content of the leaflets provided patients with information on the role of physical activity in chronic disease prevention and management as well as overall benefits for improved health and well-being. It was hoped that this information would encourage patients to consider making changes to their physical activity behaviour in the future. Patients were encouraged to return for a care pathway consultation if they re-considered their interest.

Practices recruiting patients 'opportunistically' used the BHF 'Get Active' leaflet which addressed the benefits of physical activity and how to get started. Practices recruiting patients via either the diabetes or hypertension disease registers utilised the BHF 'Physical Activity and Diabetes' and 'Physical Activity and High Blood Pressure' leaflets which provided disease-specific information on the benefits of physical activity.

Health Practitioner Guide

The Health Practitioner Guide was an information resource for practitioners to assist in their overall understanding of the care pathway design and how to deliver the care pathway in practice. The contents of the pack reflected the various stages of the care pathway, from initial patient screening and the brief intervention, through to the follow-up consultations. A copy of the care pathway schema was included in the pack, as well as eligibility guidance, details of the evaluation methods and tools, and all Power

Point slides and materials used throughout the two-day training course. One of the most important elements of the resource pack was the quick reference (reminder) guide to motivational interviewing techniques suitable for use in the brief intervention. Specifically, copies of the questions used to assess 'readiness to change' behaviour were included. The question guide was designed such that it could be removed from the resource pack and placed conveniently in the consultation room for use as required.

A second important component of the resource pack was the guide to risk stratification which indicated the risk of a patient having an adverse event or incident, based on their individual disease profile. This laminated card was also designed for easy use and display in the consultation. The risk classification system was used to determine which physical activity signposting options were suitable for patients. The risk stratification guide was for use by all health professionals involved in delivering the care pathway in both 'opportunistic' and disease register recruitment sites.

Let's Get Moving patient support pack and inserts

The Let's Get Moving resource aimed to provide patients with the necessary information to support them in making behaviour change to increase their physical activity levels. The pack was used to facilitate the brief intervention consultation and was given to patients to take away and read in more detail.

The Let's Get Moving patient resource pack is a generic booklet containing a number of MI consistent sections which address motivation to exercise, the importance of physical activity, goal setting and a physical activity diary to help monitor progress. In addition, the Let's Get Moving resource contained inserts of physical activity opportunities which were tailored to each local area, a goal setting sheet and an activity diary. The information for these leaflets was supplied by the local PCT / local authority and included information on local authority leisure services and sports clubs. A map indicating walking and cycling routes and areas of open green space were developed by Natural England and tailored to each participating practice. This resource also contained details of outdoor activities and facilities.

5 Evaluation of the Physical Activity Care Pathway

The evaluation of the Physical Activity Care Pathway London Feasibility Pilot was conducted by researchers at the BHF National Centre for Physical Activity and Health, based in the School of Sport and Exercise Sciences at Loughborough University.

Evaluation aims and objectives

The overall aim of the evaluation of the Physical Activity Care Pathway was to assess the feasibility of implementation in general practice and collect field experience to help refine a 'best practice' model or standard pathway.

More specifically, the evaluation objectives were to:

- assess the practicability of delivering the care pathway to patients 'opportunistically' and via disease registers to explore any differences in the rate of uptake into the care pathway;
- explore the feasibility of implementation of the care pathway by different health professionals (e.g., general practitioners, practice nurses, health care assistants);
- determine the rate of recruitment and characteristics of those patients interested in receiving the brief intervention consultation;
- explore the feasibility of conducting the brief intervention (stage two of the care pathway) as part of the screening consultation and as a stand alone appointment;
- gain feedback from practitioners on implementation and perceived benefits of the care pathway for their patients;
- determine the cost of implementing the care pathway in practice.

Evaluation design and methods

This feasibility study was a non experimental design series of case studies in a convenient sample of general practices. The evaluation methods included both quantitative and qualitative data collection.

The study was undertaken with two waves of participating general practices, thus allowing a rolling start to the project and also for lessons learnt from Wave One to inform and improve delivery and implementation in Wave Two. Wave One included eight practices across five London Primary Care Trusts (PCT) and Wave Two involved a further seven practices from an additional six London PCT's. One practice dropped out of Wave Two due to unexpected staff shortages. In total, 14 practices were involved in implementing the care pathway across the two waves.

Recruitment of practices was initiated by a letter which was sent out by the London Regional Director of Public Health. Practices were required to complete an application process, providing details on the number of health professionals who would attend training and deliver the care pathway, average number of weekly consultations, number of patients on the disease registers and information technology (IT) expertise at the practice (to assist in uploading the EMIS templates and extracting relevant data). A panel consisting of the Department of Health, the NHS physical activity leads, Natural England and the BHFNC selected practices based on perceived ability to recruit patients over a relatively short time-frame and to collect and provide appropriate data for the evaluation of the care pathway.

The National Research Ethics Service (NRES) advised that this pilot, including its evaluation, was within the category of 'audit' and did not require research ethics approval. The Caldecott Guardians of all PCT's participating in the care pathway were advised of the care pathway protocols and the associated evaluation activities.

The evaluation methods involved three key components:

1. Process evaluation to track patients entry and steps through the care pathway using the Egton Medical Information System (EMIS) or similar systems.
2. Economic analysis to determine the costs of implementation.
3. Focus groups and interviews to collect the experiences of health practitioners involved in delivering the care pathway.

These evaluation methods are explained in more detail below. In addition to the three main components of the evaluation, the evaluation team held weekly telephone calls and maintained regular e-mail communication with participating health practitioners at each practice. The aims of the weekly contact with practices were to collect feedback on the facilitators and barriers to implementing the care pathway, and to help support practitioners with any difficulties they were experiencing in delivering the care pathway and / or collecting the evaluation data using EMIS. This regular contact also enabled the evaluation team to monitor recruitment rates and patient follow-up figures.

1. EMIS

In order to track patients progression through the care pathway, electronic data collection tools were built into the Egton Medical Information System (EMIS), a computer software package commonly used in primary care. The EMIS templates were the main mechanism for collecting data on which components of the care pathway were delivered to individual patients. Templates were completed by the health professionals involved in the care pathway delivery and were completed during patient consultations.

Four EMIS templates were designed to reflect the consultation steps involved in delivering the care pathway:

- Template1 - assessment of eligibility;
- Template 2 - brief intervention;
- Template 3 - three month follow-up; and
- Template 4 - six month follow-up.

The EMIS template for the screening consultation (Template 1) included questions on patient eligibility for the care pathway, use of the GPPAQ and whether walking was discussed with the patient. Practitioners also recorded whether or not the patient was interested in receiving a brief intervention and use of resources, for example the BHF physical activity leaflets.

Template 2 was designed to capture data on what the patient received as part of the brief intervention. This included whether the importance and confidence rulers were used, whether specific physical activity goals were discussed and set, whether the patient was given a Let's Get Moving patient resource pack, and which physical activity opportunities the patient was signposted to, if any.

Templates 3 and 4 of EMIS were designed to capture data on follow-up consultations at three and six months respectively. This included whether practitioners re-assessed patients physical activity levels, whether the patient had met their physical activity goals, whether new goals were set and whether patients had used the Let's Get Moving resource.

Each template asked the health professionals to estimate how long they spent discussing physical activity with the patient. A copy of the questions included in each EMIS template (1 – 4) can be found in Appendix 6.

Data were downloaded from patient records using a MIQUEST[2] search which was conducted either 'locally' at the practice or 'remotely' via the PCT. The MIQUEST search extracted all data recorded on the care pathway EMIS templates as well as selected patient demographics such as age, gender and ethnicity.

In one participating practice an alternative software system (Synergy) was used as opposed to EMIS. This practice was provided with the relevant questions and developed their own data collection tools that were compatible with Synergy. Data

[2] MIQUEST is a methodology and an approach to common data access which enables enquirers to execute queries and extract data from different types of general medical practice computer systems using a common query language.

were downloaded utilising a similar search to the MIQUEST search which was performed in EMIS based practices.

2. Economic analysis

Brunel University were responsible for co-ordinating and undertaking the economic analysis in collaboration with the evaluation team. The aim of the economic analysis was to determine the costs to the NHS of implementing and running a physical activity care pathway in primary care under different delivery strategies. Secondary aims were to describe the main cost drivers and make judgements about a best practice delivery model from an economic perspective using sensitivity and scenario analysis.

The general approach involved applying a micro-costing model which allowed for the measurement of the resources consumed by individual patients and facilitated the allocation of single cost items to each patient. Specifically, a time-driven modification of the activity based costing (ABC) approach was applied (Department of Health, 2007). Since traditional ABC suffers from difficulties in implementation and maintenance, this approach offers a simplified but accurate alternative. Time driven ABC requires, in principle, estimates of only two parameters: The unit cost of capacities supplied and the time required to perform a transaction or an activity (Kaplan & Anderson, 2004). As this analysis focussed on the costs to the NHS, costs incurred to participating patients, local authorities and / or charities (e.g., the British Heart Foundation National Centre and Natural England) were not included.

Traditional macro, or 'top-down' costing frameworks, allocate costs based on averages and apportionments. This is not appropriate for the care pathway due to its strong focus on the individual patient and the opportunity to analyse data on the actual care provided to each patient.

<u>Data inclusion / exclusion</u>

Since the experiences of Wave One practices involved in this pilot study led to significant modifications of the recruitment pathways, training and implementation, only data from Wave Two practices were included in the economic analysis.

Data requirements and sources

To derive cost estimates for the care pathway on an individual patient level the following data were required:

- the individual steps of each patient through the pathway protocol (for example, patient entry route, attending a screening consultation, receiving the brief intervention, receiving a follow-up consultation);
- the actual resources used per patient at each stage of the pathway (for example, time spent conducting main activities, namely the screening consultation, the brief intervention and follow-up consultations, and time spent on support activities including contacting patients);
- the unit cost of the resources supplied within the pathway (for example, the unit cost of GP's and associated members of staff and the unit cost of support materials).

Data on patient flow through the care pathway and resource use was captured by EMIS. However, for some necessary variables in the costing model, EMIS could not provide the required information. These data were obtained on an average, rather than an individual patient level, using a two-step method. First, a survey was sent to participating practices (Appendix 9) and practices were given several weeks to respond. If the survey was not returned, questions were not answered, or answers were not in the same ballpark when compared with other practices, the second step involved contacting these practices via telephone to gain information or reconfirm their initial responses. This approach facilitated a high compliance of participating practices and ensured that no answers were missing and no questions were misunderstood.

The practice survey included items on:

- staff involved in screening disease registers;
- total number of disease register patients contacted;
- methods used to contact patients (letter, phone call, text message);
- number of consultations booked;
- number of consultations attended;
- time associated with each support activity related to the care pathway (including drafting and posting of letters and booking appointments).

An overview of the data collected through EMIS and the survey and practice contact is shown in Table 1. A detailed list of all EMIS variables entering the costing model can be obtained from Appendix 10.

Methods for quantifying resource use

Within the participating practices, a variety of practitioners may have undertaken different tasks associated with delivery of the care pathway, including general practitioners as well as associated members of staff such as nurses, receptionists, medical secretaries and practice managers. In addition, support resources were supplied within the care pathway, for instance space, technical equipment, telecommunication and furniture.

The time required by a practitioner to perform an activity captures the resource use for the care pathway. Resource use per patient was calculated as the time each patient spent absorbing these resources. Whenever possible, resource use was estimated on an individual patient level. Specifically, all of the main activities of the care pathway performed at the practice were captured by the time the health professional spent with each patient (i.e., screening consultations, brief interventions and follow-up appointments).

For support activities, average estimates for resource use were computed for each participating practice and a binary variable (Yes / No) indicated whether these support activities were supplied to an individual patient. For example, to assign resource use for postage of invitation letters sent to patients on disease registers, the total time spent by the responsible person to write a standard letter was divided by the number of invitations sent. Then, the time to complete one invitation (address, print, sign, etc) and the resources used for delivering the letter were added. Since EMIS provided information on how each patient was contacted, the average estimate on resource use for invitation letters could then be assigned to each patient who entered the pathway and who was previously contacted by mail. Table 2 provides information on resource use and source of data.

Table 1. Data requirements and data sources for the costing exercise

Groups of required data points	Classification	Patient level / average data	Data source / method of data collection
Patient entry route	Patient flow	Patient level	EMIS
Patient eligibility	Patient flow	Patient level	EMIS
Patient interest	Patient flow	Patient level	EMIS
Patient attendance at each consultation	Patient flow	Patient level	EMIS
Health professional at each consultation	Resource use	Patient level	EMIS
Length of each consultation	Resource use	Patient level	EMIS
Supply with support material (BHF leaflet*, Let's Get Moving support package)	Resource use	Patient level	EMIS
Patient compliance to assigned activity	Resource use	Patient level	EMIS
Support activities (contacting patients, booking appointments etc)	Resource use	Average	Survey / interview
Practice staff assigned to support activities	Resource use	Average	Survey / interview
Attendance of practitioners at training prior implementation of the care pathway	Resource use	Average	Records from Evaluation Team
Time spent by evaluation team for ongoing practice support	Resource use	Average	Records from Evaluation Team
Direct cost of postage, phone calls, text messages	Cost	Average	Survey / interview
Unit cost of GPs	Cost	Average	Literature / assumptions
Unit cost of practice staff (nurses, receptionists, medical secretaries, practice managers)	Cost	Average	Literature / assumptions
Unit cost of consultant responsible for two days training prior to implementation of the care pathway	Cost	Average	Contract between Innovative Health Consultancy and DH
Unit cost of researcher responsible for ongoing practice support	Cost	Average	Full Economic Costing (fEC)
Unit cost of support resources – capital costs and overheads	Cost	Average	Literature / assumptions
Development and production cost of support material (Let's Get Moving support package)	Cost	Average	DH
NHS cost of physical activities	Cost	Average	DH
Patient age, gender ethnicity, risk stratification etc	Patient characteristics	Patient level	EMIS

* The BHF leaflet can be obtained by practitioners free of charge from the British Heart Foundation. Hence, no costs occur to the NHS for the use of BHF leaflets within the care pathway

Table 2. Resource use measures

Activity supplied	Resource use measure	Source
Main activities within the GP practice		
Screening consultation	The time which health professional spent with individual patient for care pathway	EMIS*
Brief intervention	The time which health professional spent with individual patient for care pathway	EMIS*
Follow-up appointment	The time which health professional spent with individual patient for care pathway	EMIS*
Support activities within the GP practice		
Screening disease register	Average time per patient screened spent by responsible person in the practice (assigned to all patients screened through disease registers)**	Survey / interview** (EMIS)*
Postage	Average time per letter spent by responsible person in the practice (assigned to each patient contacted by letter)**	Survey / interview** (EMIS)*
Telephone	Average time per phone call spent by responsible person in the practice (assigned to each patient contacted by phone)**	Survey / interview** (EMIS)*
Text messaging	Average time to send a text message spent by responsible person in the practice (assigned to each patient contacted through SMS-service)**	Survey / interview** (EMIS)*
Booking appointments	Average time per patient spent by responsible person in the practice (assigned to each patient every time an appointment was booked)**	Survey / interview** (EMIS)*
Support materials		
Support package	Assigned to patient if he/she received a Let's Get Moving support package	EMIS*
BHF leaflet	No resource use from a NHS perspective (Leaflets can be obtained by practitioners free of charge from the British Heart Foundation)	EMIS*
Other Support activities		
Training prior implementation of the care pathway	Total time spent by participating practitioner assigned to each participating practice	Records from Evaluation Team
Ongoing practice support	Total time spent by member of the evaluation team assigned to each participating practice	Records from Evaluation Team

* Individual patient level data

** Average data assigned to individual patients through a binary variable collected by EMIS on patient level

Table 3. Unit cost estimates

Resource supplied	Resource use measure	Unit cost (2007)	Source for unit cost
Participating GP practice (estimates reflect salaries, salary on-costs, qualifications* , practice overheads and capital costs)			
GP*	Time spent per patient	£100.79/h	Netten & Curtis (2007) Appendices 3 and 4
Nurse*		£26.41/h	
Nurse (intermediate level)*		£30.89/h	
Nurse (advanced)*		£37.84/h	
Healthcare assistant	Time spent per support activity	£15.31/h	Own calculation based on Netten & Curtis (2007) Appendix 4
Receptionist		£15.31/h	
Medical secretary		£16.79/h	
Healthcare assistant (higher level)		£16.79/h	
Medical secretary (higher level)		£19.15/h	
Practice manager		£22.15/h	
Practice manager (higher level)		£26.42/h	
Let's Get Moving support package			
Care pathway pilot: 6pp with pocket + 8pp stitched text, 350gsm/130gsm coated silk	Direct cost, assigned to each patient receiving the support pack	£12.91/pack	Department of Health Appendix 5
Scenario 1: Straight reprint of current folder (500,000 packs), 6pp with pocket + 8pp stitched text, 350gsm/130gsm coated silk		£0.45/pack	
Scenario 2: Amend artwork to create a booklet of 12pp text + 4pp cover, no pocket (500,000 packs), 350gsm/130gsm coated silk (as before)		£0.35/pack	
Scenario 3: As option 2 but with additional non-capacity pocket on back cover (500,000 packs) 350gsm/130gsm coated silk (as before)		£0.39/pack	
Scenario 4: Amend artwork to create a booklet of 12pp text + 4pp cover, no pocket (500,000 packs), 250gsm/130gsm coated silk		£0.32/pack	
BHF leaflet			
British Heart Foundation (BHF) physical activity information leaflet	--	Free of charge for GPs	BHF annual report, 2007
Physical activities			
Local authorities	No additional cost to the NHS	£0.00	Personal communication with DH
Private clubs			
Sports and dance			
Pedometer			
Outdoor activities			
Exercise referral schemes			
Other cost items			
Stamp 1st class	Direct cost, assigned to each patient contacted by mail	£0.36/stamp	Royal mail price finder
Stamp 2nd class		£0.27/stamp	
Paper		£0.02/sheet	Assumption
Envelope		£0.05/envelope	Assumption
Charge per text message	Direct cost, assigned to patients contacted by text message	Free of charge	Practice survey
Phone charge per minute	Average time of phone call with patient, assigned to patients contacted by phone	£0.03-£0.09	Practice survey
Cost / hour of member of evaluation team who was responsible for ongoing practice support	Time spent with practice support per practice	£47.00/h	Full Economic Costing

Methods for obtaining the unit cost of resources

Costs of resources consumed in performing activities involved in the care pathway were estimated using either direct or modified estimates from Netten and Curtis (2007). Unit cost estimates for GPs and practice nurses (including their share of overheads and capital costs) were directly taken from Netten and Curtis (2007). For healthcare assistants, receptionists, medical secretaries and practice managers, unit cost estimates were derived by making the same assumptions, using the same sources, and applying the same model as Netten and Curtis (2007). In general, unit costs were calculated as shown in Figure 2.

Figure 2. Unit cost calculation

$$\text{Unit cost} = \frac{\text{Total cost}}{\text{Quantity}} \quad \text{or} \quad \frac{\text{Annual cost of capacity supplied}}{\text{Annual practical capacity of resources supplied}}$$

The unit cost estimate of a GP reflects the net renumeration, qualifications and ongoing training, as well as capital costs, overheads and other practice expenses but excludes all expenditures on drugs. Unit cost estimates of other practice staff generally include expenses for wages / salary, salary on-costs, qualifications (only considered for nurses), as well as a proportion of practice capital costs and overheads. Qualifications and advanced level training for nurses were annuitized over the expected working life (Netten & Curtis, 2007). In order to increase the generalisability of this costing exercise, all cost estimates represent national averages rather than London weighted unit costs. Further details on the calculation of unit costs of GPs and associated members of staff can be obtained from Table 3 and Appendices 11 and 12.

Although developed with a view to a wider print run, the Let's Get Moving support package has only been used for the care pathway pilot and was therefore initially produced on a low scale (only 2380 packs). As a consequence, the spending on this resource may seem disproportionate in the economic analysis of the care pathway. However, as it is intended to make the pack more widely available (with a target

number of up to 500,000 packs)[3] the actual cost of development, design and printing of the support packages would be spread across a wider roll out. Therefore the cost of the support pack are firstly limited to the recruitment within the care pathway study, and then secondly calculated for a national roll out of this resource. Depending on the printing options considered for this national roll out, several cost estimates were calculated to conduct a set of scenario analysis (Table 3 and Appendix 13). The figures used to derive cost estimates for support packages were obtained from the Department of Health. It is recognised that Natural England invested a large amount of resources in the production of practice-specific local area maps which were included in the Let's Get Moving pack. It has since been acknowledged that these inserts would be too costly to produce on a wider scale and a more basic map and insert would be made available for the purposes of a national roll out. As a result, costs associated with Natural England's contribution to the resource are not included in the analyses.

The BHF leaflets on physical activity were provided to patients classified by the GPPAQ as having a PAI other than 'active' and who were not interested in a brief intervention. As the British Heart Foundation is neither part nor wholly funded through the NHS, and leaflets can be obtained by health professionals free of charge, no costs were incurred to the NHS for the use of the BHF leaflets within the care pathway.

Signposting

Patients were signposted to physical activity opportunities as part of the care pathway, all of which already existed within the local community setting. It is recognised that there are external costs associated with delivering many of these activities, however these costs were not considered in this report for two reasons. Firstly, this pilot study aimed to determine the costs to the NHS for delivering the care pathway. The only activities which run at a cost to the NHS were those related to 'high risk' patients and include exercise referral schemes and condition-specific classes. These activities already existed prior to implementation of the care pathway and the assignment of patients to these activities did not induce the need to increase the capacities supplied. Hence, these activities were not associated with additional costs to the NHS. Secondly, the external costs of delivering such a diverse range of physical activity

[3] Personal communication with Department of Health (Anthea Fitzsimons)

options vary considerably and to make an accurate judgement of average costs of each activity was not possible. For these reasons, all physical activity opportunities which form part of the delivery stage of the care pathway were allocated zero cost.

Training

The cost of running the two-day training represents an investment prior the implementation of the care pathway and was attended by between one and three practitioners from each of the participating practices. The training session was delivered by a consultant with a clinical background in physical activity and smoking cessation and a research background in physical activity and behaviour change. The consultant was paid a total of £10,650 to run three two-day training events, two for Wave One practices and one for Wave Two practices. Therefore, costs of training were allocated equally to each of the 15 participating practices in Wave One and Wave Two. This equates to £710.00 per participating practice which is inclusive of course development and delivery.

In addition, follow-up telephone support was provided from the evaluation team following the training session to help practitioners with any difficulties they were experiencing in the first weeks of delivery of the care pathway. This practice support was retrospectively deemed crucial for successful delivery and it is therefore likely that a similar level of support would be required in the case of wider implementation of the care pathway. For this reason, the cost of an estimated four hours of support per practice at an hourly rate of £47.00 was included (Appendix 14). This estimate reflects the full economic cost of the researcher at Loughborough University who was responsible for delivering follow-up practice support. Full economic costs were used for consistency, since this approach was used to calculate cost estimates of other staff involved in delivering the care pathway. In the case of a wider roll out of the care pathway it is likely that follow-up practice support might be provided by local physical activity leads or health care assistants. It is recognised that the cost estimate for these staff might be different from the full economic cost of the researcher who provided practice support throughout the pilot project.

As mentioned, the cost of training and practice support constitutes an investment prior to implementation of the care pathway. Since the total cost should be allocated to

those patients successfully recruited into the care pathway, the cost per patient over time would tend towards zero as patient numbers in the care pathway increase. However, since Wave Two of the care pathway pilot only recruited patients for 12 weeks, the training cost actually represents the highest single cost item within the care pathway pilot. To highlight the significance of these costs, total cost and cost per patient will be represented with and without taking into account the costs of training and practice support. However, sensitivity and scenario analysis will be conducted using cost estimates which do not reflect these one-off investment costs.

3. Focus groups and interviews

Focus group discussions and telephone interviews were conducted to collect insights and experiences from health professionals involved in implementation of the care pathway. These data would support the interpretation of data collected from other data sources (i.e., EMIS) and assist in understanding the overall feasibility of the Physical Activity Care Pathway.

One focus group was conducted with six practitioners from Wave One practices. This focus group discussion was conducted shortly after the end of the initial recruitment phase and around the time of three month follow-up. The focus group was particularly aimed at capturing the lessons learnt from Wave One to inform Wave Two implementation. A semi-structured interview guide was used which was exploratory in nature and sought to capture valuable information regarding specific experiences and challenges of the care pathway. Results from Wave One were used to inform modifications to the training and delivery of the care pathway by practices recruited for Wave Two.

Discussion topics included:

- training;
- experiences of using the GPPAQ;
- experiences of utilising motivational interviewing with patients;
- the care pathway resources;
- benefits of the physical activity care pathway for patients;
- recommendations for modifications to the care pathway.

A second focus group was conducted with five practitioners from Wave Two practices. A revised interview guide was prepared and discussion topic areas were designed to address each component of the care pathway, namely patient screening; use of the GPPAQ; delivery of the brief intervention; recalling patients for follow-up consultations; and the use of supporting materials and resources. A copy of the focus group interview guides for Wave One and Wave Two are in Appendix 7 and Appendix 8 respectively.

Following the analysis of EMIS data from Wave Two practices, telephone interviews were undertaken with five health professionals involved in delivering the care pathway in Wave Two. The primary aim of the telephone interviews was to assist in understanding differences in the delivery of the care pathway between practices. Individual interview guides were developed for each practice based on key findings from the EMIS data. Theme areas for the questions were patient entry routes, screening for eligibility, content of the brief interventions, and experiences of recalling patients for follow-up.

6 Results

The evaluation of the feasibility of the Physical Activity Care Pathway used a mixed methods approach and was conducted with 14 practices recruited across two waves. Originally, data from both waves were to be pooled for a combined analysis, however, due to the experiences and limitations in both the training and implementation during Wave One, it was decided to utilise these data only to inform and improve delivery of the care pathway in Wave Two. As a consequence of the learning from Wave One significant changes to training, protocols and the delivery of the care pathway were made in Wave Two. Thus, only data collected from Wave Two were included in the main analyses and are shown in the flow charts of patients progression through the care pathway. Similarly, only Wave Two data were included in the economic analyses.

In this section, firstly the key learning points from Wave One are presented. This includes the evaluation of the Wave One training session, focus group results and a summary of changes made to the training and care pathway protocols for Wave Two. This is followed by the results from Wave Two which are presented in three main sections.

- Tracking of patients through the care pathway using EMIS.
- Economic analysis.
- Qualitative feedback from practitioners on implementation.

Evaluation of Wave One training

The evaluation team attended the two-day training to assist and observe in order to identify any improvements and recommendations for Wave Two. The site visits to Wave One practices also provided an opportunity to gain insight into practitioners experiences of the training and early efforts at implementing the care pathway in practice. Summary notes were recorded after the two-day training session.

Key learning points

- Overall the two-day training session was well received by practitioners.
- Training led to an increase in confidence among practitioners in promoting physical activity in their practice.
- Training would have been more beneficial if the care pathway resources, particularly the practitioner support pack, had been received in advance of the training.
- The motivational interviewing training was generic and not sufficiently tailored to the promotion of physical activity.
- More information on the care pathway protocols and pilot evaluation methods (EMIS) should be incorporated in the two-day training session rather than delivered in isolation during the practice site visit.
- EMIS templates developed for use in the pilot should be available during the training, as this would provide practitioners with an opportunity to familiarise themselves with the questions, response options and protocols.
- Practitioners particularly valued undertaking a 'mock consultation' with the evaluation team during the site visit, this should be continued and / or added to the two-day training session.

Modifications to the training session for Wave Two

- The practitioner resource pack was sent to practitioners in advance of the two-day training course.
- Day one of the training was revised to focus on the care pathway protocols and evaluation in addition to existing physical activity content.
- Motivational Interviewing training was specifically tailored to physical activity and the delivery of the care pathway.

- Role plays delivered by the trainers were more closely tailored to a typical care pathway consultation, including the use of the motivational interviewing principles and the Let's Get Moving resource.
- Although EMIS could not be provided 'live' at the training session, screen shots were used to guide practitioners though each question and how to complete the EMIS templates.
- The 'mock consultation' and role play was incorporated into the site visits following the training session.

Wave One focus group results

One focus group was conducted with six practitioners[4] from Wave One practices to learn about their experiences of delivering the care pathway and to help inform any modifications to the protocols in Wave Two. In Wave One, four practices recruited patients 'opportunistically' and four practices invited patients from disease registers (diabetes n=3; hypertension n=1).

Key learning points from the Wave One focus group are reported below by thematic areas.

<u>General views on the care pathway</u>

- The care pathway received positive feedback from all practitioners participating in the focus group.
- Practitioners viewed the care pathway as an important mechanism for auditing patients' physical activity levels.
- The specific focus on physical activity and the design of the care pathway helped practitioners emphasise the importance of physical activity to patients.
- Practitioners felt they had increased their knowledge of the benefits of physical activity.
- The use of a menu of physical activity options and the ability to promote walking as a recommended activity were viewed as beneficial.
- The ongoing support provided by the BHFNC evaluation team was considered invaluable.

<u>Recruitment of patients</u>

- Practitioners would like to consider patients of all ages for the care pathway (rather than 16 – 74 years only) but recognised this was restricted due to limitations of the GPPAQ.
- Practices inviting patients from disease registers felt the use of a letter may not be the most appropriate method to engage 'hard to reach' patients and

[4] Six practitioners: 5 practices nurses, 1 health care assistant

suggested using SMS, phone calls and 'opportunistic' recruitment during routine consultations with patients on disease registers.

- Practitioners suggested the use of advertising to raise awareness of the care pathway and physical activity; this could be undertaken in the practice, local press and national media.

GPPAQ

- The GPPAQ was considered a useful tool and provided a valuable opportunity to assess physical activity levels with patients.
- The need to discuss any reported 'walking' was viewed as challenging, however the ability to revise the patients' physical activity classification was reported as helpful as it allowed practitioners to quantify a patients' physical activity level more accurately following a discussion about walking.
- It was requested that the GPPAQ should be integrated into EMIS rather than working with two separate files (the GPPAQ was provided as an Excel worksheet).

Motivational Interviewing

- Practitioners reported that their motivational interviewing skills had improved with practice and confidence.
- Using the 'guiding approach' was a particularly useful communication tool.
- Some practitioners reported that they incorporated MI techniques into other aspects of their practice in addition to the care pathway.

Resources

- Practitioners reported that they perceived the Let's Get Moving patient resource pack to be viewed positively by patients.
- The overall content and specifically the local area descriptions included in the Let's Get Moving patient resource pack were considered to be good.
- The BHF leaflet was considered helpful for communicating the moderate intensity physical activity message.

- The disease specific resources (i.e., diabetes and hypertension) were reported as being particularly useful in helping physical activity consultations to have more personal meaning for patients and their condition.

Perceived challenges in delivering the care pathway

- The timing of the launch of Wave One (October 2007) was inconvenient due to the practices being very busy due to the flu vaccination period.

Modifications to care pathway protocols implemented in Wave Two

- Practices recruiting patients from disease registers could use one or more of the following methods to contact patients: invitation letter specific to the care pathway; usual recall letter with addition of the care pathway details; text messages; and telephone calls. In addition, patients on the disease registers could be recruited during a scheduled routine consultation.
- Practitioners who did not attend the care pathway training were able to refer patients they thought might be eligible, to a trained colleague for screening for eligibility for the care pathway.
- Several modifications were made to the EMIS templates to ensure the questions were more easily understood by practitioners and several questions were added, including an item on whether the BHF resource was given to patients.

Results from Wave Two practices

Table 4 provides a summary of the six participating practices involved in Wave Two of the care pathway. Three practices recruited patients from disease registers due to the large number of patients on their registers. All three of these practices opted to recruit patients from the hypertension as opposed to the diabetes register. The size of the hypertension resisters ranged from 897 – 998 patients. The three practices with smaller disease registers were allocated to the 'opportunistic' recruitment method. In these practices, the practitioners involved in implementing the care pathway conducted, on average, between 75 and 135 consultations per week.

