National Institute for Health and Clinical Excellence

Public Health Intervention Guidance on Physical Activity

– Brief advice for adults in primary care:

Economic Analysis

Review of economic barriers and facilitators

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(Commissioned by NICE Centre for Public Health Excellence to support update of PH2)

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Contribution of Authors

TJ led the development and running of searches with assistance from NA and JFR. NA and JFR were reviewers. Each author contributed to drafting and editing. JFR had overall responsibility for delivery to NICE.

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Declaration of interests

Authors declare *no co*nflicts of interest.

Executive Summary

Aim

To conduct a systematic literature review to examine the economic barriers and facilitators to the delivery and uptake of brief advice on physical activity delivered in primary care.

Methods

The search for evidence was based on 10 electronic databases, additional papers supplied by the NICE and effectiveness review teams, a call for evidence distributed by NICE, a Google Scholar search of citations and a search of 6 organisational websites. A 10% sample of abstracts were double reviewed and all data extracted into templates was double reviewed independently prior to agreement.

Main Results

Six papers were identified for full review; 5 quantitative studies from the USA and 1 qualitative study from New Zealand.

Weak quality evidence from 3 cross sectional studies indicates that perceived inadequate financial reimbursement is positively, but very weakly, related to the delivery of brief advice for physical activity in the primary care irrespective of whether counseling is provided by nurse or GP.

There is no interpretable policy relevant evidence on the role of remuneration for brief advice for physical activity.

There is no interpretable evidence on the role of other resources in the delivery of brief advice for physical activity.

Abbreviations

BMI	Body Mass Index
CCM	Chronic Care Model
CI	Confidence Interval
CPHE	Centre for Public Health Excellence
DH	Department of Health
GP	General Practice/Practitioner
GPPAQ	General Practice Physical Activity Questionnaire
HERG	Health Economics Research Group
JFR	Julia Fox-Rushby
NA	Nana Anokye
NCCHTA	National Co-ordinating Centre for Health Technology Assessment
NHS EED	National Health Service Economic Evaluation Database
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
OHE HEED	Office of Health Economics Health Economic Evaluations Database
OR	Odds Ratio
PH2	Public Health Guidance No 2
PHICEB	Public Health Interventions Cost Effectiveness Database
QALY	Quality Adjusted Life Year
ScHARR	School of Health and Health Related Research
SD	Standard Deviation
SOC	Stage of Change
TJ	Teresa Jones
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

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1. Introduction

NICE, in 2006, produced guidance with supporting documents on economic analysis (NICE 2006a; 2006b) on a small number of commonly used approaches to increasing physical activity; brief interventions in primary care, exercise referral schemes, pedometers and community-based exercise programmes for walking and cycling. Following a review in 2009, NICE decided to update the 'brief advice in primary care' recommendations and to supplement this with recommendations on the role of infrastructure and systems in the facilitation of brief advice in primary care (NICE 2011) as well as to consider mental wellbeing as an outcome.

The updated guidance will supersede recommendations 1–4 from NICE public health intervention guidance No. 2 on 'Four commonly used methods to increase physical activity' which covered recommendations to primary care practitioners to: identify inactive adults and advise 30 minutes of moderate activity 5 days a week; use GPPAQ for monitoring; account for individual circumstances and agree individual-specific goals; monitor of strategies to promote physical activity locally; and to cover the hard to reach and disadvantaged communities.

The updated guidance is due for publication in April 2013 and, in addition to aiming at guiding good practice among primary care practitioners and the general public, this guidance is expected to support at least six policy documents (NICE 2011) including; 'Healthy lives, healthy people: our strategy for public health in England' (DH 2010); Improving outcomes: a strategy for cancer' (DH 2011a); 'Let's get moving. Commissioning guidance: A new physical activity care pathway for the NHS' (DH 2009a); 'No health without mental health: a cross-government mental health outcomes strategy for people of all ages' (DH 2011a); 'Start active, stay active: a report on physical activity from the four home counties' Chief Medical Officers' (Department of Health 2011b); and The 'public health responsibility deal' (Department of Health 2011c).

Identifying the evidence on the factors that affect the demand for and supply of brief advice, through a review of the economic facilitators and barriers is important because it allows an assessment to be made as to the likely number of GPs delivering brief advice and the likely number of people entering into such a programme, under given conditions.

In light of this, a systematic literature review was conducted to examine the economic barriers and facilitators to delivery and uptake of brief physical activity advice interventions delivered in primary care. A similar review but with broader coverage including both economic and non economic factors was undertaken by Campbell et al (2012), alongside this