Although 14 practitioners received the two-day care pathway training, only 10 health professionals actively delivered the care pathway. Practitioners recruited patients to the care pathway for a 12 week duration.

Recruitment of patients

Recruitment of patients to the care pathway was initially very slow. Regular contact with practices (via e-mail and telephone calls) was used to provide support and encouragement and help facilitate patient recruitment to the care pathway.

EMIS templates were a central mechanism for tracking recruitment of patients, flow of patients through the care pathway steps and collecting data on what was delivered as part of the care pathway pilot. EMIS data were available from all six practices in Wave Two.

Practices using disease register recruitment contacted a total of 916 patients to invite them to participate in the care pathway. Table 5a shows the total number of invitations sent out and the number of patients who attended consultations and were thus assessed for eligibility at each practice. Patient response rates to the invitation were 9%, 12% and 59% across the three practices, respectively.

Practices used various methods to invite patients including letters, phone calls and disease specific clinics. For patients who attended a screening consultation, the most

frequent methods of engagement were via a new letter specifically designed for the purposes of the care pathway (n=78), an existing letter which practices already utilised to recall patients (n=39) or by inviting patients to take part in the care pathway during routine consultations (n=28). Only one patient on a disease register was recruited directly through a clinic.

Practices allocated to use the 'opportunistic' recruitment method were encouraged to consider every patient for eligibility in the care pathway. Table 5b shows the number of consultations that participating health professionals conducted over the 12 week recruitment period and the number of patients who were screened for eligibility in the care pathway. These data indicate that between 4 – 10% of patients seen in a consultation were screened for eligibility in the care pathway using the 'opportunistic' recruitment methodology.

In total, across six practices, 526 patients were screened for eligibility in the care pathway, just over one quarter (n=148, 28%) were from practices recruiting via disease registers and nearly three quarters (n=378, 72%) were from practices recruiting 'opportunistically'.

Table 6 summarises the characteristics of patients who were screened. More females (57%) were screened than males (43%) and the mean age of patients was 54 years. Just over half of patients (52%) were Asian or Asian British and 19% were White. Data on ethnicity were missing for 24% of the 526 patients.

Appendix 17 shows a breakdown of patient demographics by practice, at each stage of the care pathway. In terms of the characteristics of patients screened for eligibility, this was similar across practices in terms of gender and age. At every practice, more females were screened than males, with the mean age of patients ranging from 44 – 61 years. The main differences between practices related to the ethnicity of patients. The proportion of White patients screened for eligibility ranged from 6% at Hounslow to 71% at Churchill. The proportion of Asian or Asian British patients screened ranged from 1% at Mountwood to 89% at Hounslow.

Table 4. Summary of participating practices

Practice Name	PCT	Recruitment Method	Health Professionals Trained	Did the Health Professional Recruit to the Care Pathway?	Number of Patients on Hypertension Disease Register
Bromley-by-Bow	Tower Hamlets	Disease register - Hypertension	Practice Nurse 1	Yes	990
			Practice Nurse 2	Yes	
Churchill Medical Centre	Kingston	Disease register - Hypertension	General Practitioner	Yes	897
			Nurse Manager	No	
			Primary care Manager	No	
Mountwood	Hillingdon	Disease register - Hypertension	Health Care Assistant	Yes	998
			Practice Nurse	Yes	

Practice Name	PCT	Recruitment Method	Health Professional Trained	Did the health Professional Recruit to the Care Pathway	Estimate of average weekly consults
Hounslow	Hounslow and Feltham	Opportunistic	General Practitioner	Yes	135
			Health Care Assistant	No	
			Practice Nurse	Yes	75
Primary Care Medical Centre	Brent	Opportunistic	General Practitioner	Yes	115
			Practice Nurse	Yes	80
Royal Docks	Newham	Opportunistic	General Practitioner	Yes	90
			Practice Nurse	No	

Table 5a. Number of patients invited and number of patient screened in practices utilising disease register recruitment

		Number of patients on the hypertension disease register	Total number of patients invited to take part in the care pathway	Number of patients attending a screening consultation	Number of patients receiving the brief intervention	Number of patients attending follow-up consultations
Bromley-by-Bow	(2 practitioners)	990	242	28 (12%)	25	10
Churchill Medical Centre	(1 practitioner)	897	554	49 (9%)	43	11
Mountwood	(2 practitioners)	998	120	71 (59%)	65	---
TOTAL		**2885**	**916**	**148 (16%)**	**133**	**21**

Table 5b. Total number of consultations and number of patients recruited utilising opportunistic recruitment

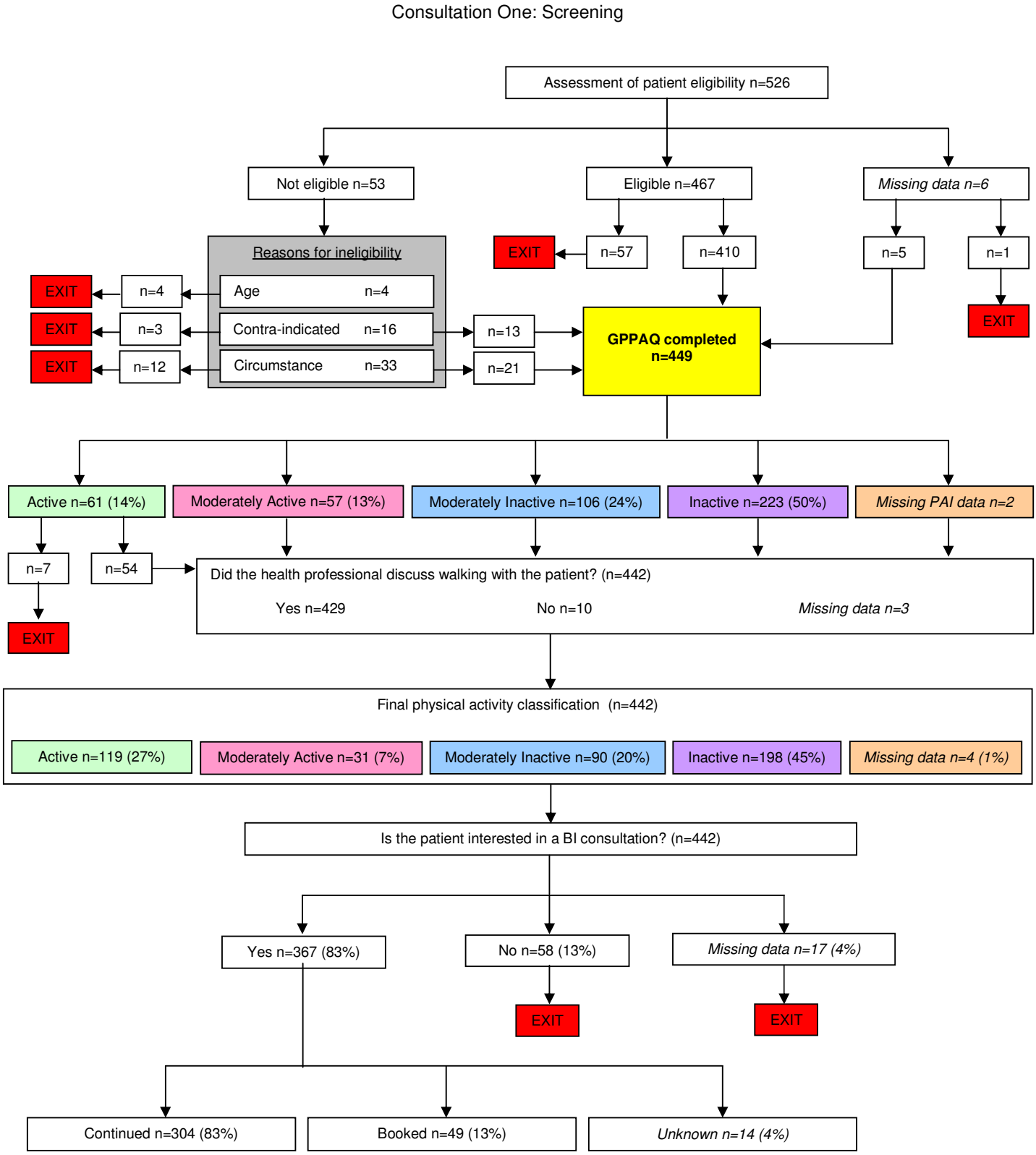
		Average number of weekly consultations for recruiting health professionals	Total number of consultations during 12 week recruitment period	Number of patients attending a screening consultation	Number of patients receiving the brief intervention	Number of patients attending follow-up consultations
Hounslow	(2 practitioners)	210	2520*	114 (5%)	62	16
Primary Care Medical Centre	(2 practitioners)	195	2315*	220 (10%)	119	38
Royal Docks	(1 practitioner)	90	1080*	44 (4%)	---	26
TOTAL		**495**	**5915**	**378 (6%)**	**181**	**80**

*Primary Care Medical Centre were able to provide figures for the exact number of consultations undertaken during the recruitment period. For Hounslow and Royal Docks this figure was estimated by multiplying the average number of weekly consultations by the 12 week recruitment period.

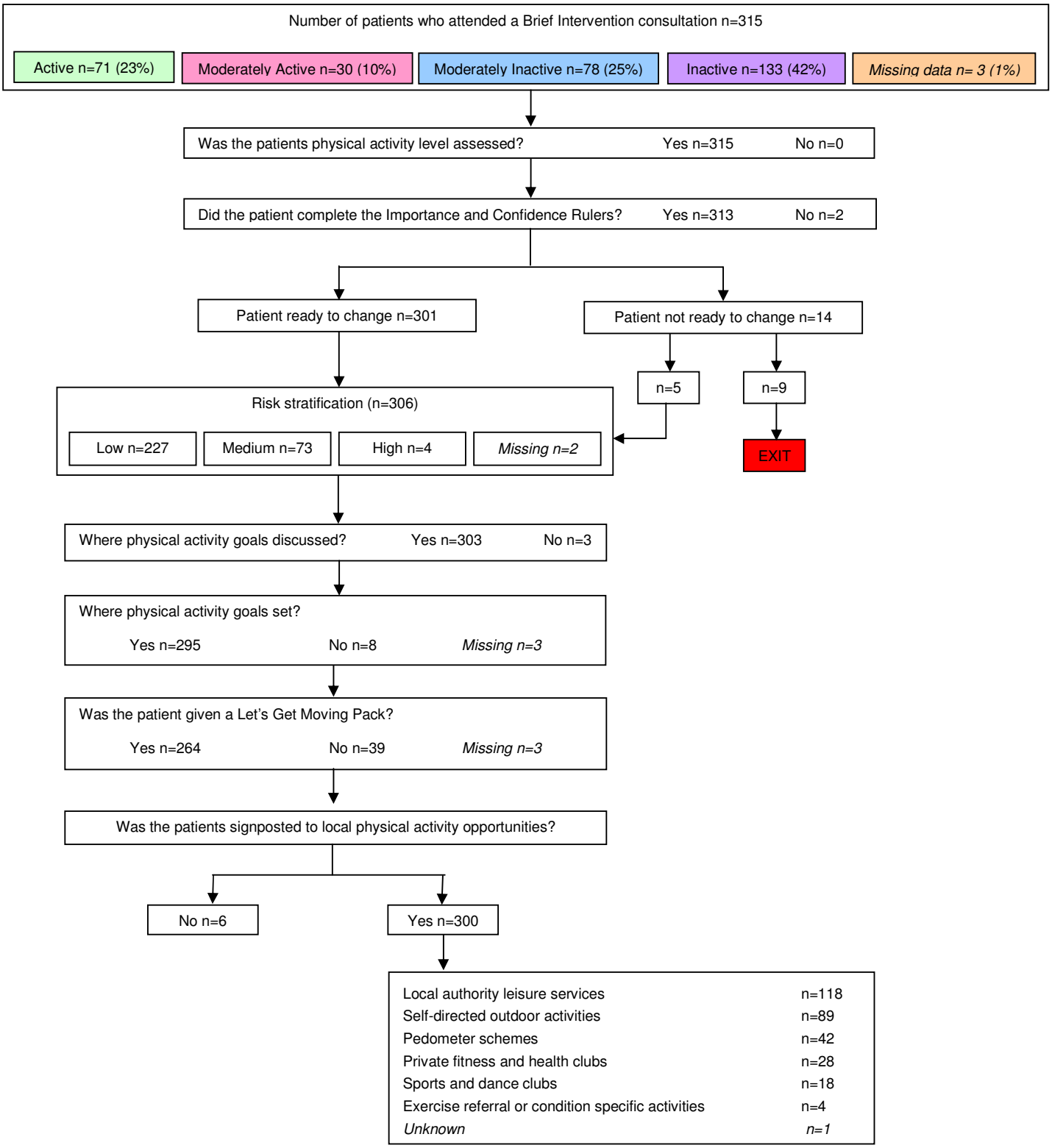
Table 6. Demographic of patients

	Attended a screening consultation **n=526**	Received a brief intervention **n=314**	Attended a follow-up consultation **n=101**
Age			
Range	10-88	16-84	15-88
Mean and SD	53.68 ± 14.88	54.66 ± 13.33	55.66 ± 14.31
Gender			
Male	224	128	45
Female	302	186	56
Ethnicity			
White	99 (19%)	67 (21%)	29 (29%)
Black or Black British	20 (4%)	8 (3%)	10 (10%)
Asian or Asian British	274 (52%)	157 (50%)	50 (50%)
Mixed	3 (1%)	1 (0%)	0
Other	3 (1%)	3 (1%)	0
Unknown	1 (0%)	0	0
Missing	126 (24%)	77 (25%)	12 (12%)

Figure 3. Tracking of patients through the care pathway



Consultation Two: Brief Intervention



Consultation Three: Follow-Up

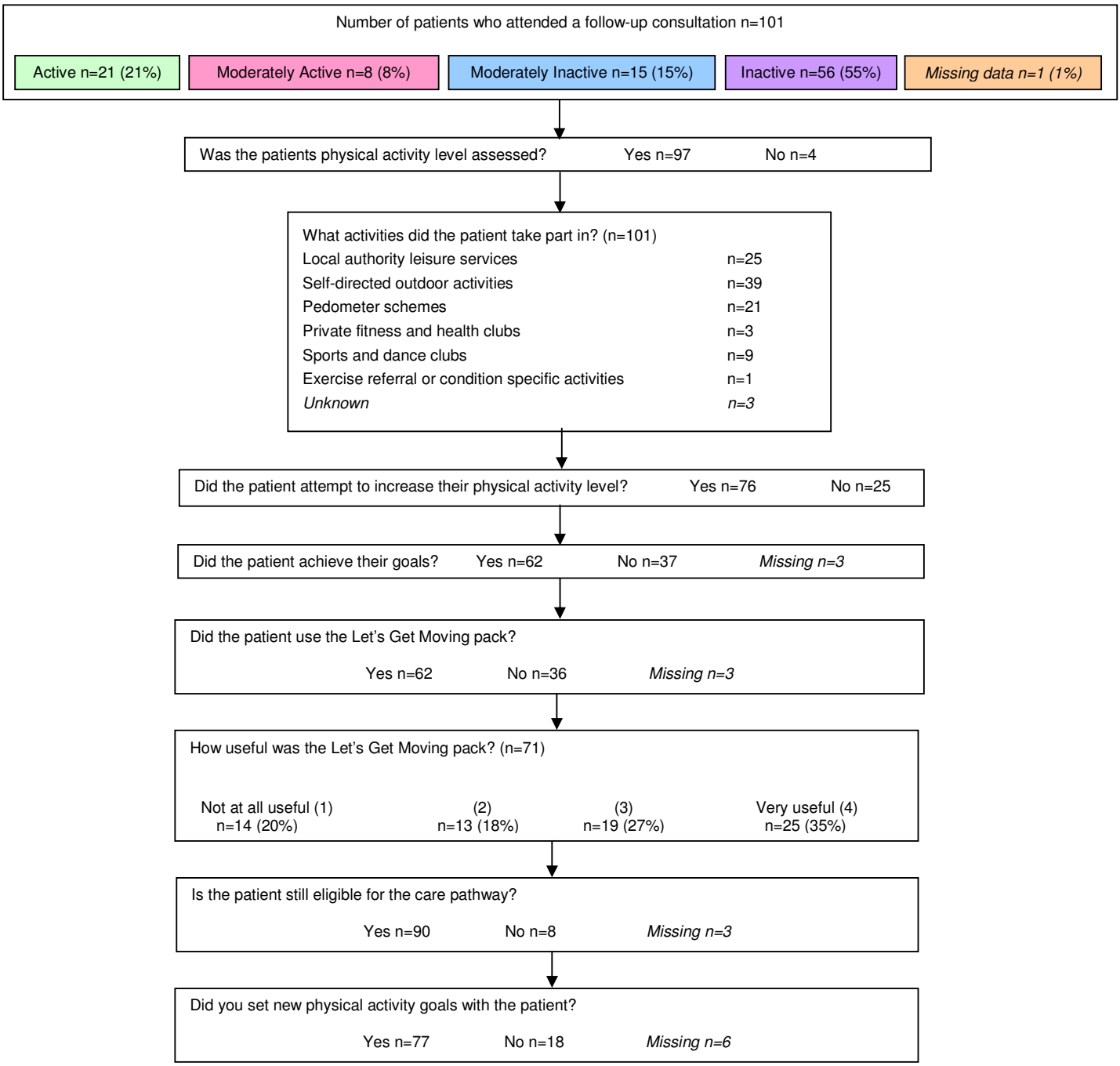


Table 7. Interest in the brief intervention by patients final physical activity classification (n=442)

	Active n=119	Moderately Active n=31	Moderately Inactive n=90	Inactive n=198	Physical activity classification unknown n=4
Interested (n=367)	76 (64%)	31 (100%)	83 (92%)	174 (88%)	3 (75%)
Not interested (n=58)	31 (26%)	0	5 (6%)	21 (11%)	1 (25%)
Unknown (n=17)	12 (10%)	0	2 (2%)	3 (1%)	0

Table 8. Signposted activities by patients' final physical activity classification (n=300)

	Active n=66	Moderately Active n=29	Moderately Inactive n=74	Inactive n=127
Local authority leisure services	14 (21%)	13 (45%)	31 (42%)	59 (46%)
Self-directed outdoor activity	17 (26%)	7 (24%)	30 (41%)	34 (27%)
Pedometer schemes	10 (15%)	3 (10%)	11 (15%)	18 (14%)
Private fitness and health clubs	11 (17%)	5 (17%)	2 (3%)	9 (7%)
Sports and dance clubs	14 (21%)	1 (3%)	0	3 (2%)
Exercise referral and condition specific	0	0	0	4 (3%)

Table 9. Signposted activities by patients' risk stratification classification (n=297)

	Low risk n=221	Medium risk n=73	High risk n=3
Local authority leisure services	75 (34%)	43 (59%)	0
Self-directed outdoor activity	75 (34%)	12 (16%)	0
Pedometer schemes	32 (14%)	10 (14%)	0
Private fitness and health clubs	24 (11%)	4 (5%)	0
Sports and dance clubs	15 (7%)	3 (4%)	0
Exercise referral and condition specific	0	1 (1%)	3 (100%)

Table 10. Average time (in minutes) spent discussing physical activity in consultations

		DISEASE REGISTER				OPPORTUNISTIC				
		Bromley-by-Bow	Churchill	Mountwood		Hounslow (health professional unknown for 1 patient)		Primary Care Medical Centre (health professional unknown for 7patients)		Royal Docks
		(2 practice nurses)	GP	HCA	PN	HP1	HP2	GP	PN	GP
Screening (n=526)	Number of patients	n=28	---	n=26	n=45	n=37	N=76	n=100	n=113	n=44
	Mean	8.64	---	10.96	8.56	2.43	3.21	1.53	2.41	12.85
	SD	4.45	---	2.01	3.47	0.65	1.17	0.80	0.67	4.57
	Range	4-21	---	10-15	5-20	2-5	2-6	1-4	1-5	6-23
BI (n=315)	Number of patients	n=25	n=49	n=26	n=39	n=7	N=55	n=16	n=103	---
	Mean	11.56	20.82*	10.96	12.05	3.83	3.40	3.79	3.70	---
	SD	7.98	3.35*	2.01	4.25	0.60	0.70	0.92	1.09	---
	Range	3-35	10-30*	10-15	5-20	3-5	2-5	3-6	2-10	---
Follow-up (n=101)	Number of patients	n=10	n=11**	---	---	n=0	n=16	n=1	n=37	n=26
	Mean	11.60	10	---	---	---	3.13	4	2.14	9.92
	SD	4.84	---	---	---	---	0.64	---	0.49	3.06
	Range	5-20	---	---	---	---	2-4	---	1-3	3-15

*Time data recorded at Churchill for screening and BI combined
** All follow-up consultations at Churchill were reported to have lasted 10 minutes in duration

Table 11. Average time (in minutes) spent discussing physical activity for screening and brief interventions which were held during one single-consultation or split across two consultations.

		OPPORTUNISTIC N=181								
		Hounslow n=62					Primary Care Medical Centre n=119			
		HP1 n=7		HP2 n=55			GP n=16	PN n=103		
		Continued N=5	Unknown n=2	Booked n=12	Continued n=36	Unknown n=7	Continued n=16	Booked n=6	Continued n=94	Unknown n=3
Screening	Mean	3	2	3.83	3.23	3.29	2.38	2.5	2.37	2.67
	SD	0	0	1.19	1.21	0.95	0.5	1.05	0.63	0.58
	Range	---	---	2-6	2-6	2-4	2-3	1-4	1-5	2-3
BI	Mean	4	4.5	3.5	3.28	3.71	3.88	4	3.68	3.33
	SD	0	0.71	0.52	0.74	0.49	0.96	1.26	1.06	1.15
	Range	---	4-5	3-4	2-5	3-4	3-6	3-6	2-10	2-4

Assessment of eligibility

Figure 3 shows the movement of the 526 patients through the care pathway, from screening through to follow up and indicates how many patients received each component of the care pathway protocol. Based on the inclusion criteria for the care pathway 467 of the 526 screened patients (89%) were identified as eligible to complete the GPPAQ.

Of the 467 patients recorded as eligible, the GPPAQ was not completed with 57 patients due to time constraints within the consultation. The GPPAQ was completed with a total of 449 patients. This included 410 eligible patients as well as an additional 39 patients; 34 patients who were not eligible for the care pathway and 5 patients who's eligibility was not recorded. Of the 34 patients recorded as ineligible, 13 patients were recorded as having contra-indications and 21 patients were considered inappropriate due to the nature of the consultation. It is unclear why these additional 34 patients completed the GPPAQ given they were apparently considered not eligible for the care pathway. All but 2 of the ineligible patients who continued in the care pathway and completed the GPPAQ were from practices utilising the 'opportunistic' recruitment methodology. It is possible that the GPPAQ was completed at the beginning of the consultation as an 'ice-breaker' to physical activity, and therefore before screening for contra-indications and consideration of the appropriateness of discussing the care pathway in the consultation. Refer to appendices 18 and 19 for a breakdown of patient movement through the care pathway by 'opportunistic' recruitment and disease register recruitment, respectively.

Of the 449 patients who completed the GPPAQ, 61 patients (14%) were classified as 'active'. The care pathway protocols indicate that those patients already undertaking sufficient levels of physical activity are ineligible for the care pathway. However, in this feasibility trial, only seven of these 61 patients exited the care pathway at this point; 54 patients classified as 'active' continued in the care pathway.

Administering the GPPAQ requires that any walking reported by patients is discussed in more detail to verify the nature and intensity. This was undertaken with 429 of the 442 patients (97%) who remained in the care pathway. For the purposes of the care

pathway pilot, health professionals were able to re-classify patients' physical activity level. The discussion about walking led to 69 patients (16%) being re-classified. All but two of the patients (n=67) were re-classified as 'active' following the discussion about walking. These patients had previously been classified as 'moderately active' (n=26), 'moderately inactive' (n=16) or 'inactive' (n=25). Two patients initially identified as 'active' were considered to be less active following the discussion about their walking.

Following the discussion about walking, a total of 119 patients (27%) were classified as 'active' and therefore were not eligible for the care pathway, however health professionals continued to discuss whether these patients were interested in a brief intervention on physical activity. Interest in the brief intervention was also assessed with all other patients, of which 31 (7%) were 'moderately active', 90 (20%) were 'moderately inactive' and 198 (45%) were 'inactive'. The final physical activity classification was unknown for 4 patients.

A total of 367 of the 442 patients (83%) were identified as interested in receiving a brief intervention consultation. The other 75 patients (17%) were either not interested in receiving the brief intervention or their interest was not recorded, and these patients took no further part in the care pathway. Table 7 shows a breakdown of interest in the brief intervention by patients' final physical activity classification.

The BHF Get Active resource was intended for patients identified as 'not interested' in receiving a brief intervention consultation, however in practice, health professionals disseminated the resource to a total of 249 patients including those who were classified as 'active', those who were not interested in a brief intervention and those who received a brief intervention consultation.

<u>The brief intervention</u>

The brief intervention could be undertaken as either an extension of the screening consultation or booked as a separate appointment. The EMIS tracking system showed that of the 367 patients who were interested in a brief intervention, over three quarters of patients (n=304, 83%) received a brief intervention in the initial

consultation rather than book a separate appointment; 49 patients (13%) booked a separate appointment and data were missing for 14 patients (4%).

Delivering the screening and the brief intervention during the same consultation may have been preferable for those practices recruiting from disease registers. This question was explored by looking at the EMIS data and tracking patients by recruitment method (refer to Appendices 18 and 19). The analyses showed that in the three disease register practices, 133 patients were interested in receiving a brief intervention, of which almost all (n=128, 96%) received the intervention as an extension of the screening consultation. Only 4 brief interventions were booked as a separate appointment (3%) (data were missing for one patient). In practices recruiting 'opportunistically', 234 patients were interested in receiving the brief intervention. Three quarters of patients (n= 176, 75%) received the brief intervention as part of the screening consultation and only 45 patients (19%) received the screening and brief intervention over two separate appointments (data were missing for 13 patients).

Although the majority of brief interventions were an extension of the screening consultation, health professionals did not always complete EMIS Template 2 and thus record the delivery of elements of the BI. Data were only available for 315 of the 367 patients interested in a brief intervention, a loss of data from 14% of patients screened, which occurred mostly at one practice [Royal Docks]. Of these 315 patients, 133 patients were recruited via disease registers and 182 were recruited 'opportunistically'. Table 6 summarises the demographic characteristics of these patients. More females (59%) received the brief intervention than males (41%) and the mean age of patients was 55 years. This is very similar to the profile of the screened patients also shown in Table 6. Half of patients receiving the brief intervention were Asian or Asian British, and over 20% were White. Data on ethnicity were missing for a quarter of patients receiving the brief intervention. Appendix 17 shows a breakdown of patient demographics by practice.

The GPPAQ classification for the 315 patients who received the brief intervention showed that 71 patients (23%) were classified as 'active' and were therefore, in theory, ineligible to take part in the care pathway. The remaining 244 patients were not classified as 'active' and therefore were correctly identified as appropriate to

receive the brief intervention; almost half (133, 42%) were ‘inactive’, a quarter (n=78, 25%) were ‘moderately inactive’ and 10% (n=30) were ‘moderately active’.

The flow chart shown in Figure 3 indicates that each component of the brief intervention was delivered to the majority of patients. Physical activity was assessed with all 315 patients, and 313 completed the importance and confidence rulers. Health professionals were required to assess the patients’ readiness to change their physical activity behaviour and this was done with all patients. Almost all patients were ‘ready to change’ (n=301, 96%), the remaining patients (n=14, 4%) were considered ‘not ready to change’. In theory, these 14 patients should have exited the care pathway at this point, however in practice, nine of these patients exited and five patients continued in the care pathway.

Health professionals used the risk stratification criteria to determine which types of physical activity opportunities would be appropriate for each patient. Of the 306 patients who remained in the care pathway, 227 patients (74%) were classified as ‘low risk’, 73 (24%) were ‘medium risk’ and 4 (1%) were classified as ‘high risk’. Data were missing for 2 patients (1%). Physical activity goals were discussed with 303 patients (99%) and specific physical activity goals were set with 295 patients (96%).

In total, 300 patients were signposted to physical activity options and Figure 3 shows a breakdown for each activity. The most frequently signposted activities were ‘local authority leisure services’ (n=118, 39%), ‘self-directed outdoor activities’ (n=89, 30%), and ‘pedometer schemes’ (n=42, 14%).

Of the 300 patients who were signposted, data were available on their final physical activity classification for 296 patients (99%). Table 8 indicates that the majority of patients classified as ‘inactive’ or ‘moderately inactive’ were signposted to ‘local authority leisure services’, ‘self-directed outdoor activity’ or ‘pedometer schemes’. Patients classified as ‘active’ were signposted to a greater range of activities including ‘private fitness and health clubs’ and ‘sports and dance clubs’.

Table 9 shows a breakdown of signposted activities by patients’ risk stratification category. ‘Low risk’ patients were generally signposted to ‘local authority leisure services’ or ‘self-directed outdoor activity’, but were also signposted to other activities

such as ‘pedometer schemes’, ‘private health and fitness clubs’, and ‘sports and dance clubs’. ‘Medium risk’ patients were generally signposted to ‘local authority leisure services’. Only 4 patients were referred to ‘exercise referral or condition specific activities’ (1%). The care pathway protocols indicate that ‘high risk’ patients should be signposted to ‘exercise referral or condition specific activities’. Of the four patients signposted to clinical physical activity options, three were ‘high risk’ and one was ‘medium risk’.

The Let’s Get Moving patient resource pack was a central tool for the brief intervention consultation and was given to most but not all patients who received the brief intervention component of the care pathway (n=264; 84%).

Follow-up consultations

Data were available for 101 patients who attended a follow-up consultation. These patients represent follow-up consultations from 5 of the 6 practices involved in delivering the care pathway; one practice [Mountwood] did not complete EMIS Template 3.

Of the 101 patients who attended a follow-up consultation, 80 (79%) were from ‘opportunistic’ practices and 21 (21%) were from disease register practices. Table 6 summarises the demographics of these patients. More females (55%) attended follow-up consultations than males (45%) and the mean age of patients was 56 years. Half of patients attending follow-up appointments were Asian or Asian British, and over 25% were White. This is very similar to the profile of the patients at earlier steps of the care pathway. Appendix 17 shows a breakdown of patient demographics by practice, at each stage of the care pathway.

Not all patients who attended a follow-up consultation had received a brief intervention. Five patients who attended a follow-up appointment were classified as ‘active’ on GPPAQ during the screening consultation and ‘exited’ the care pathway at this point. It is unclear why these patients were invited to attend a follow-up consultation. At least 70 of the remaining 96 patients did receive a brief intervention and were correctly invited to attend a follow-up appointment. It is unclear whether all patients from Royal Docks (n=26) received the brief intervention as no brief

intervention data were available from this practice, thus it is assumed that as these patients were re-called for a follow-up appointment, they should have received a brief intervention.

The care pathway protocols indicate that patients should be followed up firstly at three months and again at six months. Due to the short duration of the pilot, practices were not able to deliver six month follow-up consultations to patients. For this reason practices were asked to undertake a three month follow-up only. In this trial, follow-up appointments took place between 4 and 23 weeks after the brief intervention (mean=15 weeks ± 3.24).

The care pathway protocols for follow-up appointments include re-assessment of the patients' physical activity level, a discussion about attempts to increase activity, a review of activities that patients have taken part in and a review of patients' goals. Level of physical activity was assessed using two questions designed to capture the number of days of activity and the total amount of time spent undertaking physical activity in the past week. This physical activity assessment was completed with the majority of patients (96%).

Patients were also asked whether they had increased their physical activity level and which types of activities they had taken part in. Three quarters (n=76) of patients (75%) reported increasing their physical activity level, and almost all patients (97%) reported taking part in one of the care pathway physical activity options. The most common activities reported by patients and recorded by the practitioner in EMIS were 'self-directed outdoor activity', 'local authority leisure services' and 'pedometer schemes'. These activities were the most frequently signposted which could explain why these activities were most frequently reported at follow-up.

An analysis of data on signposting revealed that many patients attended an alternative activity to the one they were originally signposted. Of the 101 patients who attended follow-up consultations, data on the activity which patients were signposted to and the activity which they took part in was available for 66 patients (data were missing for the 35 patients). Of these 66 patients, 35 (53%) patients took part in the activity which they were signposted to, whilst 31 (47%) patients took part in alternative options for physical activity.

Of the 101 patients who attended follow-up consultations, 62 reported using the Let's Get Moving resource, the other 36 patients did not use the resource (data were missing for three patients). Practitioners asked patients to rate how useful they found the resource. Of 71 patients who appraised the resource, 25 (35%) rated it as 'very useful', 19 (27%) rated it as 'useful', 13 (18%) rated it as 'somewhat useful' and 14 (20%) rated the resource as 'not at all useful'.

Duration of consultations

The amount of time spent delivering aspects of the care pathway and discussing physical activity with patients in the screening consultations, the brief interventions and during the three month follow-up appointments was estimated by health professionals and recorded in EMIS Templates 1, 2 and 3, respectively. Table 10 shows the number of screening, brief intervention, and follow-up consultations undertaken by each health professional and the average duration of consultations. Data were not available for Royal Docks for the brief intervention consultations or for follow-up consultations at Mountwood practice.

In general, the brief intervention consultations were very similar in duration to the screening consultations. Average time taken to assess patient eligibility for the care pathway ranged from one and a half minutes to 19 minutes and average time taken to deliver the brief intervention consultation ranged from three minutes to 21 minutes. However, a closer inspection of the data provided through EMIS revealed that the same estimate for time taken appears to have been entered for the screening consultation *and* the brief intervention in some practices (Churchill and Mountwood). This suggested that the health practitioner may have entered one value for time taken for both aspects of the care pathway. This possibility was consistent with data showing that the brief intervention was conducted as an extension of the screening consultation in almost all patients from disease register practices and the majority of patients from 'opportunistic' practices. This interpretation was subsequently confirmed by contacting the practitioners. At Mountwood the reported time taken for the screening and for the brief intervention consultations was exactly replicated for every patient. The Health Care Assistant at the practice confirmed the error in duplicate recording. Data from Churchill practice was replicated for most, but not all

patients; in some cases the health professional recorded the total duration of the consultation and attempted to calculate the proportion of this time spent undertaking the screening component of the care pathway. Where the exact value was not replicated, the largest value was assumed to reflect time spent undertaking both the screening and brief intervention.

Making adjustments for the above data entry or data recording errors, the average time taken for screening and delivery of the brief intervention was approximately 20 minutes for patients recruited from the disease registers. Health practitioners delivering the care pathway 'opportunistically' were notably quicker, reporting on average approximately three minutes for the screening consultation and four minutes for the brief intervention. Although differences in the duration of consultations were observed between 'opportunistic' and disease register recruitment methods, little variation was observed between different health professionals using each of these recruitment approaches.

At practices recruiting 'opportunistically', the majority of patients (83%) received the brief intervention as part of the screening consultation, only 10% returned for a second appointment. Interestingly, no notable differences were observed in the time taken to screen patients nor in the time taken to deliver the brief intervention, regardless of whether the screening and brief intervention were undertaken in the same consultation or split across two appointments (see Table 11).

The average duration of the follow-up consultations was approximately 12 minutes for practices recruiting from the disease registers, although data were only available for two of the three practices. At Bromley-by-Bow, the duration of follow-up consultations ranged from five to 20 minutes, however at Churchill practice all follow-up consultations were recorded as lasting ten minutes. In practices which recruited 'opportunistically', the follow-up consultations were reported to take between one and 15 minutes, with a mean duration of five minutes.

Results from the economic analysis

As previously stated, the approach taken for these analyses was a micro-costing model allocating single cost items to each individual patient. Traditional macro or top-down costing frameworks allocate costs based on averages and apportionments. This was not appropriate for the care pathway due to its strong focus on the individual patient and the opportunity to analyse data on the actual care provided to each individual patient.

This first part of this section presents results on total cost per participating practice, followed by results on mean cost per patient to allow a more robust comparison between practices. The second part of this section presents results from a set of scenarios, developed to analyse the sensitivity of mean cost per patient with respect to key parameters of the costing model and to help explain the variance in resource use and costs between practices and among different delivery models.

As noted in the methods section the economic analyses used data from Wave Two practices only. EMIS data were available from all six participating practices, however for one of these [Royal Docks] data are only available for the screening consultation and the follow-up appointment, as insufficient data were provided in EMIS on the delivery of the brief intervention consultations. For another practice [Mountwood], no data were available on any follow-up appointments. Hence, estimates for total cost and mean cost per patient do not reflect the whole course of the pathway at those two practices. At Royal Docks, cost estimates are exclusive of costs of the brief intervention consultation and the Let's Get Moving support package, while cost estimates at Mountwood do not include costs of the follow-up appointment and support activities prior to the follow-up. Despite these gaps in the data, the overall quality of the data received from the practices was reasonably good. Although there were some missing values, these were mainly the result of errors with the MIQUEST search or human error in performing the search. The majority of missing values were resolved via telephone conversations to obtain data on a patient level from the EMIS system directly.

Total cost of the care pathway per participating practice

Table 12 summarises the calculations for total cost of the care pathway. Rows A, D and H provide cost estimates for support activities performed as part of implementing the care pathway. Cost of pre-screening disease registers and contacting patients (Row A) ranged from £228 at Bromley-by-Bow and £229 at Mountwood to £1,053 at Churchill. Cost of support activities undertaken in between the screening consultation and the brief intervention were modest and ranged from zero to £21 (Row D). Note, zero costs occurred at Churchill where all patients receiving the brief intervention did so within the screening consultation, thus requiring no additional support activities to arrange a second appointment.

Support activities prior to the follow-up consultation included contacting patients who previously attended a brief intervention and booking appointments (Row H). Cost of these activities ranged from £19 at Bromley-by-Bow, where only 13 patients were invited by letter, up to £130 at Churchill practice, where almost 50 patients where contacted by letter and additional phone calls were also made.

Cost estimates of the three main activities (screening consultations, brief interventions and follow-up appointments) are provided in Rows B, F and I, respectively. Across all practices, the cost of the screening consultation ranged from £62 (Bromley-by-Bow) to £852 (Royal Docks). Cost to deliver the brief intervention ranged from £74 (Bromley-by-Bow) to £280 (Mountwood). As previously noted, the GP at Churchill practice combined the screening and brief intervention thus there is only one combined time and hence cost estimate. This partly explains the higher cost estimate of the brief intervention at Churchill practice (Row F). It is also noted that at Churchill practice, a GP was involved in delivering the screening consultation where as in many other practices this was undertaken by other health practitioners, which also explains the higher cost observed at Churchill (£1549).

In comparison to the costs of screening and delivering the brief interventions, the cost of the follow-up consultations (Row I) was modest, ranging from £12 at Hounslow Medical Centre to £433 at Royal Docks. This is largely explained by the low numbers of patients attending follow-up appointments relative to the number of patients screened and receiving brief intervention consultations.

Rows C, G and J in Table 12 provide the total associated costs to the NHS of the screening consultations (Row C), the BI consultations (Row G) and the follow-up consultations (Row J). Total costs of all components of the care pathway through to (and including) the follow-up consultations are shown in Row L in Table 12 and in Figure 4 and range from £620 (Bromley-by-Bow) to £3,388 (Churchill). When the costs of the training and ongoing practice support are included (Row N in Table 12), the overall costs increase and now range from £2,445 to £6,933. Due to the pilot study implementation period being limited to just 12 weeks, the cost of training and supporting the practices turn out to be the largest contributor to total cost per practice (shown in Figure 4).

Figure 5 shows the cost of each activity delivered during the course of the care pathway pilot as a percentage of total cost per participating practice. The costs of training and support contributed between 50% (Mountwood) and 75% (Hounslow) to total cost of the care pathway pilot. Although this is clearly a substantial component, training was undertaken to equip practitioners with a sound knowledge on physical activity and to train them in motivational interviewing techniques – a central feature of the brief intervention. As such, the cost of training and support represents an investment prior to implementation of the care pathway and its significance as a contributor to total cost would decrease as the implementation period and patient volume increase.

The proportion of costs associated with undertaking support activities also varied between practices. In disease register practices they contributed between 7.3% (Mountwood) and 17.1% (Churchill) while in 'opportunistic' recruitment practices the cost of the same component only contributed between 2.3% (Royal Docks) and 2.6% (Primary Care Medical Centre). This is because no costs of support activities occurred prior to the screening consultation at 'opportunistic' sites.

Table 12. Total cost of the care pathway pilot per practice

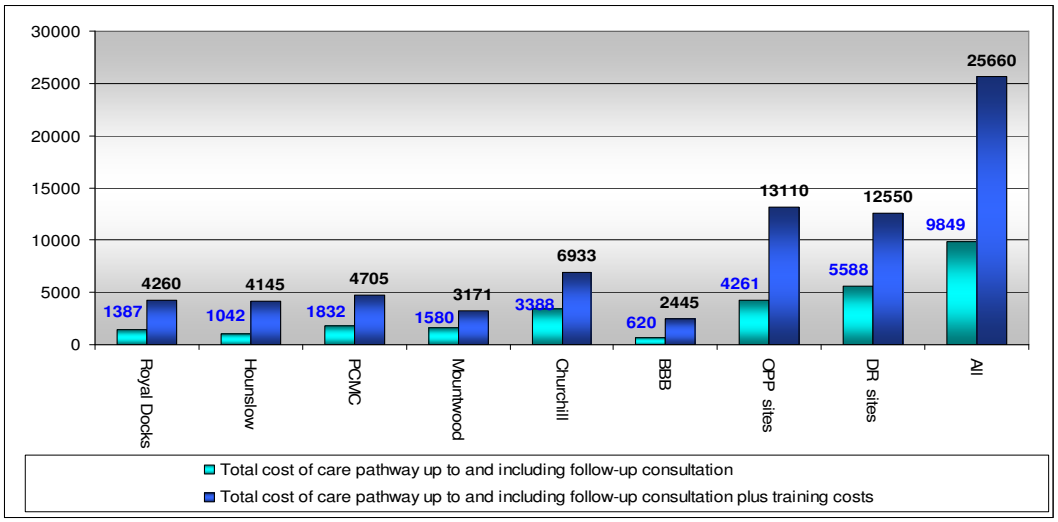
		Royal Docks	Hounslow	PCMC	Mountwood	Churchill	Bromley by Bow	Opportunistic sites	Disease register sites	All participating practices
A	Cost of support activities prior to screening consultation (Disease register sites only)	N/A	N/A	N/A	229.0	1053.0	227.6	N/A	1509.5	1509.5
B	Cost of screening consultation	851.8	212.4	293.5	242.2	n.a.***	61.7	1357.7	303.9	1661.7
C= A+B	∑ NHS cost of screening consultation	851.8	212.4	293.5	471.2	1053.0	289.3	1357.7	1813.4	3171.2
D	Cost of support activities prior to BI***	21.2*	7.7	20.7	3.2	0.0	1.3	49.6	4.5	54.1
E	Cost of support pack	No BI data*	619.8	1187.9	826.4	555.2	206.6	1807.6	1588.1	3395.8
F	Cost of BI		96.2	201.1	279.6	1548.8***	73.7	297.2	1902.2	2199.4
G= ∑ D-F	∑ NHS cost of BI	21.2*	723.6	1409.7	1109.2	2104.0***	281.6	2154.5	3494.8	5649.3
H	Cost of support activities prior to follow-up	80.5	94.2	102.2	No follow up data**	130.4	19.0	276.9	149.4	426.4
I	Cost of follow-up	433.4	12.0	26.4		100.8	29.6	471.8	130.4	602.1
J= H+I	∑ NHS cost of follow -up	513.9	106.2	128.6		231.2	48.6	748.7	279.8	1028.5
K= C+G	Total cost of care pathway up to and including BI	873.0	936.0	1703.2	1580.3**	3157.0	570.9	3512.2	5308.2	8820.4
L= K+J	Total cost of care pathway up to and including follow-up	1386.9	1042.2	1831.8	1580.3**	3388.2	619.5	4260.9	5588.0	9848.9
M	Cost of two-day training course and practice support	2873.2	3102.8	2873.2	1590.9	3545.1	1825.6	8849.1	6961.6	15810.7
N= L+M	Total cost of care pathway up to and including follow-up plus cost of training and support	4260.1	4145.0	4704.9	3171.2**	6933.3	2445.1	13110.0	12549.6	25659.6

* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation

** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation

*** Churchill only reported a combined time estimate for the screening consultation and BI consultation. Hence, cost estimates in row F and G represent total cost of the BI consultation including the screening component

Figure 4. Total cost of the care pathway pilot per practice



* Note that no BI data was available for Royal Docks practice and no follow-up data was available for Mountwood practice. Therefore, estimates of total cost and mean cost per patient do not reflect the whole course of the pathway at those two practices.

Figure 5. Cost of activities within the care pathway pilot as percentage of total cost per practice

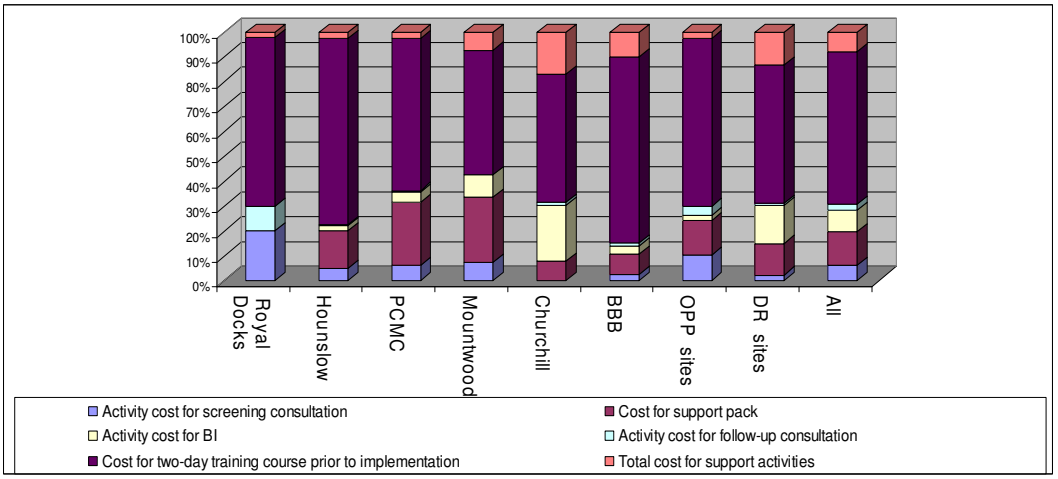


Figure 5 also shows the significance of the Let's Get Moving patient resource pack as a contributor to total cost of the care pathway (between 8.0% at Churchill and 25.3% at Primary Care Medical Centre). At Mountwood this resource contributed 26.1% to total cost of the care pathway pilot, but because data on follow-up consultations were not available for this practice the estimated total costs do not reflect the whole course of the care pathway. It is noted that the relatively high contribution of the Let's Get Moving pack is due to the fact that this resource was developed specifically for the care pathway pilot and therefore initially produced on a low scale (only 2380 packs). As it is intended to make the pack more widely available (with a target number of up to 500,000 packs)[5] the actual cost of development, design and printing of the support packages would be spread more widely.

It is noted that for the computations reported in Table 12, all cost estimates reflect incomplete patient compliance and / or incomplete patient eligibility. For example, practices recruiting patients from disease registers may have pre-screened more patients than they sent letters to (or contacted via other methods). However, the total time and thus the cost of this activity is allocated only to those patients who actually attended a screening consultation. Similarly, costs of contacting all non-participants were allocated to the patients who entered the pathway. The impact of changes in patient flow rates through the care pathway (such as ±10%), as well as changes in other variables, are assessed through sensitivity analyses reported later in this section.

[5] Personal communication with Department of Health (Anthea Fitzsimons)

Mean costs per patient of the care pathway

Calculating the mean cost per patient of the care pathway provides a more robust comparison between participating practices, although it is important to select the appropriate denominator for cost allocation. For example, to compare different entry routes, one could allocate the total cost of the care pathway to the number of patients invited to consider taking part. However, this would bias the cost estimates per patient towards those practices which have a higher proportion of patients responding to the invitation and thus attending a screening consultation. In addition, unobserved patient characteristics could systematically influence costs of components of the pathway; for example, when screening patients 'opportunistically', the health professionals decision to discuss the care pathway with a patient may be based not only on patient eligibility but also on a subjective appraisal of the patients' potential for future compliance with the pathway protocol. Hence, patients screened 'opportunistically' may be more likely to complete the pathway and this would have a systematic impact on the total cost of the subsequent components of the care pathway. Alternatively, allocating the cost of the care pathway only to those patients who achieved their activity goals, for instance, could be too restrictive since one could argue that an attempt at behaviour change is indicative of successful delivery.

It was therefore concluded that the appropriate allocation basis varies depending on the question. Moreover, a complete appraisal of the cost per patient requires an assessment of the patient flow rates through the care pathway and through to patient compliance with activity goals. No actual behaviour change data were available. Table 13 presents a summary of flow rates by practice across key steps in the care pathway protocol. These data are disaggregated from the pooled data shown earlier in the flow charts (Figure 3). It is evident that there is a large drop-out of patients in some practices across different steps of the care pathway. The pattern of patient drop-out is shown also in Figure 6, pooled by 'opportunistic' recruitment, disease register recruitment and then for all practices combined. These data show that patient participation at disease register practices drops only moderately between the screening and brief intervention consultations, with 90% of screened patients receiving the brief intervention. This is due to the fact that screening and BI were mostly delivered within the same consultation in disease register practices thus reducing the opportunity for patient drop-out. There was however, a sharp drop in

patient participation after the BI consultation, with only 14% of patients screened returning for a follow-up appointment. This pattern should translate into a sharp increase in cost per patient when costs are allocated to only those patients attending the follow-up in disease register practices and this can be seen in Figure 7. Patient participation in 'opportunistic' practices appears to fall at a more constant rate and costs per patient increase more steadily across the steps of the care pathway.

Table 13. Number of patients in different stages of the care pathway and as a percentage of the number of patients screened by practice

		Royal Docks	Hounslow	PCMC	Mountwood	Churchill	Bromley by Bow	Opportunistic sites	Disease register sites	All participating practices
O	Patients entering pathway	44	114	220	71	49	28	378	148	526
P	Patients attending BI	*No BI data.**	62 (54%)	119 (54%)	65 (92%)	43 (88%)	25 (89%)	181 (48%)	133 (90%)	314 (60%)
Q	Patients attending follow-up	26 (59%)	16 (14%)	38 (17%)	*no follow up data***	11 (22%)	10 (36%)	80 (21%)	21 (14%)	101 (19%)
R	Patients attempting to increase activity level	13(30%)	15 (13%)	31 (14%)		9 (18%)	8 (29%)	59 (16%)	17 (11%)	76 (14%)
S	Patients achieving activity goals	9 (20%)	14 (12%)	25 (11%)		6 (12%)	8 (29%)	48 (13%)	14 (9%)	62 (12%)

* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation
** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation

Figure 6. Patient flow rates through the care pathway and patient compliance with activity goals as a percentage of total participation

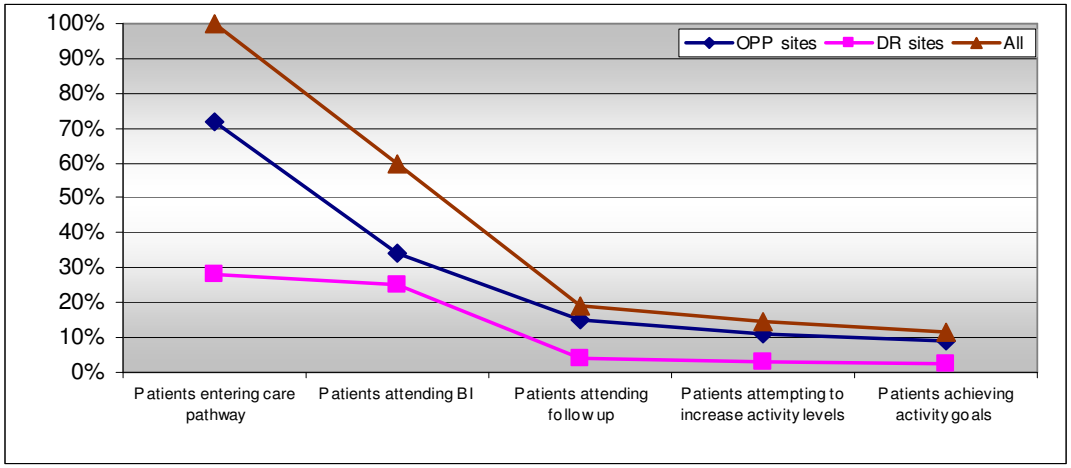


Figure 7. Cost of the care pathway up to and including follow-up per patient in £, including cost of training and practice support

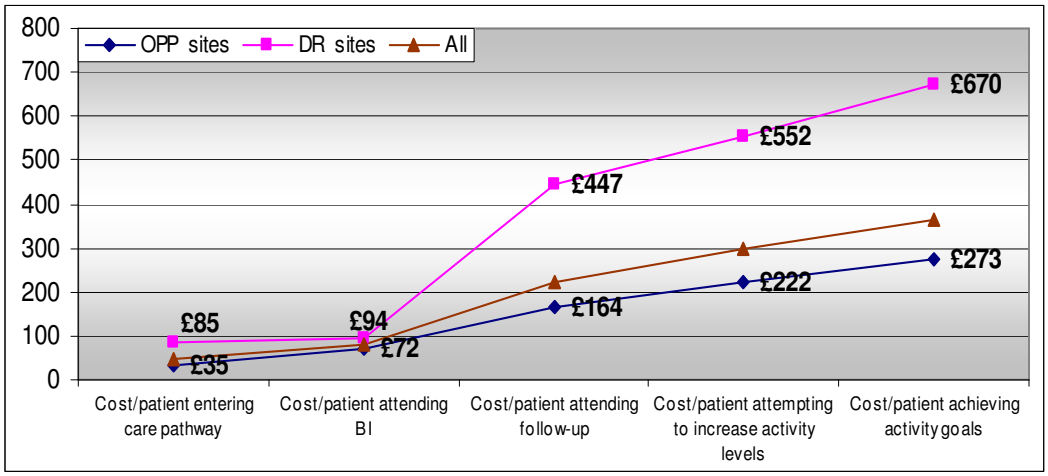
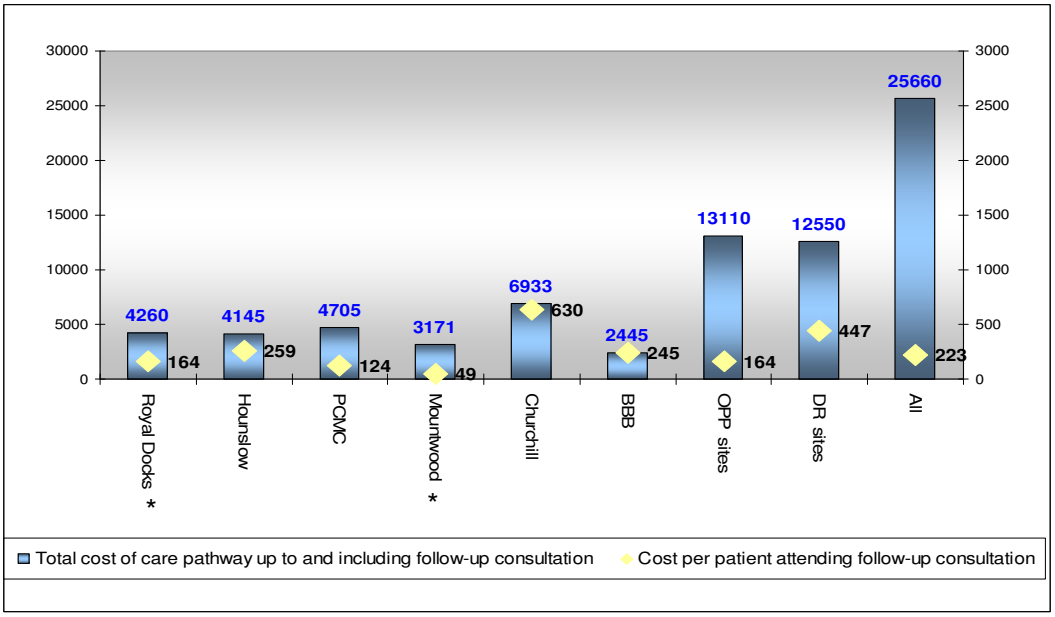


Figure 8. Total cost and mean cost per patient attending a follow-up appointment in £, including cost of practice training and support



* Note that no BI data was available for Royal Docks practice and no follow-up data was available for Mountwood practice. Therefore, estimates of total cost and mean cost per patient do not reflect the whole course of the pathway at those two practices.

Data in Tables 12 and 13 were used to present cost per patient analyses with different options for the denominator. Table 14 shows the cost per patient aggregated to 'all support activities' and 'all main activities' within the care pathway. Table 15 shows the total cost of the care pathway per patient inclusive and exclusive of cost of training and ongoing practice support. In addition, cost per patient was analysed with

respect to the key components of the care pathway pilot, namely the screening consultation; the BI consultation and the follow-up consultation. These results are presented in Appendix 15 and briefly discussed below.

As can be seen in Table 14, the appropriate allocation base has a significant impact on cost per patient. Since the number of patients declines sharply after the brief intervention consultation at disease register sites, cost of support activities per patient rise from £13 to £102 as the cost is applied to only patients attending the brief intervention and then to only those patients achieving a physical activity goal, respectively. Cost per patient for support activities was lower and did not rise as much in the 'opportunistic' practices. A similar pattern was seen in cost per patient for all 'main activities' (this includes the screening consultation, the BI and the follow-up consultation). Overall, the costs were greater in the disease register practices. This may be explained by data from Churchill since main tasks were undertaken by a GP in this practice and thus incurring greater cost. However, the pattern in the data for both 'support activities' and 'main activities' can be mainly explained by the stronger impact of patient participation rates on cost per patient during the course of the pathway at disease register sites.

Table 15 presents the total cost per patient including and excluding training and ongoing practice support activities. With training excluded cost per patient ranged from £11 to £89 in 'opportunistic' sites and from £38 to £286 in disease register practices; with training costs included, the comparable values ranged from £35 to £273 and £85 to £670, respectively. This is explained by the large cost associated with training and the relatively short period of time of the pilot study (12 weeks) which to some extent limited the number of patients recruited to the care pathway. One explanation for the higher cost per patient in the disease register practices relates to the cost at one single practice (Churchill), where estimates for many components of the care pathway were much higher than in any other participating practice. This is also illustrated in Figure 8, where total cost of the care pathway and cost per patient completing the care pathway are plotted against each other.

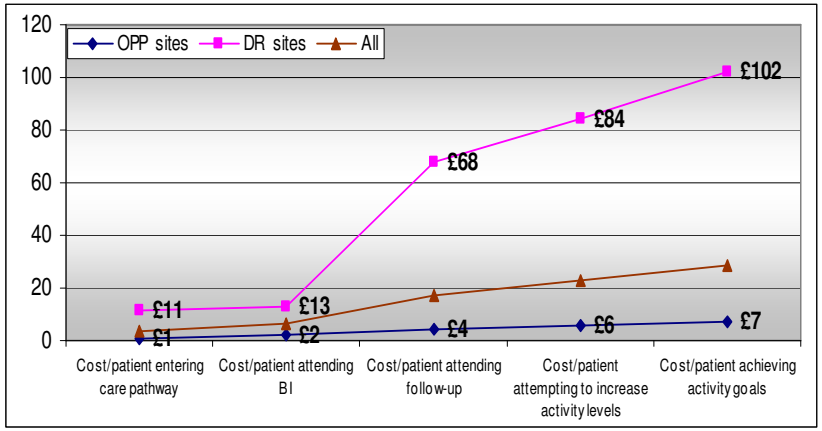
Further insights into the cause of cost variation between disease register sites and 'opportunistic' practices can be obtained by analysing the key components of the care pathway separately: the screening consultation (Appendix 15a); the brief

intervention consultation (Appendix 15b); and the follow-up consultation (Appendix 15c). Key findings from these analyses revealed that 'opportunistic' practices had lower cost (zero) for the support tasks prior to the screening consultation, higher cost of the actual screening consultation, but lower total cost per patient of all tasks related to patient screening (Section 3; Appendix 15a). This pattern was expected since disease register practices had more preparation (e.g., invitations and letters to send out) than 'opportunistic' practices. However, it is noted that in disease register practices the measurement of time spent screening is less clear and possibly less reliable – as previously mentioned the screening and the BI were conducted as one consultation in disease register practices. This also explains why data from Churchill practice was not included in this analysis, since only one estimate of time per patient for the combined screening and brief intervention consultation was provided. Hence, these results should be treated with caution and over interpretation should be avoided.

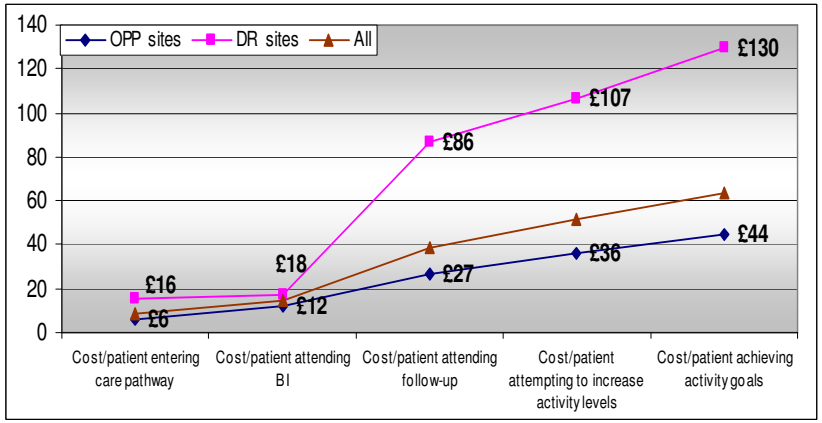
Cost per patient of the BI consultation again varied between disease register and 'opportunistic' practices. When costs were allocated to those patients entering the care pathway the costs per patient of the BI were £9.40 for 'opportunistic' sites and £5.70 for disease register practices, respectively. However, costs rose to £20.11 at 'opportunistic' sites and £44.89 at disease register practices when calculated as cost per patient achieving a physical activity goal (Appendix 15b). This means that the curves illustrated in Figures 2 and 3 in Appendix 15b are crossing. The main reason for this is that relatively more patients drop out before the brief intervention consultation at 'opportunistic' sites, while the majority of patients drop out after this component of the care pathway at disease register sites. Finally, cost per patient of the follow-up consultation are presented in Appendix 15c. There is less difference between practices on this cost, and it is interesting to see that costs are mainly driven by support activities prior to the follow-up consultation rather than the main activity of this component of the care pathway.

Table 14. Cost per patient of all support activities, all main activities and total cost of delivery of the care pathway per patient (excluding cost of training and practice support)

1	Cost of all support activities per patient in £									
		Royal Docks	**Houns -low**	**PCMC**	**Mount -wood**	**Chur-chill**	**BBB**	**OPP sites**	**DR sites**	**All**
=(A+D+H) /O	Cost per patient entering pathway	2.31	0.89	0.56	3.27	24.15	8.85	0.86	11.24	3.78
=(A+D+H) /P	Cost per patient attending BI	No BI data*	1.64	1.03	3.57	27.52	9.92	1.80	12.51	6.34
=(A+D+H) /Q	Cost per patient attending follow-up	3.91	6.37	3.23	no follow up data**	107.58	24.79	4.08	68.15 ***	17.40 ***
=(A+D+H) /R	Cost per patient attempting to increase activity level	7.82	6.79	3.97		131.49	30.98	5.53	84.19 ***	23.13 ***
=(A+D+H) /S	Cost per patient achieving activity goals	11.30	7.28	4.92		197.23	30.98	6.80	102.23 ***	28.35 ***



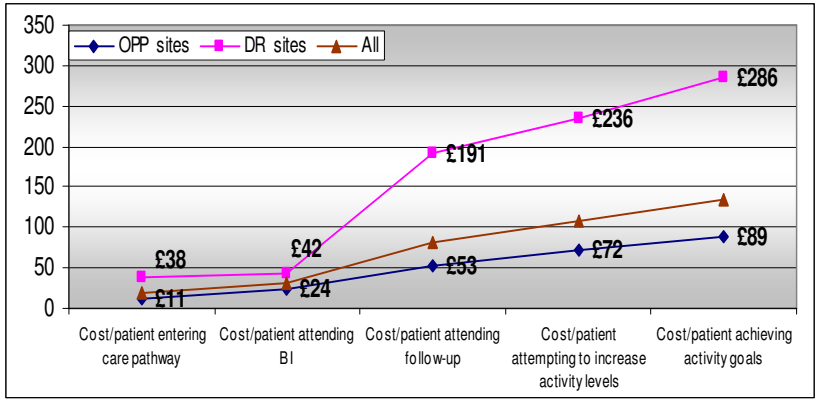
2	Cost of all main activities per patient in £ (screening consultation, Brief intervention including cost of support pack, and follow-up)									
=(B+F+I) /O	Cost per patient entering pathway	29.21	2.81	2.37	7.35	33.67	5.89	5.63	15.79	8.49
=(B+F+I) /P	Cost per patient attending BI	No BI data*	5.17	4.38	8.03	38.36	6.60	11.75	17.57	14.21
=(B+F+I) /Q	Cost per patient attending follow-up	49.43	20.04	13.71	no follow up data**	149.97	16.50	26.58	86.41 ***	39.02 ***
=(B+F+I) /R	Cost per patient attempting to increase activity level	98.86	21.37	16.81		183.29	20.63	36.05	106.75 ***	51.86 ***
=(B+F+I) /S	Cost per patient achieving activity goals	142.80	22.90	20.84		274.94	20.63	44.31	129.62 ***	63.57 ***



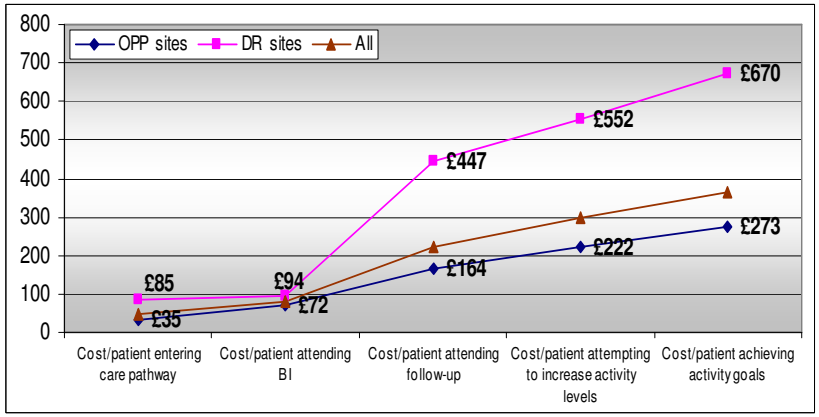
* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation
** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation
*** Since follow-up data for Mountwood was missing, these estimates are calculated without taking available Mountwood data into account

Table 15. Cost per patient of the care pathway pilot: excluding and including the costs of training and practice support

1	Excluding cost of training and practice support									
		Royal Docks	**Houns -low**	**PCMC**	**Mount -wood**	**Chur-chill**	**BBB**	**OPP sites**	**DR sites**	**All**
= L/O	Cost per patient entering pathway	31.52	9.14	8.33	22.26	69.15	22.13	11.27	37.76	18.72
= L/P	Cost per patient attending BI	No BI data.*	16.81	15.39	24.31	78.80	24.78	23.54	42.02	31.37
= L/Q	Cost per patient attending follow-up	53.34	65.14	48.20	no follow up data**	308.02	61.95	53.26	190.84 ***	81.87 ***
= L/R	Cost per patient attempting to increase activity level	106.69	69.48	59.09		376.47	77.44	72.22	235.75 ***	108.80 ***
= L/S	Cost per patient achieving activity goals	154.10	74.44	73.27		564.70	77.44	88.77	286.26 ***	133.36 ***



2	Including cost of training and practice support									
.= N/O	Cost per patient entering pathway	96.82	36.36	21.39	44.66	141.50	87.32	34.68	84.79	48.78
.= N/P	Cost per patient attending BI	No BI data*	66.85	39.54	48.79	161.24	97.80	72.43	94.36	81.72
.= N/Q	Cost per patient attending follow-up	163.85	259.06	123.81	no follow up data**	630.30	244.51	163.87	446.59 ***	222.66 ***
.= N/R	Cost per patient attempting to increase activity level	327.70	276.33	151.77		770.37	305.64	222.20	551.67 ***	295.90 ***
.= N/S	Cost per patient achieving activity goals	473.34	296.07	188.20		1155.6	305.64	273.12	669.89 ***	362.72 ***



* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation
** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation
*** Since follow-up data for Mountwood was missing, these estimates are calculated without taking available Mountwood data into account

Results of the Scenario analyses

This section presents the results from a number of different scenario analyses which were conducted to investigate the robustness of the model output (cost per patient completing the care pathway) with respect to the input parameters and underlying model assumptions. This approach shows how a change in both could affect mean cost per patient.

First, one way sensitivity analyses were performed to alter the main input parameters by 10% in each direction (scenarios 1 to 3). The main input parameters are unit cost estimates, the time required to perform activities and patient flow rates through the care pathway. Second, different scenarios were developed to assess how mean cost per patient would change if the mode of delivery was altered at each participating practice (scenarios 4 to 7). This included an assessment of the allocation of responsibilities for support and main activities within participating practices, the influence of a wider roll out of the Let's Get Moving support package and the expected cost per patient given a "perfect delivery" without any variations from the pathway protocol.

All scenarios were designed to reflect a realistic implementation of the care pathway. Since practice training and support is such a dominant contributor to total cost of the care pathway pilot, this cost component was not taken into account when performing scenario analysis. Hence, all cost estimates represent the cost per patient completing the care pathway excluding the cost of practice training and ongoing support. All results are presented as a percentage change of the model output (cost per patient). The complete results of the sensitivity / scenario analyses are given in Appendix 16.

The seven different scenarios are described in detail below.

Scenario 1:	One way sensitivity analysis to alter unit cost estimates by 10% in each direction
Scenario 2:	One way sensitivity analysis to alter the time taken to perform an activity by 10% in each direction
Scenario 3:	One way sensitivity analysis to alter patient flow rates through the care pathway as well as patient compliance with activity goals by 10% in each direction

Scenario 4: A change in allocation of responsibilities for delivery of support activities of the care pathway within a practice. For any support activity it was assumed that the responsible administrative worker within the practice could be somewhere between the lowest (receptionist) and the highest (practice manager, group practice) applicable NHS pay scale.

Scenario 5: A change in allocation of responsibilities for delivery of main activities (i.e. the screening consultation, the brief intervention consultation, and the follow-up). The average unit cost estimate of a healthcare assistant was applied on the lower end of the NHS pay scale, whereas GP unit costs were applied on the higher end of the pay scale.

Scenario 6: The influence of a national roll out of the Let's Get Moving support package with a production of 500,000 copies which reduces the costs associated with design and production from £12.91 to £0.32 per pack.

Scenario 7: A "perfect delivery" of the care pathway, assuming that there were no variations from the pathway protocol. This means specifically, that:

a. Patients who were assessed to be ineligible did not receive a GPPAQ assessment nor did they attend a brief intervention consultation or a follow-up; and
b. Patients who received the GPPAQ assessment and who were classified as 'active', did not proceed any further through the pathway protocol and exited the care pathway after the screening consultation.

The results of these analyses reveal that the model output is not sensitive to a 10% change in unit cost estimates or a 10% change in the time to perform activities within the care pathway (Scenarios 1 and 2). As can be seen from Figures 9a and 9b, the model output changes by less than 10% at each participating practice. In terms of elasticity, it can be stated that the model output is relatively *in*elastic to a change in time or unit cost estimates, i.e. the ratio of the change in input parameters and the change in the model output is between 0 and 1 ($0< \varepsilon <1$).

Altering the patient compliance and flow rates through the care pathway by 10% in each direction resulted in a much stronger impact on cost per patient completing the pathway (Figure 10). The impact ranged from almost 10% at Royal Docks to more than 20% at Bromley-by-Bow in one direction. This means that the model output is relatively elastic ($1< \varepsilon <\infty$) with respect to patient flow rates and compliance with the pathway protocol.

The reallocation of support activities within the care pathway (Scenario 4) only has a noteworthy impact on cost per patient at Bromley-by-Bow and Churchill. At all other

practices, the model output was very robust with respect to a reallocation of support activities (Figure 11).

The results indicate that although the cost per patient in the base case showed a large variation between practices (between £48 at Primary Care Medical Centre and £308 at Churchill), all estimates were most sensitive to a change in the allocation of main activities within the practice (Scenario 5). As shown in Figure 12, a reallocation of main activities towards health care assistants at the lower end of the NHS pay scale and GP's at the higher end would boost cost per patient dramatically at Bromley-by-Bow and Mountwood and would also have a strong positive impact on Hounslow and Primary Care Medical Centre. This shows that these four surgeries already delivered the main activities by health professionals at the lower end of the NHS pay scale (health care assistants or nurses). In contrast, as a GP was responsible for all patient contact at Churchill and almost all patient contact at Royal Docks, there is huge potential for cost savings in the delivery of the care pathway at these practices by reallocating tasks. Although reallocating main activities would not shift the cost per patient at Churchill into the same ballpark as other participating practices, this scenario assists in explaining a significant proportion of the variation in cost per patient between participating practices.

A larger scale 'roll out' of the Let's Get Moving support package (Scenario 6) would also have a significant effect on cost per patient completing the care pathway, with an impact between 16% at Churchill and up to 63% at Primary Care Medical Centre (Figure 13). The lower impact at Churchill is due to the lower contribution of the support pack to overall costs of the care pathway at this practice.

In contrast to Scenarios 1 to 6, the assumption of "perfect delivery" requires a more detailed examination because this scenario introduces two opposing trends on cost per patient. Specifically, the scenario assumes that:

a. Patients who were assessed to be ineligible did not complete the GPPAQ assessment nor did they attend a brief intervention consultation or a follow-up; and

b. Patients who attended the screening consultation and were classified as ‘active’ on the GPPAQ did not proceed any further through the care pathway protocol and exited the care pathway after the screening consultation.

The combined consequence is an easing effect on resource use meaning that total cost of the care pathway should decrease as ineligible or ‘active’ patients don’t proceed spuriously through the care pathway protocol. There is, however, also a negative effect on patient flow rates meaning that cost per patient may increase as fewer patients complete the pathway. Thus, this scenario has to be developed in four steps: first, the cost of carrying ineligible or ‘active’ patients through the care pathway should be reallocated to those patients who rightfully completed the pathway. This means that the numerator of the cost-per-patient ratio remains unchanged while the denominator decreases by the number of patients who should have dropped out from the care pathway. The result represents the actual cost per patient rightfully completing the care pathway (Row F in tables 16a and 16b). Second, the total cost of the care pathway should be calculated assuming perfect delivery so that patients who are ineligible or ‘active’ don’t proceed spuriously through the care pathway. The result represents the target cost of the care pathway assuming perfect delivery (Row B in tables 16a and 16b). Third, the costs of perfect delivery should also be allocated to those patients who rightfully completed the pathway. This represents the target cost assuming perfect delivery per patient who rightfully completed the pathway (Row G in tables 16a and 16b). Finally, by comparing the actual cost and the target cost per patient rightfully completing the care pathway we can estimate the impact of “perfect delivery” on cost per patient of the care pathway (Figures 14 and 15 and Appendix 16).

The results showed that 34 patients received a GPPAQ assessment although the health professional conducting the screening consultation judged these patients as being ineligible for the care pathway. However, as only one of these 34 patients completed the care pathway, the impact on total cost and cost per patient rightfully completing the care pathway remains low. Only at Hounslow Medical Centre, where 22 of these 34 errors in delivery occurred, there is a notable impact on the cost of the care pathway per patient (8.3 %).

A much stronger effect on cost per patient can be observed when investigating the impact of 'active' patients who spuriously proceeded through the care pathway protocol. As this error occurred 71 times with 21 of these patients even completing the care pathway, there is a much stronger impact of this error on total costs of the care pathway and cost per patient completing the pathway. As the error occurred most frequently at Hounslow and Primary Care Medical Centre, we can observe an impact on cost per patient of 17.5% and 15% respectively. It is also interesting to note that the dataset shows that Churchill did not carry ineligible or 'active' patients through the care pathway, meaning that no additional costs of errors occur at this practice. In addition, it can be observed that both errors seem to occur more frequently and with a higher impact on cost per patient at 'opportunistic' sites. This means that there is further potential at 'opportunistic' sites to reduce costs per patient, while disease register sites already operate with fewer errors in the delivery of the care pathway. This finding adds to the conclusion that 'opportunistic' screening might have the potential to deliver the care pathway at lower costs per patient.

Figure 9a. Scenario 1: One way sensitivity analysis of unit cost estimates (±10%)

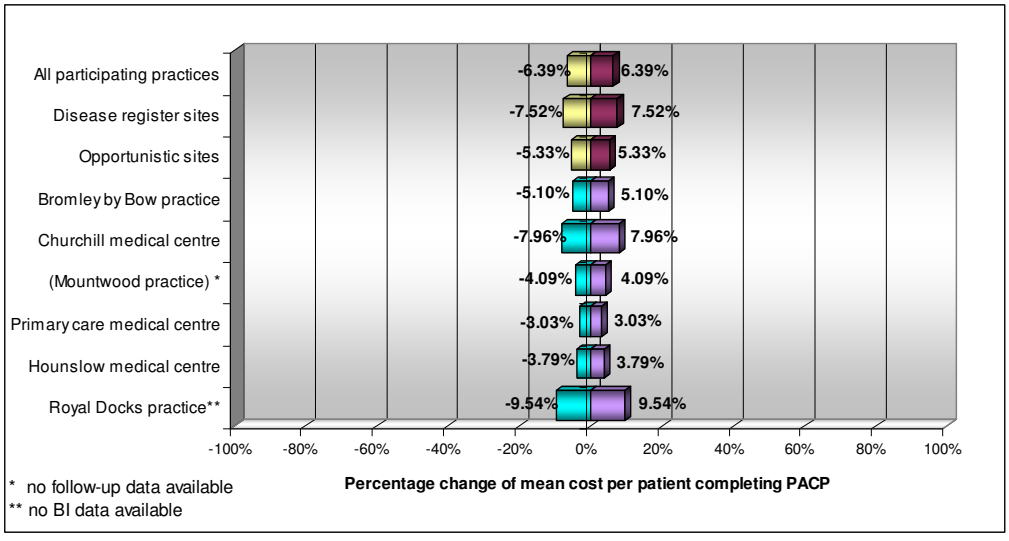


Figure 9b. Scenario 2: One way sensitivity analysis of time to perform activities (±10%)

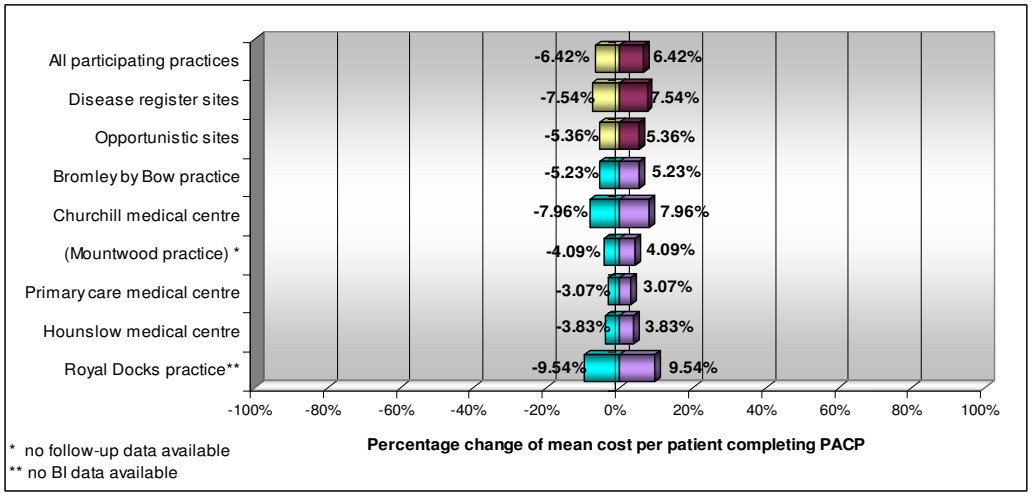


Figure 10. Scenario 3: One way sensitivity analysis of patient compliance and patient flow rates through the care pathway (±10%)

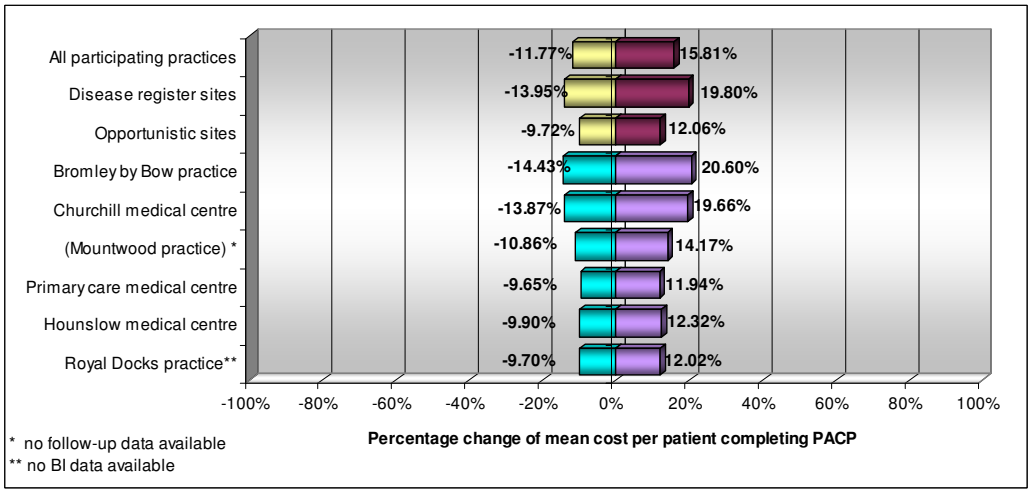


Figure 11. Scenario 4: Reallocating support activities to different support staff within the practice

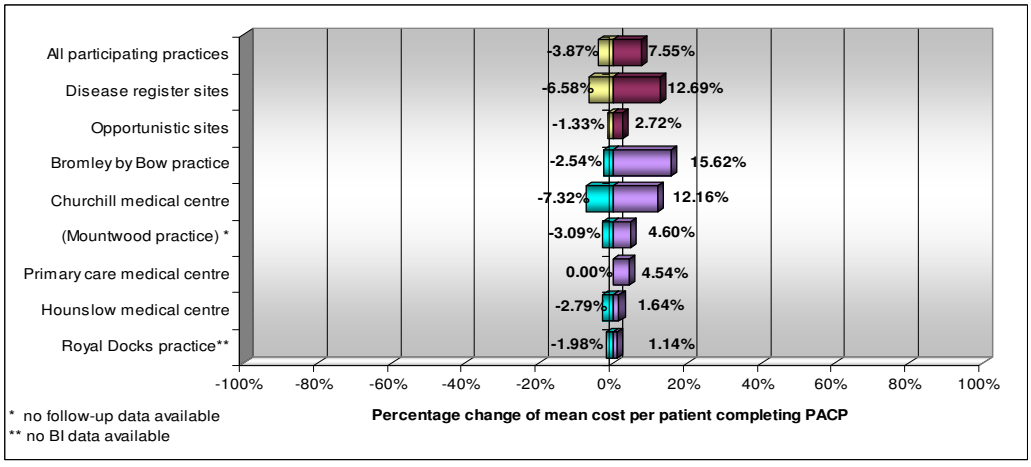


Figure 12. Scenario 5: Reallocating main activities to different health professionals within the practice

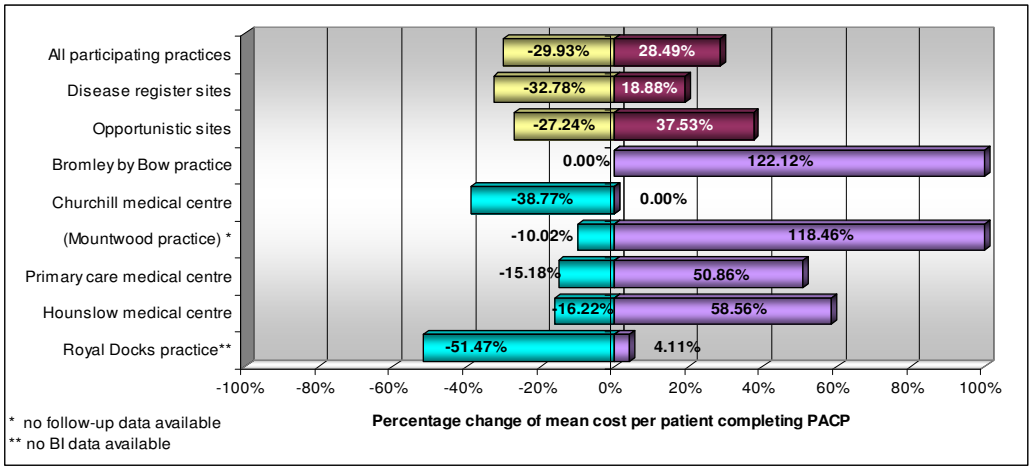


Figure 13. Scenario 6: National roll out of Let's Get Moving support package

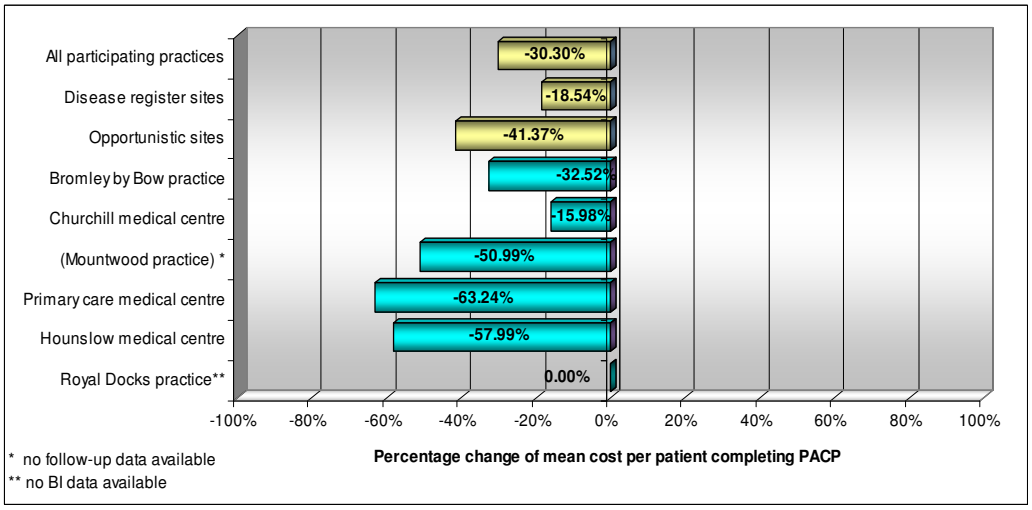


Figure 14. Scenario 7a: Exit of all ineligible patients before GPPAQ assessment

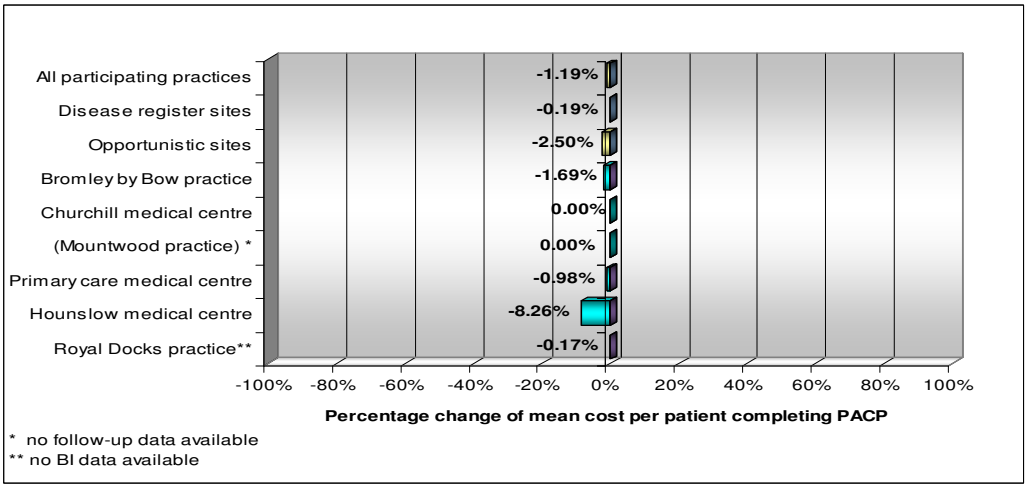


Figure 15. Scenario 7b: Exit of all 'active' patients after GPPAQ assessment

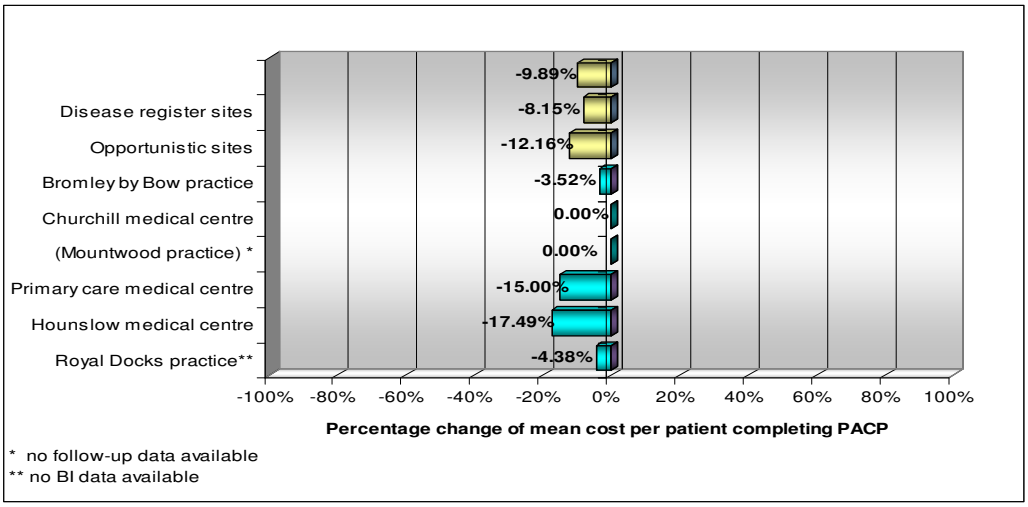


Table 16a. Scenario 7a: Exit of all ineligible patients before GPPAQ assessment

		Royal Docks Practice**	Hounslow Medical Centre	Primary Care Medical Centre	Mountwood practice*	Churchill Medical Centre	Bromley By Bow practice	Opportunistic Sites	Disease Register Sites	All Participating practices
a	Actual cost of care pathway up to and including follow-up	1386.9	1042.2	1831.8	*1580.3*	3388.2	619.5	4260.9	5588.0	9848.9
b	Target cost of care pathway up to and including follow-up assuming perfect delivery	1384.4	956.2	1813.8	*1580.3*	3388.2	609.1	4154.3	5577.6	9731.9
c	Patients attending follow-up	26	16	38	no follow-up data	11	10	80	21	101
d	Patients rightfully attending follow-up (excluding those who were judged ineligible)	26	15	38		11	10	79	21	100
e= a/c	Actual cost per patient attending follow-up	53.3	65.1	48.2	N/A	308.0	62.0	53.3	266.1	97.5
f= a/d	Actual cost per patient who rightfully attended follow-up	53.3	69.5	48.2	N/A	308.0	62.0	53.9	266.1	98.5
g= b/d	Target cost assuming perfect delivery per patient who rightfully attended follow-up	53.3	63.7	47.7	N/A	308.0	60.9	52.6	265.6	97.3
	Difference between "f" and "g" in %	-0.17	-8.3	-1.0	N/A	0.0	-1.7	-2.5	-0.2	-1.2

Table 16b. Scenario 7b: Exit of all 'active' patients after GPPAQ assessment

		Royal Docks Practice**	Hounslow Medical Centre	Primary Care Medical Centre	Mountwood practice*	Churchill Medical Centre	Bromley by Bow practice	Opportunistic Sites	Disease Register Sites	All Participating Practices
a	Actual cost of care pathway up to and including follow-up	1386.9	1042.2	1831.8	*1580.3*	3388.2	619.5	4260.9	5588.0	9848.9
b	Target cost of care pathway up to and including follow-up assuming perfect delivery	1326.2	859.9	1556.8	*1146.5*	3388.2	597.7	3742.9	5132.4	8875.2
c	Patients attending follow-up	26	16	38	*no follow-up data*	11	10	80	21	101
d	Patients rightfully attending follow-up (excluding those who were classified as 'active')	23	10	26		11	10	59	21	80
e= a/c	Actual cost per patient attending follow-up	53.3	65.1	48.2	N/A	308.0	62.0	53.3	266.1	97.5
f= a/d	Actual cost per patient who rightfully attended follow-up	60.3	104.2	70.5	N/A	308.0	62.0	72.2	266.1	123.1
g= b/d	Target cost assuming perfect delivery per patient who rightfully attended follow-up	57.7	86.0	59.9	N/A	308.0	59.8	63.4	244.4	110.9
	Difference between "f" and "g" as a %	-4.4	-17.5	-15.0	N/A	0.0	-3.5	-12.2	-8.2	-9.9

Wave Two focus group results

A focus group conducted with five Wave Two practitioners contributed to understanding practitioners experiences of delivering each component of the care pathway. The results of the focus group are presented in theme areas which were determined by the interview schedule and where appropriate, the participants themselves.

The results are grouped into eight main themes.

- Training.
- Experiences of using the GPPAQ.
- Experiences of utilising motivational interviewing with patients.
- Risk Stratification and signposting.
- The care pathway resources.
- Experiences of following-up patients.
- Benefits of the physical activity care pathway for patients.
- Future recommendations.

<u>Training</u>

- *"The two trainers were very good".*
- The training raised practitioners awareness of the role of physical activity in health promotion.
- The health walk was reported as helpful and beneficial.
- Role play was reported as particularly useful in applying theory to practice.
- The role play scenarios were particularly useful in preparing practitioners for consultations.

<u>Experiences of using the GPPAQ</u>

- The overall response to the GPPAQ was positive.
- The electronic version which automatically generates the PAI was particularly useful.
- The GPPAQ helped to initiate discussions about physical activity.
- The GPPAQ was useful for raising patients awareness of their current physical activity levels.

- Utilising the GPPAQ in consultations with patients whose first language was not English was reported as challenging.
- Some patients questioned their PAI, arguing that the limited scope of the questions could not capture their total level of physical activity.
- Many patients classified as 'moderately active' reported undertaking a lot of activity and as a result it was suggested that the care pathway should focus on patients in the less active activity categories.

Experiences of utilising motivational interviewing with patients

- Practitioners reported that patients were receptive to the brief intervention consultation.
- MI helped patients to discuss what physical activity they could do as opposed to what they couldn't do.
- The patient-centred method of MI was beneficial in terms of developing goals and increasing the likelihood of long-term behaviour change.
- Time was a barrier to delivering MI consistent consultations.
- Language barriers were reported as a perceived barrier, however this was reported as a challenge in consultations generally and not solely related to utilising MI.
- *"MI allowed patients to discuss physical activity in quite an open way and they really did appreciate it".*
- *"Patients really appreciated it and they couldn't quite believe that this was something they could use a clinicians time to discuss".*

Risk Stratification and signposting

- The risk stratification criteria was viewed as very useful and was also perceived as a 'safety net' for the practitioners.
- Risk stratification and selecting which signposting opportunities were appropriate was difficult for patients with co-morbidities.
- Some practices did not have many physical activity opportunities within the local area and were therefore limited to where they could signpost patients to.
- Pedometers were frequently used as a signposting option and patients liked using the pedometers and having targets to achieve.

- Cost was a barrier to patients taking part in many of the physical activity opportunities.

Resources

The practitioner support pack

- Practitioners found the support pack useful – *"It was like my bible next to me".*
- The support pack was used regularly as a source of reference to refresh what had been learned in training.
- The pack was often used in place of telephoning the evaluation team to make an enquiry.
- It helped to communicate the design, aim and delivery of the care pathway to other practitioners.
- The risk stratification sheet contained within the pack was considered invaluable and was described as a 'safety net' in terms of the selection of activities to which patients were signposted.

The Let's Get Moving pack

- Patients liked having a resource to take away at the end of the consultation.
- The pack helped to increase patients awareness of local physical activity opportunities.
- Patients liked the physical activity monitoring sheet and enjoyed showing their progress to the practitioner.
- Most practitioners chose to put the BHF leaflets in the pack.
- It was recommended that the resource should be published in other languages.

Experiences of following-up patients

- One practitioner reported sending SMS messages to recall patients.
- Staff and patient holidays were reported as a barrier to following-up patients during the summer months.

Benefits of the physical activity care pathway for patients

- Many patients who were issued with pedometers were achieving 10,000 steps per day when they returned for their follow-up consultation.

- Weight loss, 'breathing better' and feeling healthier were reported as common patient outcomes.
- Increases in physical activity and decreases in blood pressure were reported for hypertensive patients.
- *"The ones that we have seen so far have all improved".*
- *"Some of them who are depressed are less depressed".*
- *"Some of them who never got out of their house are feeling a little better and some have made friends".*

Future recommendations

Training

- Care pathway and MI training could be undertaken locally with 2 – 3 practices.
- Certificates for physical activity and MI training related to the care pathway were recommended.

Use of advertising

- One practice displayed information regarding the care pathway on their LCD screen in reception and this was recommended.
- National media coverage was reported as a helpful method of promoting physical activity and integrating the care pathway into practice.
- Comparisons were made with the five-a-day message and it was suggested that not a lot of people are aware of the 5 x 30 message.
- The 5 x 30 message could be tagged onto gaming console advertisements such as the Wii fit console.

Patient consultations

- The possibility of group physical activity consultations for patients was suggested – similar to smoking cessation.
- Physical activity consultations should be incorporated into all disease management clinics.

Staff involvement in delivering the care pathway

- It was recommended that nursing staff are best placed to deliver the care pathway in practice.
- Appropriate qualifications, more time, and cost effectiveness were suggested as a rationale for practice nurses to deliver the care pathway.

- Promoting a whole practice approach was recommended - *"If you get everyone in the practice on board, you're more likely to provide better support to the patients and get them more involved".*

Financial incentives for delivering the care pathway

- Most GPs support physical activity promotion in primary care in theory, however, in practice significant financial backing is needed - it was recommended that physical activity should be included in the Quality and Outcomes Framework.

7 Discussion

This evaluation study aimed to assess the feasibility and cost of the pilot physical activity care pathway. The evaluation design incorporated a mixed methods approach, combining both quantitative and qualitative data collection. Data were collected to track patients' recruitment and progression through the care pathway protocols and interviews and focus group discussions captured the experiences of those health care practitioners trained and implementing the care pathway over the study period. An economic analysis was undertaken to estimate total costs and mean cost per patients as well as to explore the sensitivity of these estimates under a set of different implementation scenarios. This Discussion draws together the learning from the multiple evaluation data sources to provide an overall appraisal of the care pathway and identify key issues and recommendations. The structure of this section reflects the key components of the care pathway.

<u>Patient eligibility and entry routes</u>

- Two methods of patient entry to the care pathway were incorporated into this pilot trial although other mechanisms were noted as possible, these were: 'opportunistic' and disease register. The protocol for 'opportunistic' practices requested that health practitioners consider the eligibility of *every* patient seen during the 12 week recruitment period. It was estimated that a total of approximately 5,900 patients attended consultations with the participating practitioners during the 12 week recruitment period across the three 'opportunistic' practices. However, only 378 (6%) of these patients were screened for eligibility for the care pathway. It is likely that this low figure is due to problems with the mechanism of recording patient eligibility in EMIS rather than 6% reflecting a robust and reliable estimate of the 'opportunistic' recruitment rate under usual conditions.

- Although participating practitioners were asked to record on EMIS whether or not *every* patient was eligible for the care pathway, this did not occur systematically. The EMIS templates were set up to allow practitioners to record possible reasons for not considering the care pathway: for instance, if

the nature of the consultation meant it was inappropriate to discuss the care pathway, or a patient had contra-indications, and whether or not the GPPAQ was used to assess the patients' level of physical activity. A response option also allowed the practitioner to record if there were any other reasons why the care pathway could not be considered with the patient including "insufficient time" and "forgot". These data would have helped explain (and quantify) why patients were not being included or considered and help estimate the throughput of patients into the care pathway.

- During the pilot study the majority of participating health practitioners only opened and recorded in EMIS if a patient was identified as eligible based on the three initial screening criteria (age, contra-indications, context of the consultation). This pilot study therefore can not report reliably on the total number of patients that may have been considered for the care pathway but were ineligible nor in how many consultations the practitioner did not consider the care pathway at all.

- There was no pattern evident, by practice nor by health practitioner, in the omissions to the recording of these details except at the Primary Care Medical Centre. It is therefore likely that completing the extra EMIS template for the care pathway was a change to normal practice and being somewhat inconvenient was only used when the care pathway was to be followed through with eligible patients. One practice was able to collect some data; at the Primary Care Medical Centre health professionals recorded details on 220 patients who were identified as eligible for the care pathway. Data showed that "time restrictions" explained why GPPAQ was not completed with 57 patients (26%) and therefore, although eligible, these patients did not take part in the care pathway.

- Analysis of the focus group and interview data revealed that health professionals made their own subjective decisions regarding which patients would be appropriate for the care pathway. One practice which recruited 'opportunistically' reported that they tended to discuss the care pathway with any patient who was on the disease registers who attended for a consultation during the pilot trial, because it was perceived that due to their own health

condition these patients might be more motivated to take part and would benefit from participation in the care pathway. One other practice reported that they only considered patients for the care pathway if a patient initiated a discussion about physical activity in the consultation.

- Results from interviews with practitioners, revealed that a lack of time was cited as a barrier to considering every patient for the care pathway because of the need to address the primary reason for the consultation and to address issues relating to the Quality and Outcomes Framework (QOF). Dealing with both of these agendas first meant there was often insufficient time to consider patients for the physical activity care pathway. One recommendation (from health practitioners) to help raise the profile of physical activity within primary care would be to get the physical activity care pathway included in QOF.

- In practices using the disease registers to recruit patients, a total of 916 invitations were sent to patients selected from only hypertension disease registers. The protocol proposed that letters of invitation were sent to a proportion of patients on the list. In total, 148 patients were interested and accepted the invitation, although the response rate did vary markedly across the three practices (9%, 12% and 59%, respectively).

- There appears to be clear reasons why the response rate from disease registers varied between practices. Churchill Medical Centre sent out the highest number of invitations, targeting over 60% of patients on the disease register, however they only had one health professional trained and available to conduct the care pathway consultations and only 49 (9%) patients attended a screening consultation. Thus, there may have been patient interest but they were unable to make an appointment in a timely way. If patients were given a long lead time or told to call back it would be understandable that these patients might lose interest. At Bromley-by-Bow practice only 12% of those invited by letter had a screening consultation. However, it was learnt through practitioner interviews that a greater number of patients responded to the invitation but due to circumstances (e.g., busy practice due to flu vaccinations) there were insufficient appointments available to meet the demand. Evidently, there is a need to balance the number of invitations sent to patients at any one

time to reflect the availability of appointments and the capacity of the practice to respond.

- The most successful practice at recruiting patients from the disease registers was Mountwood. In addition to the standard care pathway protocols (namely the letter of invitation) this practice produced additional materials, for instance flyers promoting physical activity and the care pathway was included on posters and leaflets available in the practice waiting area. These additional promotional activities may very well have contributed to the increased response rate at this practice.

- This pilot study has demonstrated that the physical activity care pathway can be implemented via both 'opportunistic' and disease register recruitment methods. In disease register practices, this study limited recruitment to those patients from hypertension registers but it would be possible to broaden to include other conditions. In addition, recruitment of patients for the physical activity care pathway could be: incorporated into disease management clinics; integrated into 'preventative clinics' (e.g., men's health and women's health clinics); delivered via group consultations on physical activity (similar to smoking cessation). Also, some health practitioners were supportive of patients being able to self-refer to the care pathway. Delivering the care pathway via multiple entry routes would increase the number of patients who could potentially engage in the pathway.

<u>Use and completion of the GPPAQ</u>

- Overall, the qualitative results suggest that in general the health practitioners involved in this study were supportive of the use of GPPAQ and found it useful for initiating a discussion about physical activity. Indeed, practitioners reported that they were keen to encourage and reinforce patients to be physically active even if they were not appropriate for the full care pathway. Using the GPPAQ as an 'opening' tool allowed them to do this.

- Results from the flow of patients through the care pathway revealed that the GPPAQ was not solely administered to patients identified as potentially

eligible. In fact, 34 patients identified as ineligible (due to age, contra-indications, or due to the nature of the consultation) completed the GPPAQ with their health professional. This is possibly because practitioners reported using the GPPAQ to establish a routine for starting the care pathway and raising the issue of physical activity thus, the GPPAQ was, in at least some practices, completed prior to making other assessments about patients' eligibility for the care pathway.

- Health professionals reported that they liked the GPPAQ because it comprised relatively few questions, was found to be easy to understand and took between 1 – 2 minutes to complete. One practice, [Hounslow] with an 85% non-English speaking population, translated and used the GPPAQ with patients in alternative languages such as Punjabi and Hindu. Despite administering the GPPAQ in another language, this practice reported that the GPPAQ still took approximately two minutes to complete and was viewed favourably by practitioners.

- The protocol for administering the GPPAQ requires that any 'walking' reported by patients should be discussed in more detail to verify the nature and intensity. The care pathway protocols enabled health professionals to amend patients' physical activity levels based on this discussion. There were no reports of this causing any difficulties by practitioners.

- The results from this pilot showed that these discussions about reported walking led to 69 patients (16%) being re-classified. Twenty five patients (6%) were reclassified from the lowest physical activity bracket ('inactive') to the highest physical activity bracket ('active'). Although this represents the most extreme reclassification, it occurred for a fairly small proportion of patients and presumably the level and nature of walking suggested this change was appropriate.

- Patients were generally considered to be more active than their original PAI following a discussion about walking, with an additional 67 patients being considered 'active', i.e. meeting the Chief Medical Officer's (CMO) recommendation of 30 minutes of moderate activity on five or more days of

the week. The consequence of this reclassification is that patients who were identified as eligible for the care pathway based on the GPPAQ are no longer eligible to take part. Whether it is appropriate to reclassify patients' physical activity level based on a discussion about walking requires consideration.

- The available data from tracking patients through the recruitment and eligibility care pathway steps revealed that approximately 80% of patients identified as eligible for the care pathway were interested in receiving the brief intervention. This result is very encouraging. It is, however, worth noting that asking patients about their level of interest is not altogether consistent with the principles of motivational interviewing. However, in this context of the care pathway, it was justified because it was necessary to appraise patient interest in order to plan to continue with the brief intervention and / or book another appointment. Further consideration of this step of the protocol is warranted when decisions about the final delivery (in one or two consultation) have been made.

- Data collected on the use of care pathway resources showed that the BHF 'Get Active' resource was well liked and indeed given to a range of patients beyond just those patients specified in the care pathway protocols (namely, those not interested in the BI), including those identified as 'active' as well as those who received a brief intervention consultation.

Delivery of the Brief Intervention

- As reported above, patient interest in receiving the brief intervention was high; 78% of patients were interested in practices recruiting 'opportunistically' and 93% from practices recruiting via the disease register approach. The higher proportion of patients in disease register practices is not unexpected given that these patients had already expressed an interest in the care pathway by responding to their initial invitation and attending a consultation for this specific purpose.

- One issue of particular interest in this pilot study was whether the brief intervention consultation would be conducted within the screening consultation

or undertaken as a separate stand alone appointment; and whether the approach would vary according to the patient recruitment strategy. The results showed that the majority (83%) of brief interventions were conducted as an extension of the initial screening consultation, in practices recruiting via disease registers, this was nearly always the case (96%). This has a practical explanation, practitioners were aware that the purpose of the consultation was to discuss the care pathway and consequently planned a 'double appointment' to ensure there was sufficient time to complete both the screening and the brief intervention. In 'opportunistic' practices, over 70% of brief interventions were conducted as part of the initial screening consultation with only 19% of brief interventions conducted as a separate consultation. For 6% whether the brief intervention was a separate appointment is unknown.

- Patient 'drop-out' between screening and brief intervention across 'opportunistic' practices was 22%, however this is partly due to the exclusion of Royal Docks as this practice did not record data on the brief interventions. As 26 patients attended follow-up appointments at Royal Docks practice, one could assume that at least 26 patients received the brief intervention. Including these 26 patients gives a revised estimate of patient drop out of 11% between screening and brief intervention in 'opportunistic' practices.

- In interviews with the health professionals, it was evident that they valued the flexibility of being able to deliver the brief intervention either as part of the screening consultation or as a separate appointment. This was emphasised particularly by practices piloting the 'opportunistic' recruitment who liked being able to use the second appointment for the brief intervention when there were time constraints, thus these patients could still be offered the opportunity to take part in the care pathway.

- As indicated above, EMIS data on the delivery of the brief intervention consultation was not available for Royal Docks. This is partly because the relevant health practitioner was not familiar with the different templates and was unsure which template to open and complete. It appears necessary to embed the care pathway EMIS templates into existing templates and thus

avoid stand alone files which health professionals have to open in addition to other templates, to maximise ease and usage.

- Of the 315 patients who received the brief intervention in this pilot study, almost a quarter (23%) were classified as 'active' on the GPPAQ and were therefore, in theory, not eligible for the care pathway. Practitioners reported that even if a patient was identified as 'active', practitioners felt they might still benefit from participation in the care pathway. Ten percent of patients receiving the brief intervention were 'moderately active', 25% were 'moderately inactive' and 42% were 'inactive'.

- EMIS data indicates very good compliance with the delivery of each component of the brief intervention with the majority of patients. However, qualitative feedback from practitioners did indicate that the content of the brief interventions varied considerably between practitioners. One practitioner reported that they found the use of motivational interviewing relatively easy, they could remember the steps involved in delivering the brief intervention and delivered every component. However, another health practitioner reported that they struggled to implement the motivational interviewing principles, did not understand how to assess a patient's readiness to change and were not comfortable signposting patients based on the limited information contained in the Let's Get Moving resource. This suggests that the two-day training may have been insufficient for some health practitioners and / or that a greater level of support may be required post-training.

Risk Stratification

- Prior to signposting patients to opportunities for physical activity the practitioners need to undertake a risk assessment using a risk stratification tool, this was modified and updated from existing tools specifically for this pilot study. Several practitioners reported difficulty risk stratifying patients and identifying which activities were appropriate for patients, especially for those patients with conditions such as hypertension, renal failure or arthritis. Although the risk stratification criteria were based on current tools and the best available literature, they did have some limitations, particularly in not providing

sufficient guidance on multiple risks. There is currently a proposal under development for a programme of work to develop national risk stratification guidelines which will address the complexities of risk stratifying patients with co-morbidities. The proposal is being led by the BHFNC and work will be undertaken in collaboration with the National Governments across the UK and key partners, including condition specific NGOs. The risk stratification tool used in the care pathway should be revised and updated accordingly.

- In this pilot, only four patients were classified as 'high risk' using the care pathway risk stratification criteria. It was anticipated that more patients would be classified as 'high risk', particularly those from the disease register practices. It is possible that there was some selection bias by health professionals, such that patients considered as potentially 'high risk' were not screened for eligibility. It is also possible that practices continued to direct identified 'high risk' patients to ongoing exercise referral schemes (see point below).

- The way in which the care pathway was implemented alongside exercise referral schemes was of interest. One practice, for example, continued to refer 'high risk' patients to their exercise referral scheme independently as opposed to integrating the exercise referral scheme into the care pathway model. If this also occurred across other practices, it would help to explain why such a low number of 'high risk' patients entered the care pathway. This highlights the need for clear guidelines on how the physical activity care pathway is intended to integrate with or replace existing protocols for schemes such as exercise referral.

<u>Signposting</u>

- All patients identified as 'high risk' were signposted to exercise referral or clinical physical activity options, while 'medium risk' and 'low risk' patients were generally signposted to either 'local authority leisure services' or 'self-directed outdoor activity'. For some practices, these were the only activities available in their local area and some health professionals reported that some patients expressed a preference towards self-directed outdoor activity. In

general, these results indicate that health professionals understood the care pathway protocols and the importance of signposting patients to appropriate physical activity options.

- 'Local authority leisure services' was the most frequently signposted activity although interview data identified that health professionals felt more comfortable discussing ways to be more physical active in the context of every day life. Practitioners also expressed concerns about 'signposting' to activities or programmes that no longer took place, thus preferring self-directed and pedometer-based opportunities to avoid suggesting to the patient activities that were no longer running or had changed. Retaining an up-to-date inventory of local physical activity opportunities would be useful to support 'signposting' but does present practical challenges.

- One limitation of the data collected on signposting was identified from interviews with practitioners which revealed that they were unsure of how to record signposting to use a pedometer [as 'pedometer scheme' or 'self-directed outdoor activity']. The net effect is that the prevalence of signposting to a 'pedometer intervention' may be conservative as practitioners often recorded this as 'self-directed outdoor activity'. This is supported by qualitative data which identified that health professionals were keen to signpost to pedometer programmes. Motivation and confidence to signpost to pedometer programmes may have been facilitated by the Step-O-Meter session which was included in the two-day training.

<u>The Let's Get Moving resource</u>

- In general, health professionals found the Let's Get Moving resource very helpful for guiding the consultation, and reported that they felt it was good to give patients something to take away with them at the end of the consultation.

- Practitioners provided several suggestions on how to improve the resource, these included tailoring the list of activities to ensure they take place within close proximity of the practice and are not generic for the whole borough, inclusion of an activity timetable and details on the cost of each activity.

Although a telephone number was included which patients could call for more information, this was perceived as a potential barrier to patients taking part in the care pathway. Practitioners suggested that internet resources which health professionals could access for additional information would be desirable.

- Health professionals reported that patients found the resource helpful, particularly the area-specific map, as this identified areas of green space which patients didn't know existed. Patients' appraisals of the usefulness of the pack were captured at the follow-up consultations and were very mixed with 35% rating the pack as 'very useful' and 20% rating it as 'not at all useful'.

- Practitioners suggested publishing the Let's Get Moving resource in a variety of languages would also facilitate the delivery of the brief intervention with non-English speaking populations. This would however increase the upfront costs of the care pathway and the amount would depend on how many languages were considered to be necessary and useful.

<u>Follow-up consultations</u>

- Approximately one third (32%) of patients who received the brief intervention were reached and successfully returned for a follow-up appointment. Although the care pathway protocols requested practitioners undertake two follow-up appointments with patients (at three and six months) due to the short duration of this pilot study practices had insufficient time to deliver the six month follow-up consultations. The follow-up appointments took place between 4 and 23 weeks (average 15 weeks) after the brief intervention.

- It is unclear why patients attended follow-up consultations just 4 – 6 weeks after their brief intervention. It is possible that patients attended the practice for another reason and health professionals took the opportunity to follow-up with these patients on the care pathway. For those patients with a longer time gap, practitioners reported that it often took several weeks for patients to respond to the invitation for a follow-up appointment and even then additional time might be needed before a convenient appointment was available. It may therefore be appropriate to recommend in the protocols that follow-up

invitations are sent out earlier in anticipation of potential delays in booking appointments. It was however suggested by practitioners that three months may be too soon to follow-up patients. For many conditions patients are recalled at six months. It was suggested that one follow-up appointment at six months may be more appropriate for the care pathway.

- Qualitative data revealed that practices found it challenging to successfully get patients to return for a follow-up consultation, and that this was consistent with the practitioners experiences for other interventions designed for preventative purposes as opposed to treatment. Additional barriers included: a shortage of appointments due to seasonal factors such as vaccinations; and practitioners being on annual leave.

- Methods for contacting patients at follow-up varied but text messages and phone calls were reported to be more effective than a letter at encouraging patients to attend a follow-up appointment. This is contrary to the successful techniques used to initially engage patients, here text messages and phone calls were considered to be less effective than sending a written letter with promotional material. Due to the difficulties experienced in recalling patients to the practice, delivering the follow-up consultations via the telephone was suggested as a possible alternative.

- Data collected during the follow up consultations revealed that approximately 50% of patients reported taking part in the physical activity for which they were signposted, the remaining 50% reported that they took part in alternative physical activity options. This may indicate that for some patients the practitioners were unable to identify patients' interests during the brief intervention or that patients changed their minds. It is also possible that participation in one specific physical activity gave patients the motivation or confidence to try alternative activities. This may have been facilitated by the menu of physical activity opportunities provided within the Let's Get Moving resource.

- Health practitioners reported that patients who attended a follow-up consultation were generally very positive about the care pathway and many

had achieved their goals. For example, some patients reported to health professionals that they had experienced weight loss and "improved breathing" as a result of increasing their physical activity level. It is likely, however, that the patients who attended the follow-up consultations were the most motivated and engaged in the care pathway. For patients who did not attend a follow-up, it is unknown whether they took part in any physical activity options and whether they experienced any benefits from participation in the care pathway. This pilot study did not involve direct follow-up of participating and non-participating patients.

Duration of consultations

- Screening and delivery of the brief intervention required approximately 20 minutes for patients recruited from the disease registers. The duration of follow-up consultations was estimated to be on average approximately 12 minutes. Health practitioners delivering the care pathway 'opportunistically' required approximately three minutes for the screening consultation and four minutes for the brief intervention with follow-up consultations requiring on average of five minutes.

- For practices recruiting 'opportunistically', time taken to deliver the screening and brief intervention components of the care pathway was similar regardless of whether these were undertaken in the same consultation or delivered as two separate appointments.

- The shorter time spent delivering the care pathway in 'opportunistic' practices is likely to reflect the time constraints of delivering the care pathway within usual practice. Practices which recruited via the disease registers were able to book in advance longer consultations to accommodate the care pathway steps and components.

- The content of the consultations is likely to have differed between disease register and 'opportunistic' practices, due to the variation in time to deliver each component of the care pathway between the two recruitment methods. Although data reveal that all steps were conducted it is self evident from the

reported time taken that this was done more quickly in 'opportunistic' conditions.

- Although differences in the duration of consultations were observed between 'opportunistic' and disease register recruitment methods, little variation was observed between different health professionals using each of these recruitment approaches.

Costs to deliver the care pathway

- The estimated total costs of the care pathway pilot to the NHS are £25,659 (£13,110 at opportunistic sites and £12,549 at disease register sites respectively). This includes cost of practice training and support and cost of the Let's Get Moving support package but excludes any costs associated with development, monitoring or evaluation of the care pathway pilot.

- With the cost of training and practice support excluded, the cost per patient within the care pathway ranged from £11 to £89 in 'opportunistic' practices and from £38 to £286 in disease register practices; with training costs included the comparable values ranged from £35 to £273 and £85 to £670, respectively.

- The high contribution of practice training and support to the costs of the care pathway pilot represents an investment prior to implementation of the care pathway. Therefore, its significance as a contributor to cost per patient would decrease as the implementation period and thus patient numbers would increase.

- Since the Let's Get Moving support pack was developed specifically for the care pathway pilot and therefore initially produced on a low scale, its contribution to cost within the care pathway would also decrease significantly in the case of a wider roll out of this resource.

- Cost per patient of the care pathway were generally lower in 'opportunistic' sites. One explanation for this relates to the cost at one single practice

(Churchill), where estimates for many components of the care pathway were much higher than in any other participating practice. Also, in disease register practices the measurement of time spent screening was less clear and reliable. Hence, over interpretation of these results should be avoided.

- Since patient participation rates after the brief intervention are higher at 'opportunistic' sites, disease register screening remains more costly during the whole course of the pathway. Although this observation could be independent of the screening process and rather associated with unobserved characteristics of patients or participating GP practices, it adds confidence to the finding that 'opportunistic' screening has the potential for delivering the pathway at a lower cost per patient.

- Costs per patient are not sensitive to a 10% change in unit cost estimates or a 10% change in the time to perform activities within the care pathway. A much stronger impact was observed when altering patient compliance and flow rates by 10% in each direction.

- The reallocation of support activities within the care pathway only had a noteworthy impact on cost per patient at Bromley-by-Bow and Churchill. However, all estimates were most sensitive to a change in the allocation of main activities within a practice. Allocating the main activities (i.e., patient screening, brief intervention and follow-up consultation) to health care assistants as opposed to general practitioners would have a considerable impact (downwards) on the cost per patient to deliver the care pathway.

- A wider roll out of the Let's Get Moving support package would also lead to a significant decrease of cost per patient completing the care pathway, with an impact between 16.0% at Churchill and up to 63.2% at Primary Care Medical Centre. The lower effect at Churchill is due to the lower contribution of the support pack to overall costs of the care pathway at this practice.

- It can be observed that errors in the delivery of the care pathway seem to occur more frequently and with a higher impact on cost per patient at 'opportunistic' sites. This means that there is further potential at 'opportunistic'

sites to reduce costs per patient. This finding adds to the conclusion that 'opportunistic' screening might have the potential to deliver the care pathway at a lower cost per patient.

Recommendations for future implementation of the physical activity care pathway

- This study has provided a very good insight into the feasibility of implementing the care pathway. A large number of suggestions have been proposed for modifications to the protocols and these should be considered and integrated into an updated set of protocols before further testing and any wider implementation.

- This study does not demonstrate the effectiveness of the care pathway to deliver short or long term behaviour change. It has shown however that many aspects of the care pathway approach to the promotion of physical activity by health care practitioners are liked and feasible, and are perceived to be well received by patients. It is strongly recommended that an effectiveness trial is undertaken to determine the impact of the revised care pathway protocols on patients' physical activity behaviour. An effectiveness trial should incorporate a full economic analysis.

- To maximise involvement and availability for patients, training of all staff in the practice should be considered thus allowing multiple staff members to be available to undertake screening, brief interventions and follow-up consultations. However, due to the higher costs associated with general practitioners involvement in delivery, it might be appropriate for a variety of staff to screen patients and refer eligible patients onto a practice nurse or a health care assistant to deliver the brief intervention.

- To encourage and motivate practices to participate and implement the care pathway a site visit from a representative within the PCT was viewed as potentially helpful.

- Two days of training appears necessary to develop the knowledge, skills and confidence to enable practitioners to deliver the care pathway, incorporating

elements of motivational interviewing techniques. Even still, some practitioners benefited from the on-going practice support and specifically the additional opportunities for 'role play'. Wider implementation will require sufficient resources to adequately train and support health practitioners which could be provided by the Health Promotion Unit at the PCT. Providing support via e-mail and site visits was viewed as more preferable to telephone support. Follow-up training, or access to web-based resources might also help support practitioners refresh their learning and skills.

- Patient recruitment to the care pathway should be extended beyond just those patients on hypertension registers, for example, to other health conditions. In addition, recruitment of patients could be: incorporated into disease management clinics; integrated into 'preventative clinics' (e.g., men's health and women's health clinics); delivered via group consultations on physical activity (similar to smoking cessation). Some health practitioners were supportive of patients being able to self-refer to the care pathway. Delivering the care pathway via multiple entry routes would increase the number of patients who could potentially engage in the pathway.

- Increased publicity of the Physical Activity Care Pathway was viewed as a potentially useful additional component of any wider implementation of the care pathway. This would help practices encourage patient participation. Specific suggestions included posters within the practices, local mail outs and media campaigns. Promoting the care pathway in community settings such as temples and shopping centres was also viewed as potentially useful to raise awareness about the care pathway.

- The care pathway EMIS templates should be embedded into existing systems to maximise ease and usage. This would help the care pathway to become part of standard routine practice, as opposed to an additional aspect of care which is provided to a selection of patients.

- The care pathway risk stratification was developed specifically for the purposes of the pilot project. Although the criteria is based on current tools and the best available literature, this should not be considered the 'gold

standard'. There appears to be a need to develop a standard risk stratification criteria for use by health professionals when recommending physical activity, and the care pathway criteria should be revised accordingly.

- Clear guidance is needed on how the Physical Activity Care Pathway should be integrated into routine practice, particularly in terms of the implications the PACP may have on existing systems and infrastructure for example exercise referral schemes.

- Health professionals suggested revising the care pathway protocols to include just one follow-up appointment at six months would increase the feasibility of implementing the care pathway and would align the care pathway with other re-call protocols.

- Publishing the Let's Get Moving resource in a variety of languages would facilitate delivery of the brief interventions in languages other than English and would also make the resource accessible for non-English speaking populations.

- Financial backing, for example via QOF, may be needed for practitioners to embed the physical activity care pathway into standard practice. Health professionals suggested that monthly updates on practices' progress and comparative data on a local and national level would motivate them to deliver the care pathway.

<u>Limitations of the physical activity care pathway evaluation</u>

- This evaluation of the pilot implementation of the Physical Activity Care Pathway did not involve the collection of behaviour change data or patient satisfaction from individual patients. This was due to the lead time to the study commencing and the restricted classification as an 'audit' and not an experimental designed intervention trial. A robust assessment of effectiveness involving an experimental design and behaviour change measures is warranted. This pilot provides a good basis for the design of such a trial.

- The scope of the evaluation did not allow for any detailed data collection or observation of the patient consultations to assess the extent to which practitioners used motivational interviewing principles with their patients and the overall content and quality of discussions around each step of the care pathway behavioural change programme. Given that the qualitative data suggest that some practitioners found it difficult to deliver the brief interventions, further exploration is warranted to verify what patients actually received as part of the brief intervention and the care pathway as a whole.

- This evaluation did not assess the patients' experiences of the care pathway, for example, in terms of how they felt discussing physical activity within a primary care setting, perceptions of the care pathway consultations, utility of the Lets Get Moving resource and local maps, and facilitators and barriers to taking part in the care pathway and the signposted physical activities.

- This study was undertaken with a small number of general practices in the London region who were supportive of the project and motivated to be involved with delivering the physical activity care pathway. It is unknown what barriers might be associated with delivering the care pathway in practices which are less motivated, outside of London, or in contexts that have different local opportunities and services for physical activity.

- The relationship between, and impact of implementing the Physical Activity Care Pathway in practices with existing physical activity schemes (such as exercise referral) was not fully explored. It is therefore unknown how much the existing level of skills and infrastructure within practices influenced their willingness and ability to integrate the care pathway protocols into standard practice. This warrants further assessment and clear protocols.

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9 Appendices

Appendix 1: Contra-indications to the care pathway

If patients are diagnosed with any of the following contra-indications they are not eligible to participate in the physical activity care pathway pilot.

A. Resting SBP ≥180mmHg / DBP >100
B. Febrile illness
C. Uncontrolled / unstable angina
D. Acute uncontrolled psychiatric illness
E. Osteoporosis (T score ≥ 2.5)
F. Significant drop in BP during exercise
G. Uncontrolled tachycardia
H. Unstable or acute heart failure
I. Uncontrolled diabetes

Appendix 2: The GPPAQ

Date……

Name……..

1. Please tell us the type and amount of physical activity involved in your work. Please tick one box that is closest to your present work from the following five possibilities:

		Please mark one box only
a	I am not in employment (e.g. retired, retired for health reasons, unemployed, full-time carer etc.)	
b	I spend most of my time at work sitting (such as in an office)	
c	I spend most of my time at work standing or walking. However, my work does not require much intense physical effort (e.g. shop assistant, hairdresser, security guard, childminder, etc.)	
d	My work involves definite physical effort including handling of heavy objects and use of tools (e.g. plumber, electrician, carpenter, cleaner, hospital nurse, gardener, postal delivery workers etc.)	
e	My work involves vigorous physical activity including handling of very heavy objects (e.g. scaffolder, construction worker, refuse collector, etc.)	

2. During the *last week*, how many hours did you spend on each of the following activities?
Please answer whether you are in employment or not

Please mark one box only on each row

		None	**Some but less than 1 hour**	**1 hour but less than 3 hours**	**3 hours or more**
a	Physical exercise such as swimming, jogging, aerobics, football, tennis, gym workout etc.				
b	Cycling, including cycling to work and during leisure time				
c	Walking, including walking to work, shopping, for pleasure etc.				
d	Housework/Childcare				
e	Gardening/DIY				

3. How would you describe your usual walking pace? Please mark one box only.

Slow pace (i.e. less than 3 mph)		Steady average pace	
Brisk pace		Fast pace (i.e. over 4mph)	

Hit 'Return' to calculate PAI

Appendix 3: Importance and Confidence rulers

On a scale of 1-10,I how important is it to you to become more physically active?

What number would you give yourself?

1	2	3	4	5	6	7	8	9	10
not at all important									very important

What makes it that important?

Why are you at X and not at Y (lower number)?

What would it take to raise your score to Z (higher number)?

How can I help to get you there?

On a scale of 1-10, how confident are you that you could become more physically active if you wanted to. What number would you give yourself?

1	2	3	4	5	6	7	8	9	10
not at all confident									very confident

What makes you that confident?

Why are you at X and not at Y (lower number)?

What would it take to raise your score to Z (higher number)?

How can I help to get you there?

Appendix 4: Risk stratification criteria

High Risk Factors	
Cardiac	Stable angina with no chest pain at rest, Myocardial Infarction, Coronary Artery Bypass Graft, Valve replacement, pacemaker, Percutaneous Transluminal Coronary Angioplasty, Heart Failure
Cardiac Arrhythmias	Diagnosed by cardiologist
Hypertension	Medicated but with BP of 160 – 180 / 95 – 100 mmHg
Transient Ischemic Attack	With sever disability / cognitive impairment
Older people > 65 yrs at risk of falls	Has fallen within the last 12 months
Osteoporosis	BMD T score > 2.5 SD
Claudication	With cardiac dysfunction
Type 1 or 2 Diabetes	With accompanying autonomic neuropathy, advanced retinopathy
Severe Osteoarthritis / Rheumatoid arthritis	With associated immobility
Moderate to severe asthma	Where ventilatory limitation restrains sub maximal exercise
COPD / emphysema	With true ventilatory limitation
Severe psychiatric illness	Cognitive impairment, dementia, schizophrenia
AIDS	With accompanying neuromuscular complications, severe depletion of CD4 cells, malignancy or opportunistic infection

Moderate Risk Factors	
Asthma	Mild to moderate, controlled
NIDDM	Pharmacologically controlled
Surgery Pre and Post	General or Orthopaedic (NOT CARDIAC)
Intermittent Claudication	No symptoms of cardiac dysfunction
Depression	Medicated, without complications
IDDM*	Ensure adequate instructions regarding modification of insulin dosage depending on timing of exercise, and warning signs.
Hypertensive stage 1	140 – 159 / 90 – 99 mmHg – medication controlled
Osteopenic	T score < 2.5 S.D
COPD	With out ventilatory limitation but would benefit from optimisation of respiratory system mechanics and correction of physical deconditioning.
Neurological conditions	Parkinson's Disease, Multiple Sclerosis
Moderate Rheumatoid Arthritis/ Osteo arthritis	Intermittent mobility problems
Early symptomatic HIV	Moderately diminished CD4 cells, intermittent or persistent signs and symptoms e.g. fatigue, weight loss, fever
Myalgic Encephalopathy (ME)	Deconditioned due to longstanding symptoms
Fibromyalgia	Associated impaired functional ability, poor physical fitness, social isolation, neuroendocrine and autonomic system regulation disorders

Low Risk	
Family History	Asymptomatic but may have family history of CHD
Cigarette smoker	Current or given up with in the past 6 – 12 months
High normal BP	130 - 139 / 85 - 89 mmHg (not medication controlled)
Hypercholesterolaemia	Total > 5.2 mmol/L or HDL <0.9 mmol/L or LDL > 3.4 mmol/L
Overweight / Obese	BMI between 25 and 40 White and Black population BMI ≤ 35 for South Asian Population
NIDDM	Diet Controlled
Older person (aged > 65yrs)	Not at risk of falling
Antenatal	No symptoms of pre-eclampsia / no history of miscarriage
Postnatal	Provided 6/52 check complete and no complications
Osteoarthritus	Mild where physical activity will provide symptomatic relief
Mild Bone Density Changes	BMD > 1SD and < 2.5 SD below young adult mean
Exercise induced asthma	Without other symptoms
Depression	Mild or moderate. Not medication controlled
Stress / mild anxiety	No complications
Seropositive HIV	Asymptomatic
Physical Disabilities	

Appendix 5: Content of the two-day training course

DAY 1

0930 -1000	Introductions, Needs Assessment, exploring practitioner expectations and Orientations
1000 -1100	MI context – overview of training and introduction
1100 – 1130	**Break**
1130 – 1230	Overview of MI – What is it? Introduction to core concepts
1230 – 1330	**Lunch**
1330 – 1500	Key skills – theory and practice • Open-ended questions • Affirmations • Reflective Listening • Summarising
1500 – 1515	**Break**
1515 – 1630	MI consistent vs MI inconsistent practice Setting the Agenda

DAY 2

0900 – 0930	Welcome Back Reflection, review and questions
0930 – 1030	How do people change?
1030 – 1100	**Break**
1100 – 1200	Ambivalence Exchanging information/goal setting (eg. implementation intentions)
1200 – 1300	**Lunch**
1300 - 1400	Dealing with resistance
1400 – 1430	**Break**
1430 – 1600	Application to practice Questions, reflections and evaluation

Appendix 6: EMIS Templates

Template One – Initial Patient Screening and Recruitment

How was the patient initially contacted?

- Invitation added to existing recall letter
- A separate PACP letter sent to patients
- Via Text message
- Via Clinics held at practice
- Opportunistically – Flagged up on EMIS
- Other

Was the patient identified as potentially eligible for the PACP and referred to you by another health professional in your practice?

- No
- Yes – PACP trained
- Yes – PACP untrained

Is this patient potentially eligible for the physical activity care pathway?

- Yes
- No – Patient circumstance/ nature of appointment
- No – Contra-indication or risk factors
- No – Age

Free text section to record why the patient was not appropriate/ eligible

Did you complete the GPPAQ with the patient?

- Yes
- No – Lack of time
- No – Patient refused
- No – Language barriers
- No – Forgot
- No – Patient rated as 'Active' on GPPAQ within past 12 months
- No – Other

Free text section

GPPAQ Classification

- Active
- Moderately Active
- Moderately Inactive
- Inactive

Did you discuss walking with the patient?

- Yes
- No

What is the patients' new physical activity rating?

- Active
- Insufficiently active

Free text to allow you to review patient's activity

If classified as 'insufficiently active', is the patient interested in receiving a brief intervention consultation?

- Yes – Booked follow up
- Yes – Continue within this consultation
- No

Did you give the patient a BHF leaflet?

- Yes
- No

Approximately how much time did you spend discussing physical activity with this patient including time taken to complete the GPPAQ and assess patient interest?

Enter time in Minutes

Template Two – Brief Intervention Consultation

In the past week, on how many days have you accumulated at least 30 minutes of moderate intensity physical activity such as brisk walking, cycling, sport, exercise, and active recreation. Do not include physical activity that may be part of your job or usual role activities.
Enter number of days

How much time in total do you estimate you spent participating in moderate intensity physical activity last week?
Enter time in **Minutes**

Record patient self rating of the importance of physical activity (1 is not important, 10 is very important)

Record patient self rating of confidence to change physical activity behaviour (1 is not confident, 10 is very confident)

Free text to record details of motivational interview

Do you consider the patient ready to change?
- Yes
- No

Patient risk stratification (please refer to risk stratification guidance)
- Low risk
- Medium risk
- High risk

Would this patient be eligible for the local exercise referral scheme?
- Yes
- No

Did you discuss the use of goal setting with the patient?
- Yes
- No

Were specific physical activity goals set in the consultation?
- Yes
- No

Free text to allow you to review patient's goals

Did you 'signpost' the patient to any physical activity opportunities?
- Yes
- No

Which type of physical activity was the primary focus of the signposting?
- Local authority leisure services

- Private fitness centres and health clubs
- Sports and dance clubs
- Pedometer schemes
- Self-directed outdoor
- Exercise referral or condition specific programmes

What second physical activity option did you signpost the patient to?

- Local authority leisure services
- Private fitness centres and health clubs
- Sports and dance clubs
- Pedometer schemes
- Self-directed outdoor
- Exercise referral or condition specific programmes
- None

Did you give the patient a Let's get Moving Pack?

- Yes
- No

Approximately how much time did you spend conducting the BI consultation with this patient, discussing readiness, signposting and the activity pack?
Enter time in Minutes

Record that the patients next appointment is due in 3 months time

Template Three – Three month follow up appointment

Did the patient report attempting to increase their levels of physical activity since the last consultation

- Yes
- No – Patient views themselves as too unfit
- No – Lack of time
- No – Too expensive
- No – Patient views physical activity as boring
- No – Patient not interested in increasing their level of PA
- No – Other

Free text

Which physical activity, if any, has the patient primarily participated in?

- Local authority leisure services
- Private fitness centres and health clubs
- Sports and dance clubs
- Pedometer schemes
- Self-directed outdoor
- Exercise referral or condition specific programmes

What second physical activity option has the patient participated in?

- Local authority leisure services
- Private fitness centres and health clubs
- Sports and dance clubs
- Pedometer schemes
- Self-directed outdoor
- Exercise referral or condition specific programmes
- None

In the past week, on how many days have you accumulated at least 30 minutes of moderate intensity physical activity such as brisk walking, cycling, sport, exercise, and active recreation. Do not include physical activity that may be part of your job or usual role activities.
Enter number of days

How much time in total do you estimate you spent participating in moderate intensity physical activity last week?
Enter time in **Minutes**

Did the patient self report that they had achieved their original physical activity goals?

- Yes
- No – did not achieve goals
- No – Did not discuss
- Did not set any specific PA goal(s)

Did the patient self report that they used the Let's Get Moving Pack?

- Yes – pack used

- No – patient did not use
- No – patient did not remember receiving pack
- Did not discuss

How useful did the patient consider the Let's Get Moving Pack? (1 is not useful, 4 is very useful)

Is the patient still appropriate/ eligible for the care pathway?

- Yes
- No – patient circumstance
- No – contraindication or risk factors

Did you set any (new) physical activity goals?

- No
- Yes

Free text to allow you to review patient's goals

Approximately how much time did you spend discussing physical activity with this patient in this consultation?
Enter time in Minutes

Record that the patients next appointment is due in 3 months time

Template Four – Six month follow up appointment

Did the patient report attempting to increase their levels of physical activity since the last consultation

- Yes
- No – Patient views themselves as too unfit
- No – Lack of time
- No – Too expensive
- No – Patient views physical activity as boring
- No – Patient not interested in increasing their level of PA
- No – Other

Free text

Which physical activity, if any, has the patient primarily participated in?

- Local authority leisure services
- Private fitness centres and health clubs
- Sports and dance clubs
- Pedometer schemes
- Self-directed outdoor
- Exercise referral or condition specific programmes

What second physical activity option has the patient participated in?

- Local authority leisure services
- Private fitness centres and health clubs
- Sports and dance clubs
- Pedometer schemes
- Self-directed outdoor
- Exercise referral or condition specific programmes
- None

In the past week, on how many days have you accumulated at least 30 minutes of moderate intensity physical activity such as brisk walking, cycling, sport, exercise, and active recreation. Do not include physical activity that may be part of your job or usual role activities.
Enter number of days

How much time in total do you estimate you spent participating in moderate intensity physical activity last week?
Enter time in **Minutes**

Did the patient self report that they had achieved their original physical activity goals?

- Yes
- No – did not achieve goals
- No – Did not discuss
- Did not set any specific PA goal(s)

Did the patient self report that they used the Let's Get Moving Pack?

- Yes – pack used

- No – patient did not use
- No – patient did not remember receiving pack
- Did not discuss

How useful did the patient consider the Let's Get Moving Pack? (1 is not useful, 4 is very useful)

Is the patient still appropriate/ eligible for the care pathway?

- Yes
- No – patient circumstance
- No – contraindication or risk factors

Did you set any (new) physical activity goals?

- No
- Yes

Free text to allow you to review patient's goals

Approximately how much time did you spend discussing physical activity with this patient in this consultation?
Enter time in Minutes

Record that the patients next appointment is due in 6 months time

Appendix 7: Wave One focus group interview guide

Introductory Questions

1) What were your initial thoughts regarding the proposal of a PACP within primary care?

Transition Questions

2) Can you explain how these thoughts may have changed over the course of the pilot programme, if at all?

Key Questions

3) Can I ask what your experiences of the training you received were? There is no correct answer; I am really interested in what each of your opinions are.

4) The current version of EMIS you have used has been designed to collect data specifically for research and monitoring purposes. How would you see the role of EMIS in the care pathway in the future?

5) What were your experiences of using GPPAQ?

6) How useful was the practitioner pack?

7) How useful were the patient information resources you received?

Note to Interviewer: Probe for any changes the participants may have made to the resources in addition to opinions regarding usefulness

8) How would you describe your experience of using Motivational Interviewing techniques in your practice?

9) What was the **most beneficial** aspect of the care pathway for your practice?

10) What was the **least beneficial** or most challenging aspect of the care pathway for your practice?

11) Suppose the care pathway were to be rolled out nationally, what support and resources do you consider that your practice would need?

12) Following your experiences of implementing the care pathway how would you describe your view of the importance of promoting physical activity in primary care?

Ending Questions

13) Suppose you had one minute or less to describe your experience of implementing the care pathway, what would you say?

Note to interviewer: Allow each participant approximately one minute to respond.

14) Of **all** the things we have discussed today, what do you think is the most important in terms of future developments of the care pathway?

14a) Note to interviewer: Provide a 2-3 minute oral summary of issues evoked by the key questions then ask:

15) How well do you feel what I've said captures what has been reported by you today?

16) Note to interviewer: provide an overview of the purposes of the focus group then ask:

17) In light of this, is there anything we should have talked about but didn't?

Note to interviewer: Delivery is critical, allow the participants time for reflection.

Thank participants and informally ask how they feel about their participation in the group.

Appendix 8: Wave Two focus group interview guide

Introduction

Hello and welcome.

The purpose of the focus group today is to learn about the implementation of the PACP in day to day practice.

I have prepared a discussion guide that will help us to explore some of the central components of the design and delivery of the PACP. In addition to recording our conversations today, you will also see me taking notes to help me focus on some of the things you report as being particularly important to you.

Specifically the focus group discussions are structured to:

1. Identify what could be improved
    - In the training and preparation for a practice starting PACP
    - In the tools and resources used in implementing PACP with patients
    - In the approach and use of motivational interviewing principles
    - In the systems in place to track PACP delivery (EMIS)
    - In the follow up of patients

2. To capture any other experiences or feedback shared by the practitioner

Remind participants that the focus group will be recorded.

Encourage participants to speak one person at a time.

Inform participants that for some questions the interviewer may request that each participant responds in turn and for others, they will be invited to respond openly.

Any questions so far?

That said, before we start could I ask you to introduce yourself briefly – perhaps with your name, job title and the practice you are representing?

Note to Interviewer: Thank the participants for their responses and ask if they have any questions before we begin.

The care pathway has a number of key components – the assessment of PA, the BI interview itself, the use of resources and signposting to activities and then Follow up consults. I would like to talk about each of these in turn to learn about your experiences.

There are no right or wrong answers we are interested in all your different experiences and particularly what did work and what did not work.

- So, the assessment of PA using the GPPAQ. What were your experiences of using the GPPAQ?

Note to Interviewer: Probe for opinions regarding the training received to administer the GPPAQ

- What would you recommend to a colleague if they were just starting to use the GPPAQ – what tips do you have?

- I'd like to ask you about the BI consults.

- What was most beneficial about incorporating motivational interviewing methods into your consultations with patients?

- What was least beneficial or the most challenging about incorporating motivational interviewing methods into your consultations with patients?

- How did patients respond to these consultations?

Note to Interviewer: Probe for what aspects worked well and why, what did not and why

- The PACP has a set of resources. How useful were the Let's Get Moving pack and BHF leaflets when you used them with a patient?

- How useful was the patient risk stratification document you received?

Note to Interviewer: Probe for whether the document was used and in what way.

- One aspects of the PACP has been recording on EMIS forms – this is in part to help evaluate but would remain part of the day to day delivery as a record of what the patient had received.

- Can I ask, what were your experiences of using the EMIS forms?

Note to Interviewer:

Probes:
What worked well
What did not work so well

- If you were to receive more training regarding the use of EMIS what would that be, if any?

- If you were to receive more ongoing support using EMIS, what would this be, if any?

- What were your experiences of following up patients?

- What do you think the benefits of the care pathway may be for your patients, if any?

Note to interviewer: Probe for physiological and psychological health changes in addition to discussions regarding opportunity for PA and activities to which patients were signposted.

- I would like to ask you about the training you received in preparation for delivering the care pathway.

- How well did the amount of MI training you received prepare you for integrating some of these methods into your consultations?

Probe for responses regarding how difficult it was to a) learn and b) apply MI methods in practice in addition to amount of training received.

- How well did the training prepare you for understanding how you may integrate the PACP resources into a consultation with appropriate signposting for patients?

- If you were to be offered additional training in what areas of the PACP would you prefer this training if any?

Note to Interviewer: Probe for when this training, if any should be received and what support would be required.

- In what ways could we make the PACP a routine part of practice?

Note to Interviewer: Probe for recommendations

- We have discussed quite a lot today and your responses have been really valuable, is there anything we haven't mentioned so far that you feel is important to our understanding of how the care pathway works in practice?

- Of all the things we have discussed today, what do you feel is most important in terms of the future development of the care pathway?

Thank participants for attending the focus group.

Appendix 9: Practice survey

Responsibilities

1) Who was responsible for the following support activities? (please tick the appropriate box if someone performed any of the activities below as part of the PACP)

Activity (if applicable to your surgery)	Administrative workers					Medical professionals				
	Receptionist (pay band 2)	**Medical secretary** (pay band 3)	**Medical secretary** (pay band 4)	**Practice manager** (pay band 5)	**Practice manager** (pay band 6)	**Healthcare assistant** (pay band 2)	**Healthcare assistant** (pay band 3)	**Nurse** (pay band 5)	**Nurse** (pay band 7)	**General Practitioner**
Screening the disease registers for eligible patients (disease register sites only)										
Writing standard letters (e.g. to invite eligible patients)										
Postage (printing, addressing and mailing letters)										
Calling patients by phone										
Contacting patients via text message										
Booking appointments (checking the diary, agreeing on a day/time with the patient, updating the diary)										

Contacting patients

2) At several points during the pathway, patients had to be contacted:

   a) How many patients were contacted for each of the following components of the pathway?

   b) How did you contact them?

(Please indicate the total number of patients contacted for each component in the pathway in column 1. In the other columns, indicate the percentage of these patients contacted through a specific medium. Make sure that percentages add up to 100)

	Total number of patients contacted	**Percentage of patients contact through**				
		Letter	**Letter attached to existing recall letter**	**Phone call**	**Text message**	**Other (please indicate)**
Invitation to participate at PACP						
Invitation for 3 month follow up						
Invitation for 6 month follow up						
Other (please indicate)						

Booking and attending appointments

3) How many of the following appointments were
   a) Booked?
   b) Attended?

	1st consultation	Separate BI	3 month follow up	6 month follow up
Booked appointments				
Attended appointments				

Time to perform activities:

4) If any of the following activities was a standard procedure of the PACP in your surgery, please indicate the time to perform this activity in minutes (only give a time estimate if any of the activities listed below was a standard support activity to deliver the PACP)

Activity (if applicable to your surgery)	Total time to perform activity (in minutes)
Total time to screen the disease registers	
Total time to write a standard letter to invite patients for a) taking part at the PACP b) follow up appointments c) other occasions (please indicate)	a)
	b)
	c)
Average time for printing, addressing and mailing **one** letter	
Average time to call a patient by phone (e.g., to invite patients for attending consultations, booking appointments, etc)	
Average time to send **one** text message	
Average time to book **one** appointment (e.g., checking the diary, agreeing on a day/time with the patient, updating the diary)	

Direct cost of support activities and patient waiting time

5) What kind of telephone contract does your surgery have? (Please tick)

   Monthly payment – flat line with no additional cost of calls □
   Charge per minute □

6) If there is a charge per minute, how much is it? £-------

7) Were letters sent first or second class? (please tick)

   First class □
   Second class □

8) If Applicable, what is the fee per text message? £--------

9) What is the average patient waiting time in the surgery prior to an appointment?

-------- minutes

Thank you for taking the time to complete this survey

Appendix 10: EMIS variables for costing exercise

	Variable	Type	Categories
General			
Practice characteristics	Practice name or practice ID	categorical	- surgery name 1 - surgery name 2 - surgery name 3
	Practice type	categorical	- opportunistic site - disease register site
Patient characteristics	Patient ID	nominal number	
	Patient age	continuous, ratio	
	Patient gender	binary	- male - female
	Patient Ethnicity	categorical	- white - black or black british - asian or asian british - mixed parentage - other ethnic background - unknown
Screening / Consultation 1			
Resource / time	Patient screening	binary	- opportunistic - disease register
	Initial patient contact	categorical	- opportunistic - letter - letter attached to existing recall letter - phone - text message
	Health professional conducting consultation 1	categorical	- nurse (band 5) - nurse advanced (band 7) - healthcare assistant (band 2) - healthcare assistant (higher level, band 3) - GP
	Total time for consultation 1	continuous, ratio	
	% time for PACP (consultation 1)	continuous, ratio	
	total time for PACP (consultation 1)	continuous, ratio	
Consultation outcome	GPPAQ assessment completed	binary	- yes - no
	Walking behaviour assessed	binary	- yes - no
	Patient activity index	binary	- active - inactive
	Patient interested in BI	binary	- yes - no
	Patient received BHF leaflet?	binary	- yes - no
Brief intervention (BI)			
Resource / time	BI consultation booked/continued	categorical	- booked - continued - patient not interested
	BI consultation attended	binary	- yes - no
	Health professional conducting BI	categorical	- nurse (band 5) - nurse advanced (band 7) - healthcare assistant (band 2) - healthcare assistant (higher level, band 3) - GP
	Patient received support package?	binary	- yes - no
	Total time for BI	continuous, ratio	
	% time for PACP BI	continuous, ratio	
	Total time for PACP BI	continuous, ratio	

Consultation outcome	Patient ready to change?	binary	- yes - no
	Risk classification	categorical	- low - medium - high
	Patient sign posted to	categorical	- local authorities - private clubs - sports and dance - pedometer - outdoor activities - exercise referral
3 month follow up			
Resource / time	Patient contact	categorical	- letter - letter attached to existing recall letter - phone - text message
	3 month follow up attended	binary	- yes - no
	Health professional conducting 3 month follow up	categorical	- nurse (band 5) - nurse advanced (band 7) - healthcare assistant (band 2) - healthcare assistant (higher level, band 3) - GP
	Total time for 3 month follow up	continuous, ratio	
	% time for PACP (3 month follow up)	continuous, ratio	
	Total time for PACP (3 month follow up)	continuous, ratio	
Consultation outcome	Patient got active/relapsed/lost to follow up	categorical	- patient got active - patient relapsed - patient lost to follow up
	Patient still eligible?	binary	- yes - no
	Patient sign posted to	categorical	- local authorities - private clubs - sports and dance - pedometer - outdoor activities - exercise referral

Appendix 11: Unit cost estimates (2007) for Practice Staff

.

	Costs and unit estimation	Nurse	Nurse (intermediate level)	Nurse (advanced)	Receptionist / healthcare assistant	Medical secretary / healthcare assistant (higher level)	medical secretary (higher level)	practice manager (small practice)	Practice manager (group practice)	Notes	Source
a	Pay Band	Scale mid point Band 5	Scale mid point Band 6	Scale mid point Band 7	Scale mid point Band 2	Scale mid point Band 3	Scale mid point Band 4	scale mid point Band 5	scale mid point Band 6		NHS pay - agenda for change
b	annual wages (salary)	£22187	£27388	£32704	£13844.5	£15870	£18528	£22187	£27388	Scale mid points for pay bands; pay rates from November 1st 2007	NHS pay - agenda for change pay rates
c	14% of salary for employers contribution to superannuation	£3106.18	£3834.32	£4578.56	£1938.23	£2221.8	£2593.92	£3106.18	£3834.32	Employers contribute about 14% of the employee's salary to the NHS pension scheme. NHS pensions:	http://www.nhspa.gov.uk/nhspa_site/members/scheme_changes/newcontrates/index.htm
d	Employers annual national insurance	£1518.24	£1991.52	£2475.24	£759	£943.32	£1185.24	£1518.24	£1991.52	National Insurance for the current year 2007-2008 based on monthly payment of salary for an employee participating in a contracted out salary related superannuation scheme.	NHS revenue and customs-National Insurance Contributions Calculator http://nicecalculator.inlandrevenue.gov.uk/Class1NICs1.aspx
e	Total salary oncosts	£4624.42	£5825.84	£7053.8	£2697.23	£3165.12	£3779.16	£4624.42	£5825.84	(=c+d)	
f	Overheads	£5585.142	£6225.38	£6879.78	£3731.09	£3855.76	£4019.36	£4244.57	£4564.69	Comprises £2904 for indirect overheads and 10% (for nurses and nurses (advanced) and 5% for other professions of salary costs for direct revenue overheads	Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury Netten et al. (1998) Development of a ready reckoner for staff costs in the NHS, vols 1 and 2, Personal Social Services Research Unit, University of Kent, Canterbury
g	Capital overheads	£3833	£3833	£3833	£3833	£3833	£3833	£3833	£3833	Based on the new build and land requirements of community health facilities, but adjusted to reflect shared use of treatment and non treatment space. Capital costs have been annuitized over 60 years at a discount rate of 3.5%	Curtis 2007; Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury
h	Qualifications	£5373	£5373	£9129	--	--	--	--	--	Equivalent annual cost of pre-registration education after the total investment cost has been annuitized over the expected working life. For nurses advanced, pre-registration training includes general nurses education plus further education to honours or masters degree level. Pre-registration education cost is assumed to be zero for receptionists, secretaries and practice managers, since there are usually no set entry qualifications for these professions.	Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury
i	Working time	42 weeks per annum, 37.5 hours per week								Includes 29 days of annual leave and 8 statutory leave days. Assumes 5 study/training days and 10 days sickness leave.	NHS employers (2006) Agenda for change pay bands 1 April 2006/07, NHS employers, London http://www.rcn.org.uk/agendaforchange/payconditions/pay/pay2006.php
j	Working time in hours	1575								.=42*37.5	
	Unit cost per hour - national average										
k	Including qualification costs	£26.41	£30.89	£37.84	--	--	--	--	--	.= (b+e+f+g+h)/j	
l	Excluding qualification costs	£23.00	£27.47	£32.04	£15.31	£16.97	£19.15	£22.15	£26.42	.= (b+e+f+g)/j	

Appendix 12: Unit cost estimates (2007) for General Practitioners

	Costs and unit estimation	2005/2006 value	Inflator:	2006/2007 value	Notes	Source
a	Net numeration	£113600	HCHS Pay*	£119848	average net profit after expenses	Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury
				Practice expenses		
b	Out of hours	£12269	HCHS pay and prices***	£12882.45	Amount allocated for out of hours care	Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury
c	Direct care staff`	£22757	HCHS pay and prices***	£23894.85	on average in 2006 each FTE equivalent practitioner (excluding GP registrars and GP retainers) employed 0.64 FTE practice staff	
d	Travel	£4598	HCHS prices**	£4735.94	Estimated using the car allowance for GP registrars using information on full cost of owning and running a car allowing for 10000 miles p.a.	
e	Other	£13019	HCHS prices**	£13409.57	Other practice expenditures are estimated on the basis of final expenditure figures from the DH . Practice expenses exclude all expenditures on drugs	
f	Qualifications	£25910	HCHS pay and prices***	£27205.5	Equivalent annual cost of pre-registration and postgraduate medical education	
g	Ongoing training	£2155	HCHS pay and prices***	£2262.75	calculated using budgeting information provided by the Medical Education Funding Unit of the NHS Executive relating to allocation of Medical and Dental Levy (MADEL) Funds	
				Capital costs		
h	Premises	£8519	HCHS prices**	£8774.57	Based on new build and land requirements for a GP practieneer suite. Capital costs have been annuitised over 60 years at a discount rate of 3.5%	Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury
i	Equipment	£2777	HCHS prices**	£2860.31	Taken from final expenditure figures from the DH and afjusted to allow for equipment allocated to direct care staff. Expenditure on computer equipment is used as a proxy for annuitised capital	
j	Overheads	£7210	HCHS prices**	£7426.3	Based on final expenditure figures from the DH. Overheads include PCO administered funds, demand management and recruitement and retention.	
k	Annual unit cost	£212814		£223300.24	.=∑a-j	
l	Working time (43.5 weeks per annum, 44.4 hours per week)	£1931.4		£1931.4	Derived from the 2006/07 UK General Practice Workload Survey. Number of hours for a full time GP partner. Allows for time spent per year on annual leave, sick leave and study leave	Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury
m	Unit cost per hour	£110.19		£115.62	.=k/l	
				Unit cost per hour (excluding travel cost and direct care staff)		
n	Unit cost per hour	£96.02		£100.79	.=(k-c-d)/l	

* HCHS pay inflator for 2006/07 5.50%
** HCHS prices inflator for 2006/07 3.00%
*** HCHS pay and prices inflator for 2006/07 5.00%
Curtis (2007); Unit costs for health and social care; Personal Social Services Research Unit, University of Kent, Canterbury

Appendix 13: Cost estimates for Let's Get Moving support pack

Printing option 1
Straight reprint of current folder - 6pp with pocket + 8pp stitched text
350gsm/130gsm coated silk

		Pilot	500k	1 million	2 million	5 million
a	Number of packs	2380.00	500000	1000000	2000000	5000000
b	Reprint cost of current support packs (£)	11765.00	89780	178230	355280	886130
c	Reprint cost for goal sheets (£)		4965	9530	18660	46050
d	Insert goal sheets		4000	8000	16000	40000
e=∑b,c,d	Total cost (£)		98745	195760	389940	972180
f=e/a	Cost/pack (£)	4.94	0.20	0.20	0.19	0.19
g=a/152	Approximate number of packs per PCT	216	3290	6579	13158	32895
h	Design cost/PCT (£)	777.50	777.50	777.50	777.50	777.50
i=h/g	Design cost/Pack (£)	3.59	0.24	0.12	0.06	0.02
j	Development cost (£)	10412.50	10412.50	10412.50	10412.50	10412.50
k=j/a	Development cost/Pack (£)	4.38	0.021	0.010	0.005	0.002
L=∑f,i,k	**Total cost /pack (£)**	**12.91**	**0.45**	**0.32**	**0.26**	**0.22**

Printing Option 2
Amend artwork to create a booklet of 12pp text + 4pp cover (no pocket)
350gsm/130gsm coated silk (as before)

		500k	1 million	2 million	5 million
a	Number of packs	500000	1000000	2000000	5000000
b	Reprint cost of amend artwork to create a booklet of 12pp text + 4pp cover (no pocket) (£)	45025	88820	176420	439215
c=∑b	Total cost (£)	45025	88820	176420	439215
d=c/a	Cost/pack (£)	0.09	0.09	0.09	0.09
e= a/152	Approximate number of packs per PCT	3290	6579	13158	32895
f	Design cost/PCT (£)	777.50	777.50	777.50	777.50
g=f/e	Design cost/Pack (£)	0.24	0.12	0.06	0.02
h	Development cost (£)	10412.50	10412.50	10412.50	10412.50
i=h/a	Development cost/Pack (£)	0.021	0.010	0.005	0.002
j= ∑d,g,i	**Total cost /pack (£)**	**0.35**	**0.22**	**0.15**	**0.11**

Printing option 3
As option 2 but with additional non-capacity pocket on back cover
350gsm/130gsm coated silk (as before)

		500k	1 million	2 million	5 million
a	Number of packs	500000	1000000	2000000	5000000
b	Cost of printing as option 2 but with additional non-capacity pocket on back cover (£)	64645	127565	253560	631250
c=∑b	Total cost (£)	64645	127565	253560	631250
d=c/a	Cost/pack (£)	0.13	0.13	0.13	0.13
e= a/152	Approximate number of packs per PCT	3290	6579	13158	32895
f	Design cost/PCT (£)	777.50	777.50	777.50	777.50
g=f/e	Design cost/Pack (£)	0.24	0.12	0.06	0.02
h	Development cost (£)	10412.50	10412.50	10412.50	10412.50
i=h/a	Development cost/Pack (£)	0.021	0.010	0.005	0.002
j= ∑d,g,i	**Total cost /pack (£)**	**0.39**	**0.26**	**0.19**	**0.15**

Printing option 4
Amend artwork to create a booklet of 12pp text + 4pp cover (no pocket)
250gsm/130gsm coated silk

		500k	1 million	2 million	5 million
a	Number of packs	500000	1000000	2000000	5000000
b	Reprint cost of amend artwork to create a booklet of 12pp text + 4pp cover (no pocket) (£)	31935	62495	123625	307000
c=∑b	Total cost (£)	31935	62495	123625	307000
d=c/a	Cost/pack (£)	0.06	0.06	0.06	0.06
e= a/152	Approximate number of packs per PCT	3290	6579	13158	32895
f	Design cost/PCT (£)	777.50	777.50	777.50	777.50
g=f/e	Design cost/Pack (£)	0.24	0.12	0.06	0.02
h	Development cost (£)	10412.50	10412.50	10412.50	10412.50
i=h/a	Development cost/Pack (£)	0.021	0.010	0.005	0.002
j= ∑d,g,i	**Total cost /pack (£)**	**0.32**	**0.19**	**0.13**	**0.09**

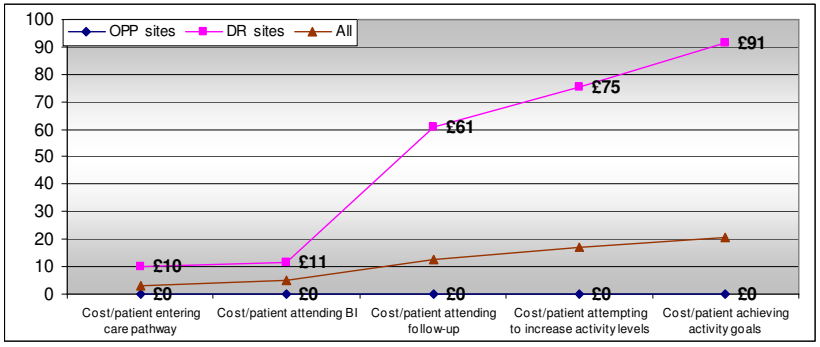
Appendix 14: Cost of training prior to implementation of the care pathway and ongoing practice support

Practice	Training attendees	Cost estimate/h	Training time	Staff cost per practice	Cost of consultant delivering the training	Cost of ongoing practice support	Total cost of practice training and support
Royal Docks	1 GP 1 PN	£100.79 £30.89	15hours (Two working days)	£1975.17	£10,650.00 /15 = £ 710 per participating practice	4 hours per practice at £47.00/ hour (£350/day)* £188 per participating practice	£2,873.17
Hounslow	1 GP 1 PN 1 HCA	£100.79 £30.89 £15.31		£2204.75			£3,102.75
Primary Care Medical Centre	1 GP 1 PN	£100.79 £30.89		£1975.17			£2,873.17
Mountwood	1 HCA 1 PN	£15.31 £30.89		£692.87			£1,590.87
Churchill	1 GP 1 NM 1 PCM	£100.79 £37.84 £37.84		£2647.11			£3,545.11
Bromley by Bow	2 PN	£30.89		£926.58			£1,825.58
Total	6 PN 4 GP 2 HCA 1 NM 1 PCM	£30.89 £100.79 £15.31 £37.84 £37.84	15 hours (Two working days)	£10,421.65	£4,260.00	£1,128.00	£15810.65
GP = General Practitioner; PN = Practice Nurse; HCA = Healthcare Assistant: NM = Nurse Manager; PCM = Primary Care Manager							

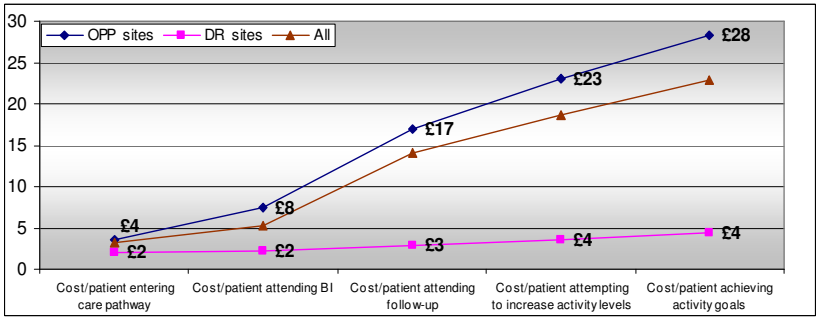
*This estimate equals the full economic cost of the researcher at Loughborough University who was responsible for delivering ongoing practice support. It is recognised that this cost estimate might be different from the cost of local physical activity leads who may be responsible for providing support in the case of a national roll out of the care pathway.

Appendix 15a: Cost per patient for patient screening

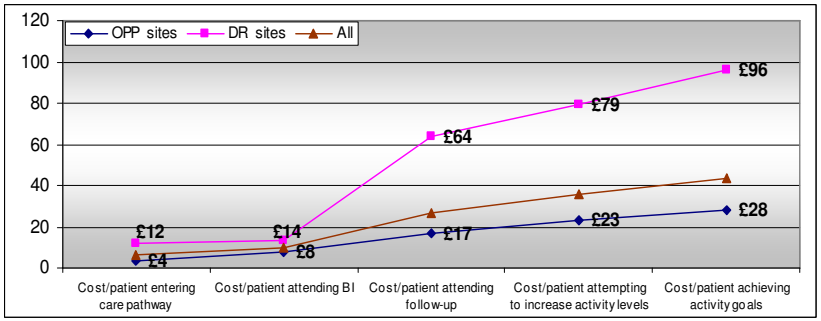
1	Cost of support activities prior screening consultation per patient in £									
		Royal Docks	Houns -low	PCMC	Mount -wood	Chur-chill	BBB	OPP sites	DR sites	All
.= A/O	Cost per patient entering pathway	0.00	0.00	0.00	3.23	21.49	8.13	0.00	10.20	2.87
.= A/P	Cost per patient attending BI	No BI data avail.*	0.00	0.00	3.52	24.49	9.10	0.00	11.35	4.81
.= A/Q	Cost per patient attending follow-up	0.00	0.00	0.00	no follow up data**	95.72	22.76	0.00	60.98 ***	12.68 ***
.= A/R	Cost per patient attempting to increase activity level	0.00	0.00	0.00		117.00	28.45	0.00	75.33 ***	16.85 ***
.= A/S	Cost per patient achieving activity goals	0.00	0.00	0.00		175.50	28.45	0.00	91.47 ***	20.65 ***



2	Cost of screening consultation per patient in £									
.= B/O	Cost per patient entering pathway	19.36	1.86	1.33	3.41	no separate time estimate for screening consultation****	2.20	3.59	2.05	3.16
.= B/P	Cost per patient attending BI	No BI Data avail.*	3.43	2.47	3.73		2.47	7.50	2.29	5.29
.= B/Q	Cost per patient attending follow-up	32.76	13.28	7.72	no follow up data**		6.17	16.97	2.94 ***	14.05 ***
.= B/R	Cost per patient attempting to increase activity level	65.52	14.16	9.47			7.72	23.01	3.63 ***	18.68 ***
.= B/S	Cost per patient achieving activity goals	94.65	15.17	11.74			7.72	28.29	4.41 ***	22.89 ***



3	∑ NHS cost of patient screening per patient in £ (support activities prior screening consultation plus screening consultation)									
=(A+B)/O	Cost per patient entering pathway	19.36	1.86	1.33	6.64	no separate time estimate for screening consultation****	10.33	3.59	12.25	6.03
=(A+B)/P	Cost per patient attending BI	No BI data avail.*	3.43	2.47	7.25		11.57	7.50	13.63	10.10
=(A+B)/Q	Cost per patient attending follow-up	32.76	13.28	7.72	no follow up data**		28.93	16.97	63.92 ***	26.73 ***
=(A+B)/R	Cost per patient attempting to increase activity level	65.52	14.16	9.47			36.16	23.01	78.96 ***	35.53 ***
=(A+B)/S	Cost per patient achieving activity goals	94.65	15.17	11.74			36.16	28.29	95.88 ***	43.55 ***



* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation

** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation

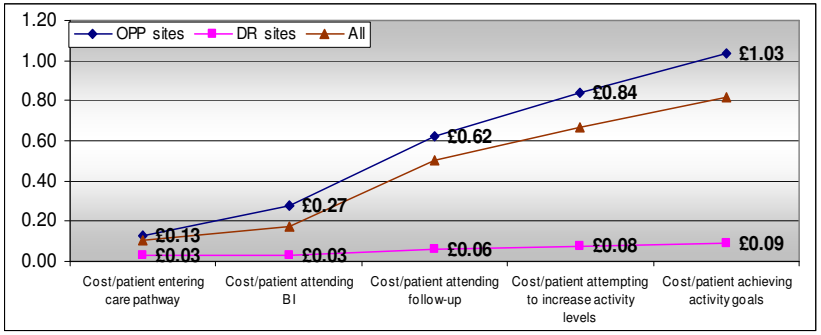
*** Since follow-up data for Mountwood was missing, these estimates are calculated without taking available Mountwood data into account

**** Churchill only reported one time estimate for the screening consultation and BI consultation together

Appendix 15b: Cost per patient for Brief intervention (BI)

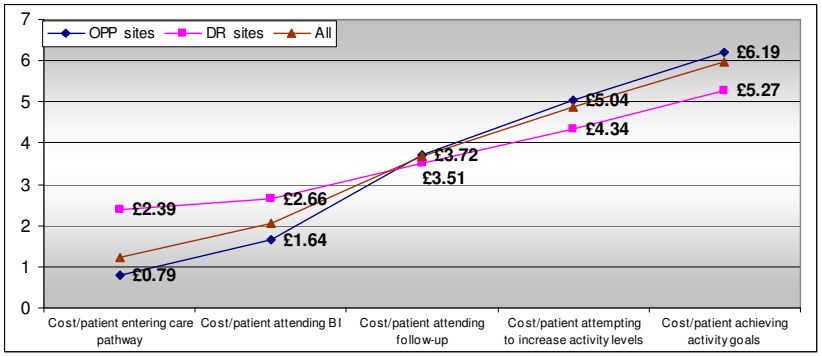
1 Cost of support activities prior BI consultation per patient in £

		Royal Docks	Houns -low	PCMC	Mount -wood	Chur-chill	BBB	OPP sites	DR sites	All
.= D/O	Cost per patient entering pathway	No BI data*	0.07	0.09	0.04	no separate time estimate for BI consultation****	0.05	0.13	0.03	0.10
.= D/P	Cost per patient attending BI		0.12	0.17	0.05		0.05	0.27	0.03	0.17
.= D/Q	Cost per patient attending follow-up		0.48	0.55	no follow up data**		0.13	0.62	0.06***	0.50***
.= D/R	Cost per patient attempting to increase activity level		0.51	0.67			0.16	0.84	0.08***	0.67***
.= D/S	Cost per patient achieving activity goals		0.55	0.83			0.16	1.03	0.09***	0.82***



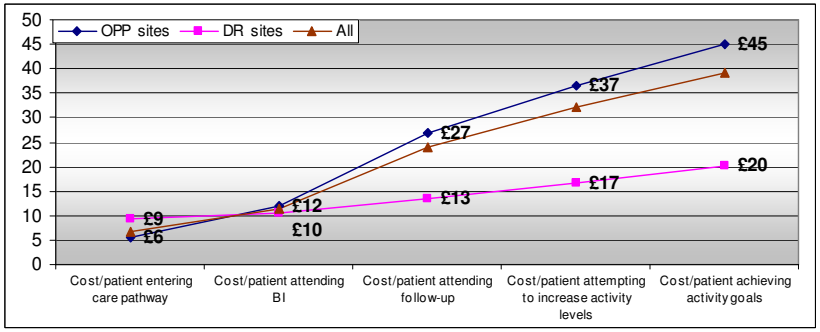
2 Cost of BI consultation per patient in £ (excluding cost of support pack and support activities)

= F/O	Cost per patient entering pathway	No BI data*	0.84	0.91	3.94	no separate time estimate for BI consultation****	2.63	0.79	2.39+	1.24+
= F/P	Cost per patient attending BI		1.55	1.69	4.30		2.95	1.64	2.66+	2.07+
= F/Q	Cost per patient attending follow-up		6.01	5.29	no follow up data**		7.37	3.72	3.51 ***+	3.67 ***+
= F/R	Cost per patient attempting to increase activity level		6.41	6.49			9.22	5.04	4.34 ***+	4.88 ***+
= F/S	Cost per patient achieving activity goals		6.87	8.04			9.22	6.19	5.27 ***+	5.98 ***+



3 ∑ NHS cost of BI consultation per patient (including cost of support pack and support activities)

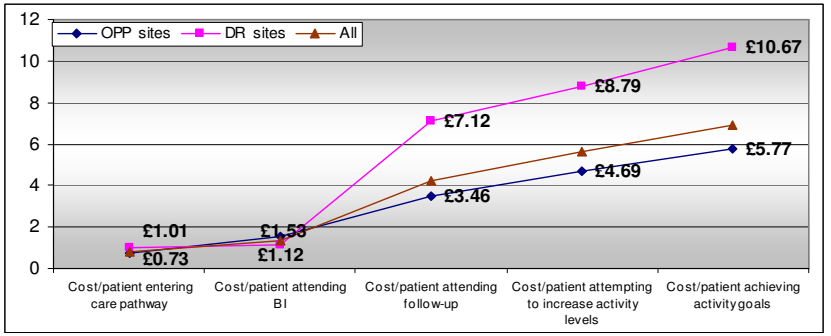
.= G/O	Cost per patient entering pathway	No BI data*	6.35	6.41	15.62	no separate time estimate for BI consultation****	10.06	5.70	9.40+	6.74+
.= G/P	Cost per patient attending BI		11.67	11.85	17.06		11.26	11.90	10.46+	11.29+
.= G/Q	Cost per patient completing PACP		45.22	37.10	no follow up data**		28.16	26.93	13.41 ***+	24.12 ***+
.= G/R	Cost per patient attempting to increase activity level		48.24	45.47			35.20	36.52	16.56 ***+	32.05 ***+
.= G/S	Cost per patient achieving activity goals		51.68	56.39			35.20	44.89	20.11 ***+	39.29 ***+



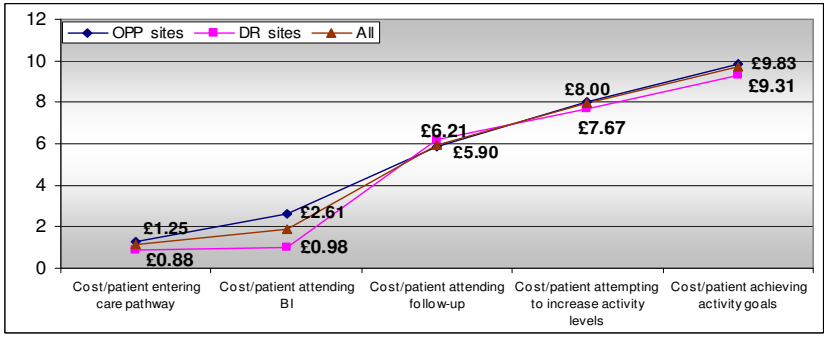
* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation
** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation
*** Since follow-up data for Mountwood was missing, these estimates are calculated without taking available Mountwood data into account
**** Churchill only reported one time estimate for the screening consultation and BI consultation together
\+ Since Churchill did not report time estimates for screening and BI separately, these estimates are calculated without taking Churchill data into account

Appendix 15c: Cost per patient for follow-up

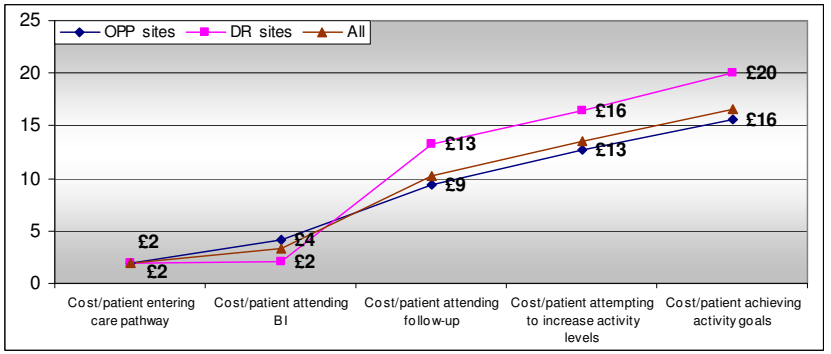
1	Cost of support activities prior to follow-up consultation per patient in £									
		Royal Docks	Houns -low	PCMC	Mount -wood	Chur-chill	BBB	OPP sites	DR sites	All
= H/O	Cost per patient entering pathway	1.83	0.83	0.46	no follow up data**	2.66	0.68	0.73	1.01 ***	0.81 ***
= H/P	Cost per patient attending BI	No BI data*	1.52	0.86		3.03	0.76	1.53	1.12 ***	1.36 ***
= H/Q	Cost per patient attending follow-up	3.10	5.89	2.69		11.85	1.90	3.46	7.12 ***	4.22 ***
= H/R	Cost per patient attempting to increase activity level	6.19	6.28	3.30		14.49	2.38	4.69	8.79 ***	5.61 ***
= H/S	Cost per patient achieving activity goals	8.94	6.73	4.09		21.73	2.38	5.77	10.67 ***	6.88 ***



2	Cost of follow-up consultation per patient in £									
= I/O	Cost per patient entering pathway	9.85	0.11	0.12	no follow up data**	2.06	1.06	1.25	0.88 ***	1.14 ***
= I/P	Cost per patient attending BI	No BI data*	0.19	0.22		2.34	1.18	2.61	0.98 ***	1.92 ***
= I/Q	Cost per patient attending follow-up	16.67	0.75	0.69		9.16	2.96	5.90	6.21 ***	5.96 ***
= I/R	Cost per patient attempting to increase activity level	33.34	0.80	0.85		11.20	3.70	8.00	7.67 ***	7.92 ***
= I/S	Cost per patient achieving activity goals	48.16	0.86	1.05		16.80	3.70	9.83	9.31 ***	9.71 ***



3	∑ NHS cost of follow-up consultation per patient in £									
= J/O	Cost per patient entering pathway	11.68	0.93	0.58	no follow up data**	4.72	1.74	1.98	1.89 ***	1.96 ***
= J/P	Cost per patient attending BI	No BI data*	1.71	1.08		5.38	1.95	4.14	2.10 ***	3.28 ***
= J/Q	Cost per patient attending follow-up	19.77	6.64	3.38		21.02	4.86	9.36	13.32 ***	10.18 ***
= J/R	Cost per patient attempting to increase activity level	39.53	7.08	4.15		25.69	6.08	12.69	16.46 ***	13.53 ***
= J/S	Cost per patient achieving activity goals	57.10	7.59	5.14		38.53	6.08	15.60	19.99 ***	16.59 ***

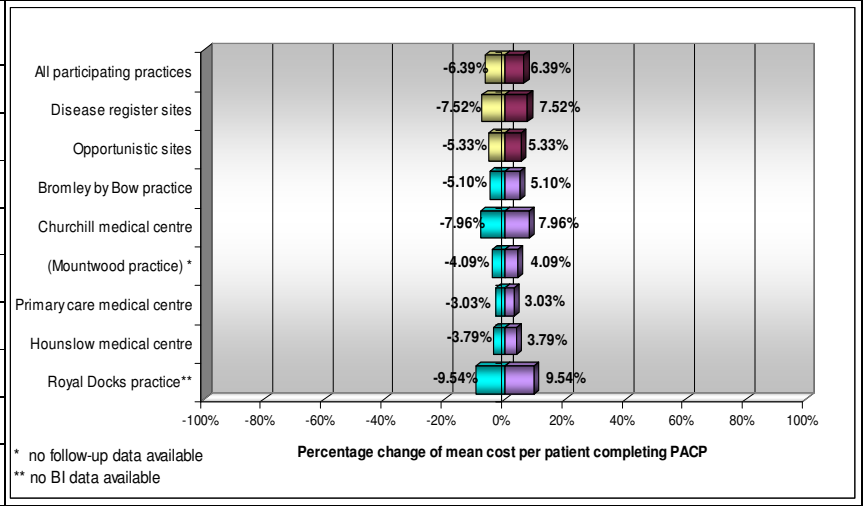


* Royal Docks practice did not provide any patient level data through EMIS for the BI consultation
** Mountwood practice did not provide any patient level data through EMIS for the follow-up consultation
*** Since follow-up data for Mountwood was missing, these estimates are calculated without taking available Mountwood data into account

Appendix 16: Scenario Analysis

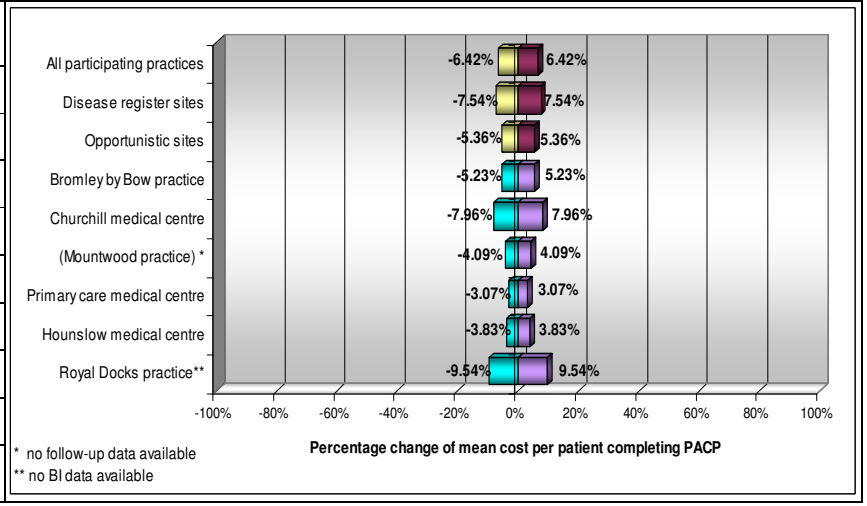
Scenario 1: 10% change of unit cost estimates

Practice		lower bound	mean value	higher bound	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	76.63	81.87	87.10	10.47	-6.39%	6.39%
Disease Register Sites		176.50	190.84	205.19	28.69	-7.52%	7.52%
Opportunistic Sites		50.42	53.26	56.10	5.68	-5.33%	5.33%
Bromley By Bow practice		58.79	61.95	65.11	6.32	-5.10%	5.10%
Churchill Medical Centre		283.51	308.02	332.53	49.02	-7.96%	7.96%
Mountwood practice *		23.32	24.31	25.31	1.99	-4.09%	4.09%
Primary Care Medical Centre		46.75	48.20	49.66	2.92	-3.03%	3.03%
Hounslow Medical Centre		62.67	65.14	67.61	4.94	-3.79%	3.79%
Royal Docks practice**		48.25	53.34	58.43	10.18	-9.54%	9.54%



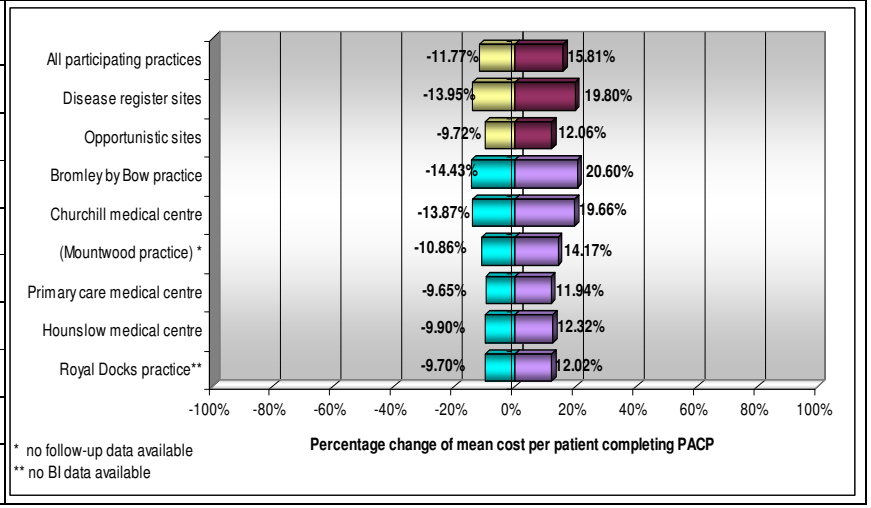
Scenario 2: 10% change in time to perform activities

Practice		lower bound	mean value	higher bound	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	76.61	81.87	87.12	10.51	-6.42%	6.42%
Disease Register Sites		176.46	190.84	205.23	28.77	-7.54%	7.54%
Opportunistic Sites		50.40	53.26	56.12	5.71	-5.36%	5.36%
Bromley By Bow practice		58.71	61.95	65.19	6.48	-5.23%	5.23%
Churchill Medical Centre		283.50	308.02	332.54	49.04	-7.96%	7.96%
Mountwood practice *		23.32	24.31	25.31	1.99	-4.09%	4.09%
Primary Care Medical Centre		46.72	48.20	49.68	2.96	-3.07%	3.07%
Hounslow Medical Centre		62.64	65.14	67.63	4.99	-3.83%	3.83%
Royal Docks practice**		48.25	53.34	58.43	10.18	-9.54%	9.54%



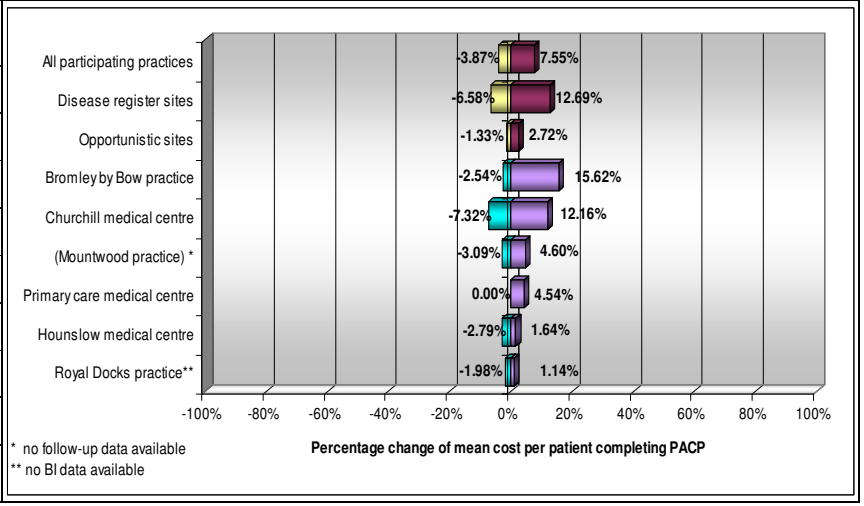
Scenario 3: 10% change in patient compliance and flow rates through the care pathway

Practice		lower bound	mean value	higher bound	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	72.23	81.87	94.81	22.58	-11.77%	15.81%
Disease Register Sites		164.21	190.84	228.64	64.42	-13.95%	19.80%
Opportunistic Sites		48.08	53.26	59.68	11.60	-9.72%	12.06%
Bromley By Bow practice		53.01	61.95	74.71	21.70	-14.43%	20.60%
Churchill Medical Centre		265.31	308.02	368.57	103.26	-13.87%	19.66%
Mountwood practice *		21.67	24.31	27.76	6.09	-10.86%	14.17%
Primary Care Medical Centre		43.55	48.20	53.96	10.40	-9.65%	11.94%
Hounslow Medical Centre		58.69	65.14	73.16	14.47	-9.90%	12.32%
Royal Docks practice**		48.17	53.34	59.75	11.58	-9.70%	12.02%



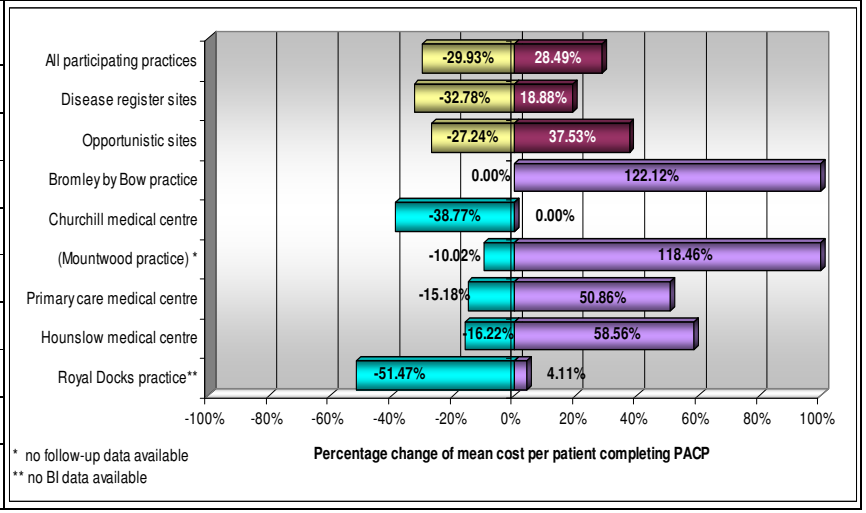
Scenario 4: Reallocating support activities

Practice		lower bound	mean value	higher bound	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	78.70	81.87	88.05	9.35	-3.87%	7.55%
Disease Register Sites		178.29	190.84	215.06	36.77	-6.58%	12.69%
Opportunistic Sites		52.56	53.26	54.71	2.16	-1.33%	2.72%
Bromley By Bow practice		60.38	61.95	71.63	11.25	-2.54%	15.62%
Churchill Medical Centre		285.48	308.02	345.46	59.98	-7.32%	12.16%
Mountwood practice *		23.56	24.31	25.43	1.87	-3.09%	4.60%
Primary Care Medical Centre		48.20	48.20	50.39	2.19	0.00%	4.54%
Hounslow Medical Centre		63.32	65.14	66.21	2.88	-2.79%	1.64%
Royal Docks practice**		52.29	53.34	53.95	1.66	-1.98%	1.14%



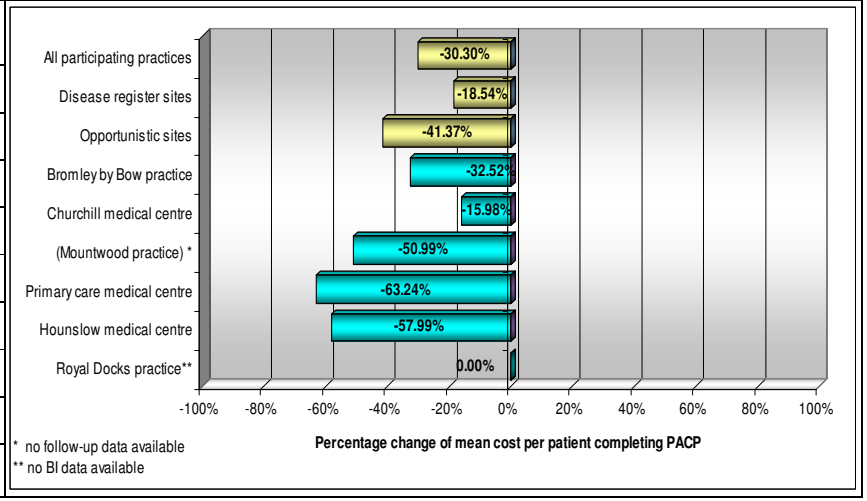
Scenario 5: Reallocating main activities

Practice		lower bound	mean value	higher bound	range	Percent. change (-)	Percent. Change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	57.37	81.87	105.19	47.82	-29.93%	28.49%
Disease Register Sites		128.29	190.84	226.87	98.58	-32.78%	18.88%
Opportunistic Sites		38.75	53.26	73.25	34.50	-27.24%	37.53%
Bromley By Bow practice		61.95	61.95	137.61	75.66	0.00%	122.1%
Churchill Medical Centre		188.60	308.02	308.02	119.42	-38.77%	0.00%
Mountwood practice *		21.88	24.31	53.11	31.24	-10.02%	118.5%
Primary Care Medical Centre		40.89	48.20	72.72	31.83	-15.18%	50.86%
Hounslow Medical Centre		54.57	65.14	103.28	48.71	-16.22%	58.56%
Royal Docks practice**		25.89	53.34	55.54	29.65	-51.47%	4.11%



Scenario 6: National rollout of support package

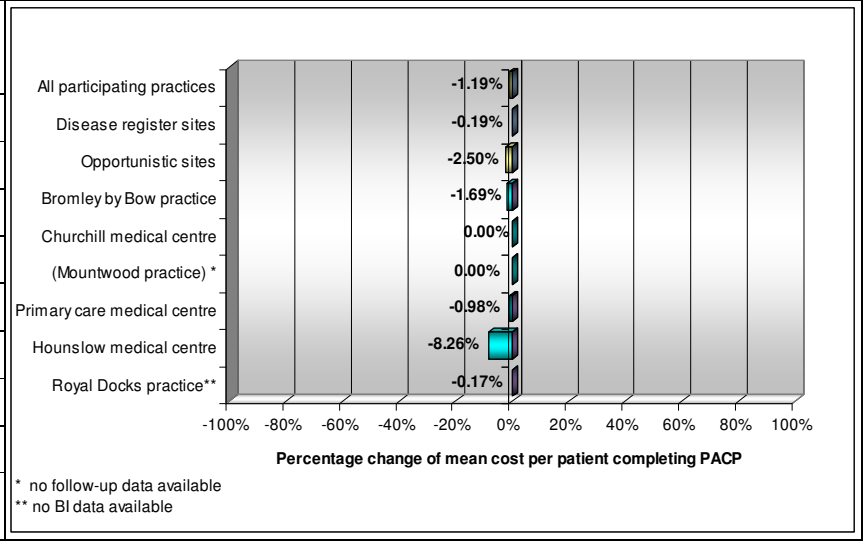
Practice		lower bound	mean value	higher bound	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	57.06	81.87	81.87	24.81	-30.30%	0.00%
Disease Register Sites		155.47	190.84	190.84	35.37	-18.54%	0.00%
Opportunistic Sites		31.23	53.26	53.26	22.03	-41.37%	0.00%
Bromley By Bow practice		41.81	61.95	61.95	20.15	-32.52%	0.00%
Churchill Medical Centre		258.80	308.02	308.02	49.22	-15.98%	0.00%
Mountwood practice *		11.92	24.31	24.31	12.40	-50.99%	0.00%
Primary Care Medical Centre		17.72	48.20	48.20	0.00	-63.24%	0.00%
Hounslow Medical Centre		27.37	65.14	65.14	37.77	-57.99%	0.00%
Royal Docks practice**		53.34	53.34	53.34	0.00	0.00%	0.00%



Scenario 7a: Exit of all ineligible patients before GPPAQ assessment										
		Royal Docks practice**	Hounslow Medical Centre	Primary Care Medical Centre	Mountwood practice*	Churchill Medical Centre	Bromley By Bow practice	Opportunistic Sites	Disease Register Sites	All Participating practices
a	Actual cost of PACP up to and including follow up	1386.9	1042.2	1831.8	*1580.3*	3388.2	619.5	4260.9	5588.0	9848.9
b	Target cost of PACP up to and including follow up assuming perfect delivery of the care pathway	1384.4	956.2	1813.8	*1580.3*	3388.2	609.1	4154.3	5577.6	9731.9
c	Patients completing the care pathway	26	16	38	*no follow up data available*	11	10	80	21	101
d	Patients rightfully completing the pathway (excluding those who were judged ineligible)	26	15	38		11	10	79	21	100
e= a/c	Actual cost per patient completing the care pathway	53.34	65.14	48.20	N/A	308.02	61.95	53.26	266.10	97.51
f=a/d	Actual cost per patient who rightfully completed the pathway	53.34	69.48	48.20	N/A	308.02	61.95	53.94	266.10	98.49
g= b/d	Target cost assuming perfect delivery per patient who rightfully completed the pathway	53.25	63.74	47.73	N/A	308.02	60.90	52.59	265.60	97.32

Cost per patient who rightfully completed the pathway vs. cost per patient assuming perfect delivery

Practice		lower bound (row g table 1)	mean value (row f table 1)	higher bound (row f table 1)	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	97.32	98.49	98.49	1.17	-1.19%	0.00%
Disease Register Sites		265.60	266.10	266.10	0.50	-0.19%	0.00%
Opportunistic Sites		52.59	53.94	53.94	1.35	-2.50%	0.00%
Bromley By Bow practice		60.90	61.95	61.95	1.05	-1.69%	0.00%
Churchill Medical Centre		308.02	308.02	308.02	0.00	0.00%	0.00%
Mountwood practice *		N/A	N/A	N/A	N/A	N/A	N/A
Primary Care Medical Centre		47.73	48.20	48.20	0.47	-0.98%	0.00%
Hounslow Medical Centre		63.74	69.48	69.48	5.74	-8.26%	0.00%
Royal Docks practice**		53.25	53.34	53.34	0.09	-0.17%	0.00%

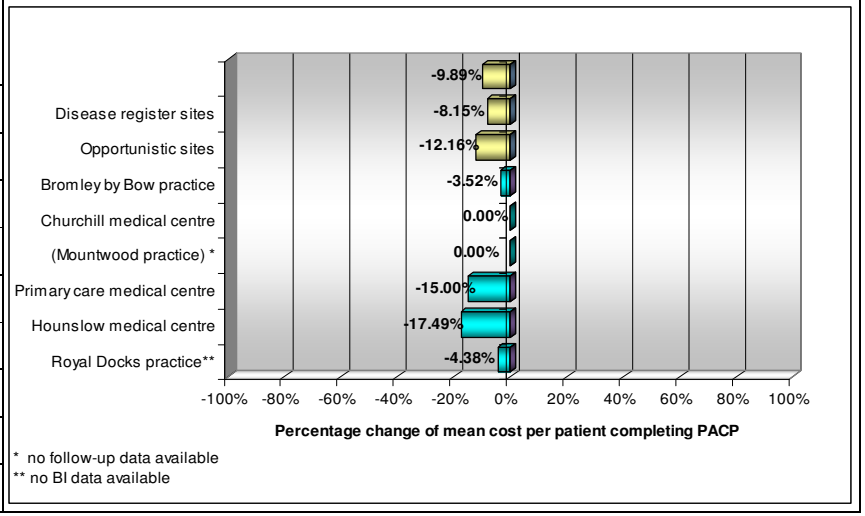


* no follow-up data available
** no BI data available

Scenario 7b: Exit of all active patients after GPPAQ assessment										
		Royal Docks practice**	Houns-low Medical Centre	Primary Care Medical Centre	Mountwood practice*	Churchill Medical Centre	Bromley By Bow practice	Opportunistic Sites	Disease Register Sites	All Participating practices
a	Actual cost of PACP up to and including follow up	1386.9	1042.2	1831.8	*1580.3*	3388.2	619.5	4260.9	5588.0	9848.9
b	Target cost of PACP up to and including follow up assuming perfect delivery of the care pathway	1326.2	859.9	1556.8	*1146.5*	3388.2	597.7	3742.9	5132.4	8875.2
c	Patients completing the care pathway	26	16	38	*no follow up data available*	11	10	80	21	101
d	Patients rightfully completing the pathway (excluding those who were judged active)	23	10	26		11	10	59	21	80
e=a/c	Actual cost per patient completing the care pathway	53.34	65.14	48.20	N/A	308.02	61.95	53.26	266.10	97.51
f=a/d	Actual cost per patient who rightfully completed the pathway	60.30	104.22	70.45	N/A	308.02	61.95	72.22	266.10	123.11
g=b/d	Target cost assuming perfect delivery per patient who rightfully completed the pathway	57.66	85.99	59.88	N/A	308.02	59.77	63.44	244.40	110.94

Cost per patient who rightfully completed the pathway vs. cost per patient assuming perfect delivery

Practice		lower bound (row g table 1)	mean value (row f table 1)	higher bound (row f table 1)	range	percentage change (-)	percentage change (+)
All Participating Practices	cost of PACP up to and including follow-up per patient	110.94	123.11	123.11	12.17	-9.89%	0.00%
Disease Register Sites		244.40	266.10	266.10	21.70	-8.15%	0.00%
Opportunistic Sites		63.44	72.22	72.22	8.78	-12.16%	0.00%
Bromley By Bow practice		59.77	61.95	61.95	2.18	-3.52%	0.00%
Churchill Medical Centre		308.02	308.02	308.02	0.00	0.00%	0.00%
Mountwood practice *		N/A	N/A	N/A	N/A	N/A	N/A
Primary Care Medical Centre		59.88	70.45	70.45	10.57	-15.00%	0.00%
Hounslow Medical Centre		85.99	104.22	104.22	18.23	-17.49%	0.00%
Royal Docks practice**		57.66	60.30	60.30	2.64	-4.38%	0.00%



* no follow-up data available
** no BI data available

Appendix 17: Patient demographics by practice

a) Demographics of patients assessed for eligibility

	BBB N=28	C N=49	H N=114	MW N=71	PCMC N=220	RD N=44	ALL N=526
Age							
Range	43-74	34-73	10-84	41-74	16-87	15-88	10-88
Mean	59.50	61.20	50.63	56.52	52.86	44.23	53.68
SD	8.75	8.76	15.24	8.78	16.13	15.80	14.88
Gender							
Male	11	18	47	29	105	14	224
Female	17	31	67	42	115	30	302
Ethnicity							
White	13 (46%)	35 (71%)	7 (6%)	12 (17%)	19 (9%)	13 (30%)	99 (19%)
Black or Black British	1 (4%)	2 (4%)	1 (1%)	8 (11%)	9 (4%)	7 (16%)	20 (4%)
Asian or Asian British	14 (50%)	9 (18%)	102 (89%)	1 (1%)	126 (57%)	15 (34%)	274 (52%)
Mixed	0	1 (2%)	1 (1%)	0	0	1 (2%)	3 (1%)
Other	0	2 (4%)	0	1 (1%)	0	0	3 (1%)
Unknown	0	0	0	0	0	1 (2%)	1 (0%)
Missing	0	0	3 (3%)	50 (70%)	66 (30%)	7 (16%)	126 (24%)

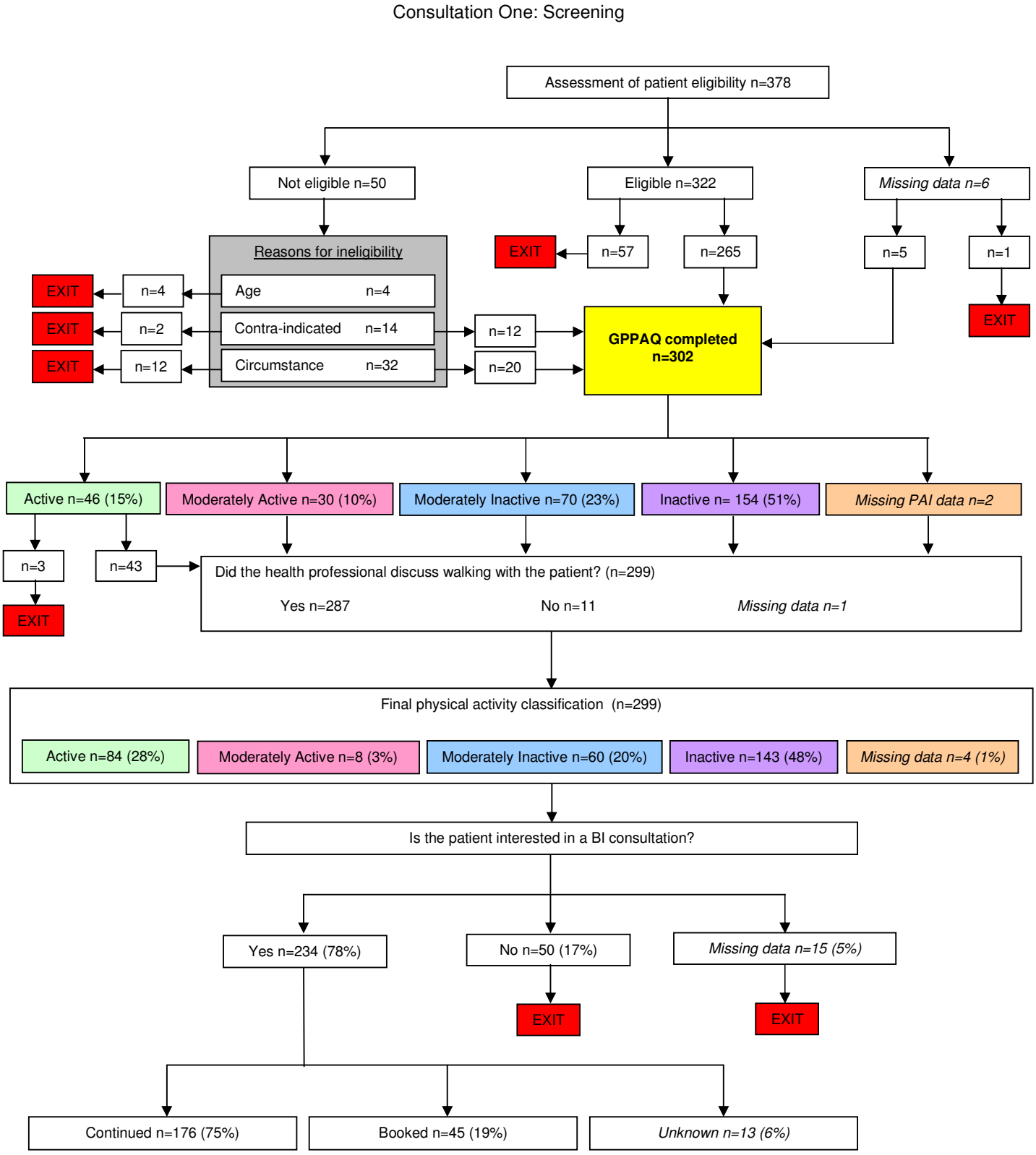
b) Demographics of patients receiving a brief intervention

	BBB N=25	C N=43	H N=62	MW N=65	PCMC N=119	ALL N=314
Age						
Range	43-74	34-72	19-70	41-74	18-84	16-84
Mean	60.0	61.12	50.27	59.25	51.31	54.66
SD	8.96	8.61	12.64	8.63	15.51	13.33
Gender						
Male	10	16	19	26	57	128
Female	15	27	43	39	62	186
Ethnicity						
White	11 (44%)	29 (67%)	4 (7%)	11 (17%)	12 (10%)	67 (21%)
Black or Black British	1 (4%)	2 (5%)	0	0	5 (4%)	8 (3%)
Asian or Asian British	13 (52%)	9 (21%)	56 (90%)	8 (12%)	71 (60%)	157 (50%)
Mixed	0	1 (2%)	0	0	0	1 (0%)
Other	0	2 (5%)	0	1(2%)	0	3 (1%)
Unknown	0	0	0	0	0	0
Missing	0	0	2(3%)	45 (69%)	31 (26%)	77 (25%)

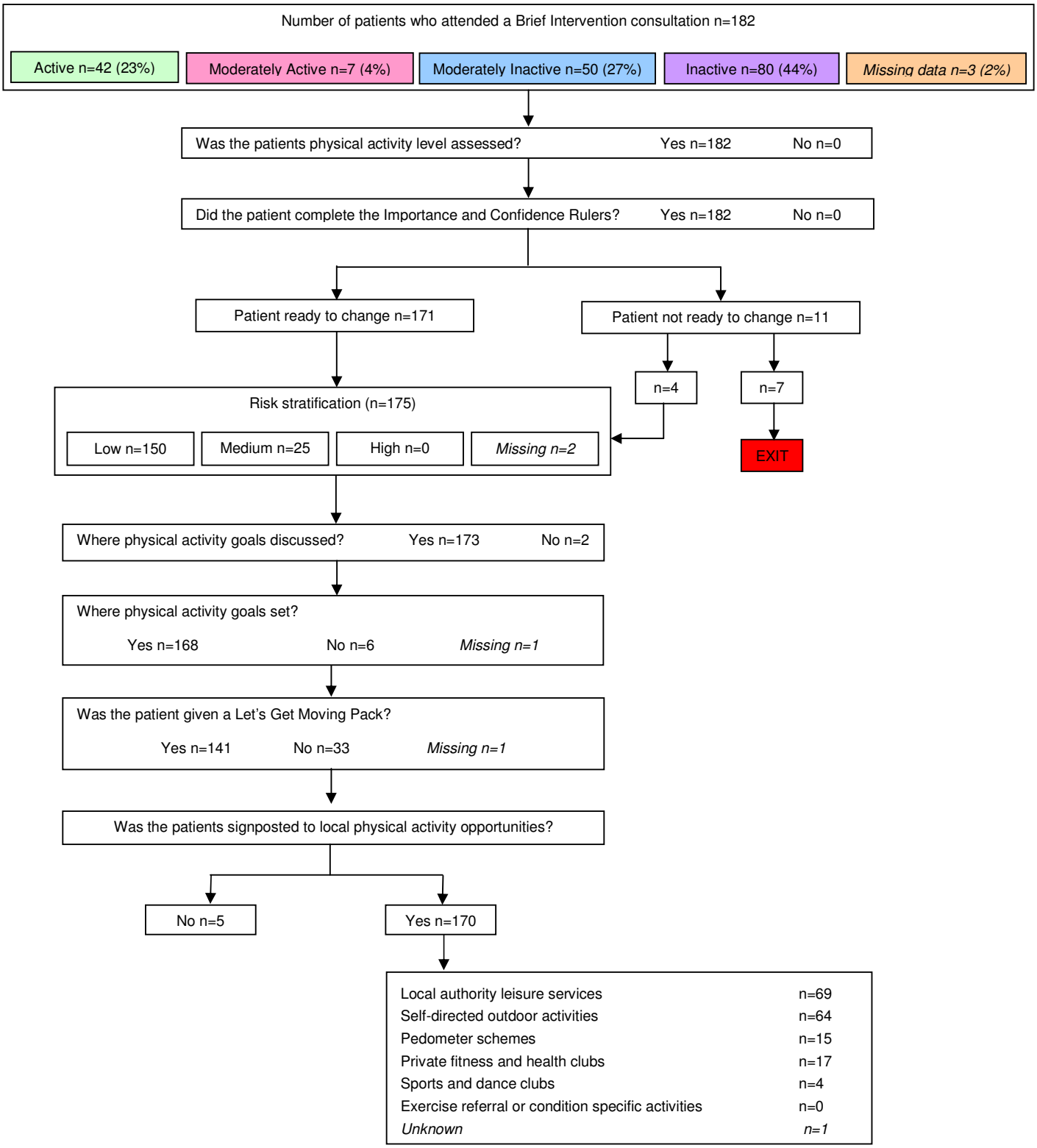
c) Demographics of patients attending a follow-up consultation

	BBB n=10	C n=11	H n=16	PCMC n=38	RD n=26	ALL n=101
Age						
Range	43-74	57-72	25-69	26-81	15-88	15-88
Mean	60.40	66.64	52.38	58.39	47.23	55.66
SD	10.53	5.46	12.92	13.02	16.18	14.31
Gender						
Male	6	5	5	21	8	45
Female	4	6	11	17	18	56
Ethnicity						
White	7 (70%)	7 (6%)	2 (13%)	6 (16%)	7 (27%)	29 (29%)
Black or Black British	0	1 (1%)	0	3 (8%)	6 (23%)	10 (10%)
Asian or Asian British	3 (30%)	3 (3%)	14 (88%)	21 (55%)	9 (35%)	50 (50%)
Mixed	0	0	0	0	0	0
Other	0	0	0	0	0	0
Unknown	0	0	0	0	0	0

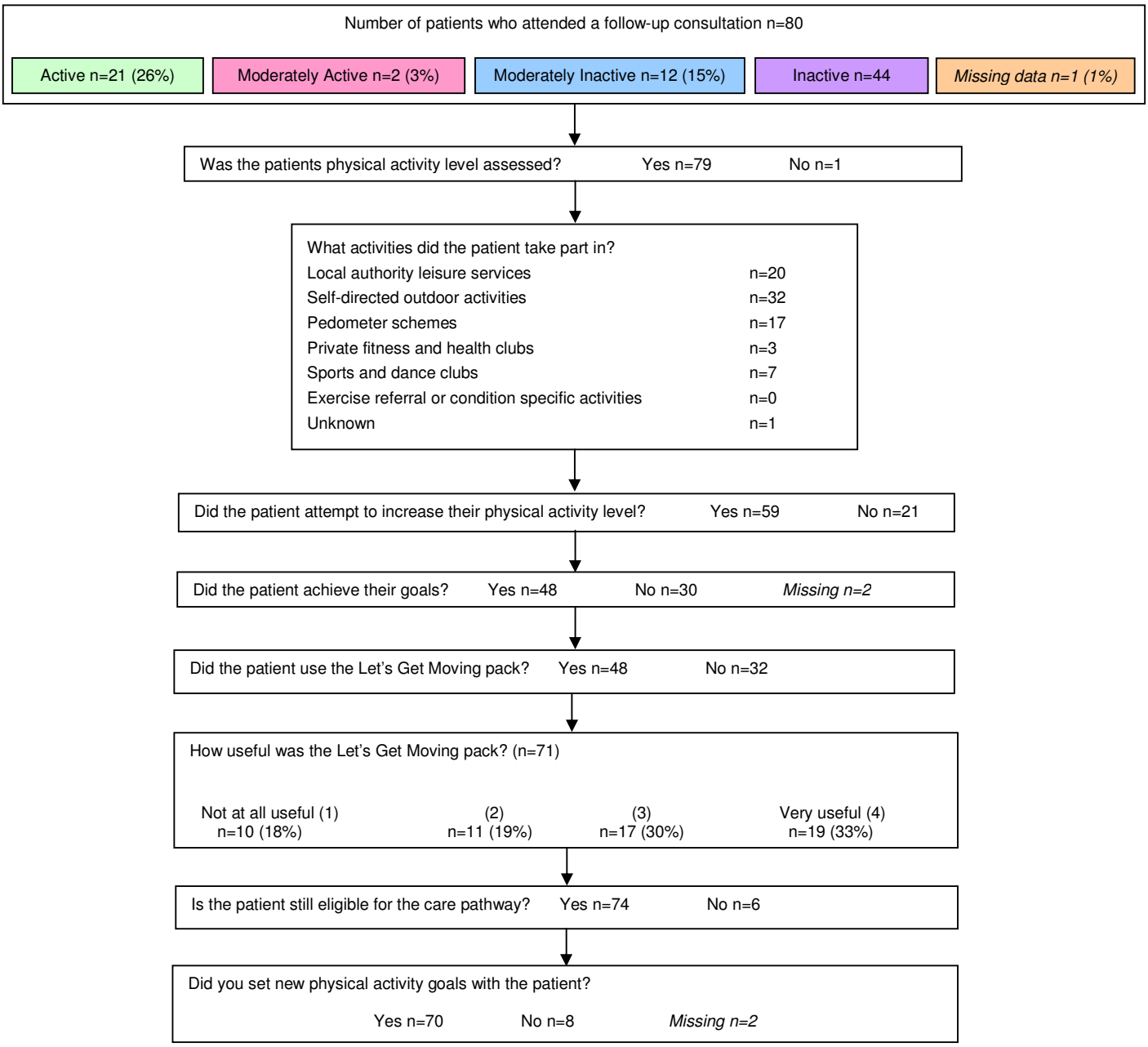
Appendix 18: Tracking of patients through the care pathway – Opportunistic Recruitment



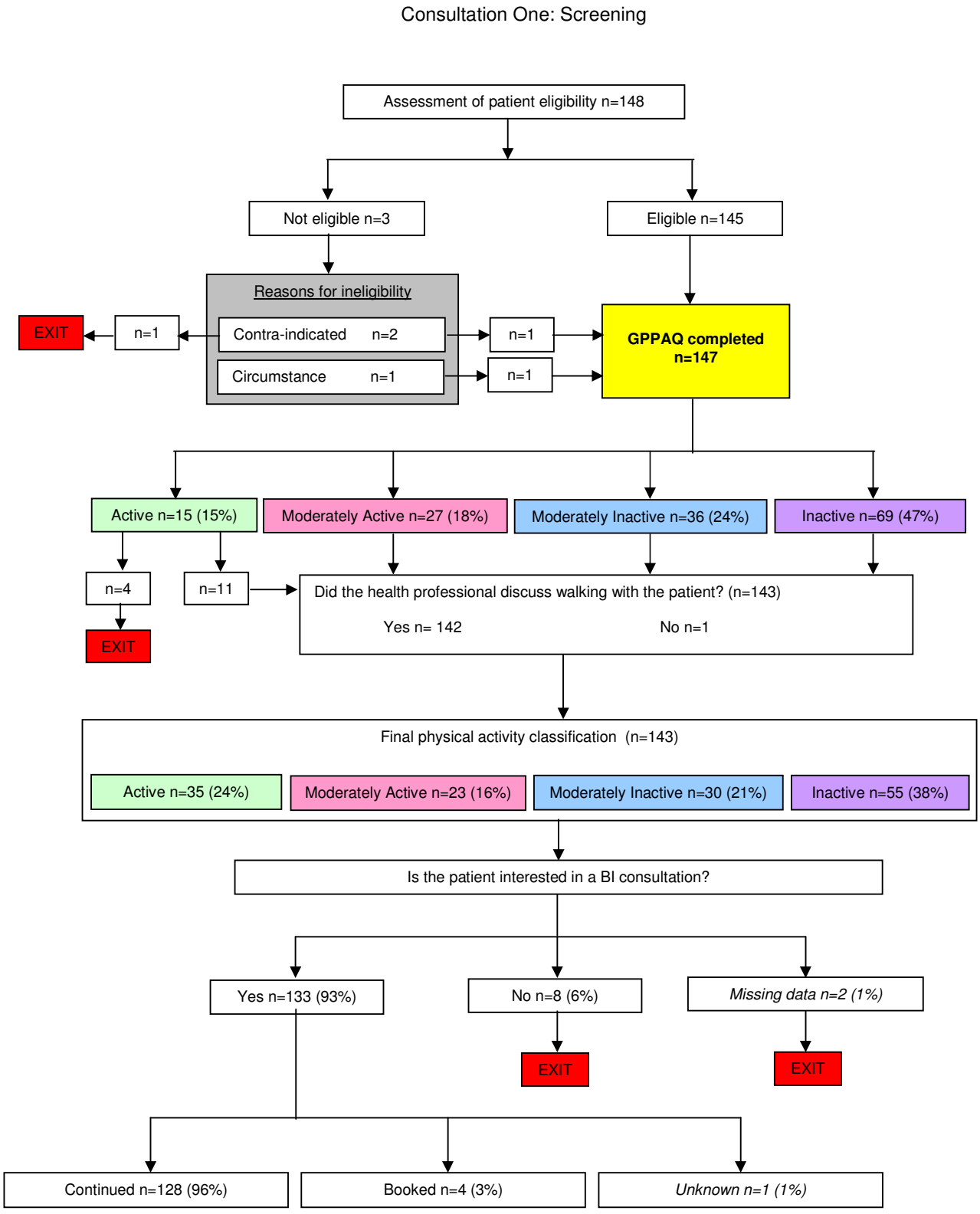
Consultation Two: Brief Intervention



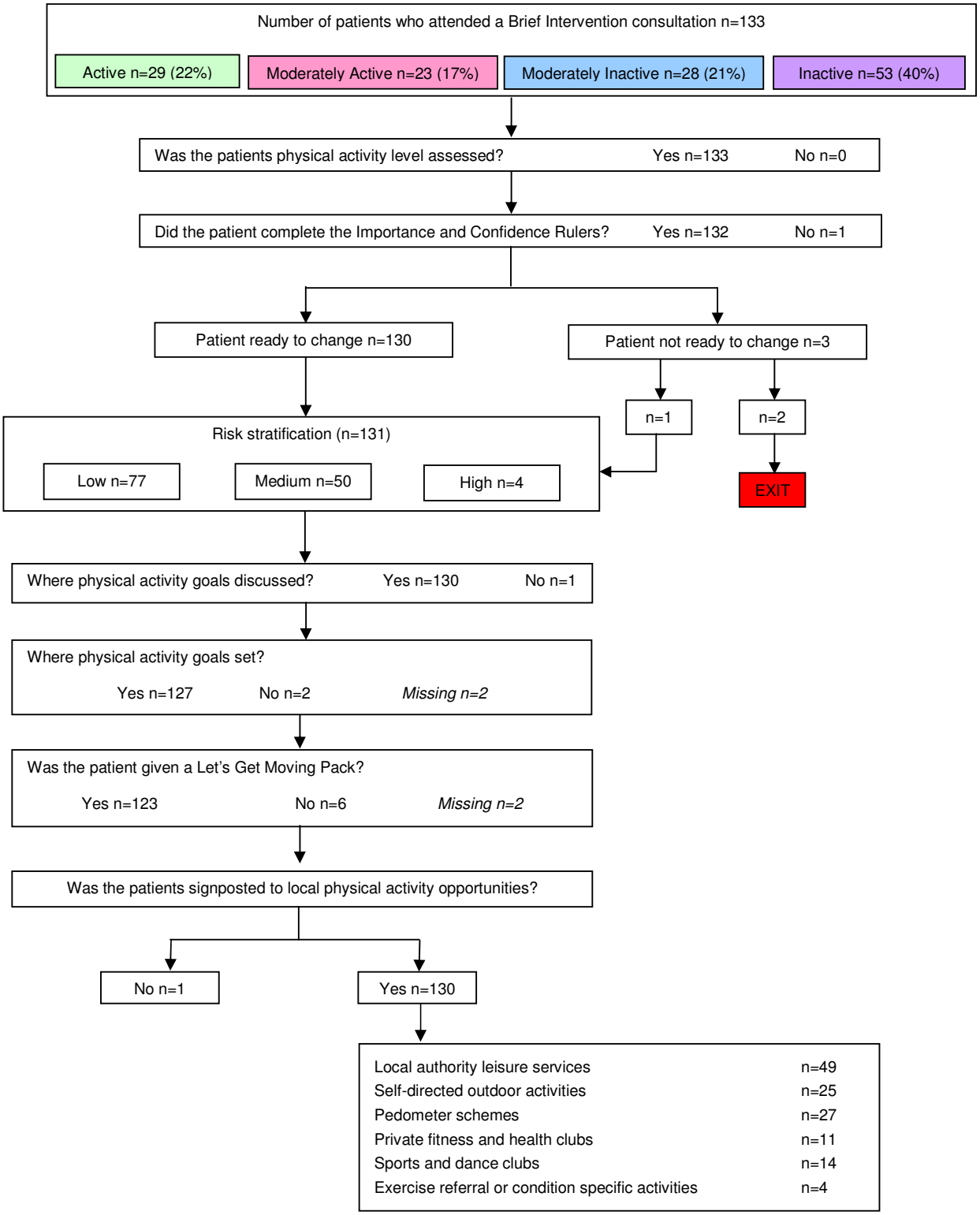
Consultation Three: Follow-Up



Appendix 19: Tracking of patients through the care pathway – Disease Register Recruitment



Consultation Two: Brief Intervention



Consultation Three: Follow-Up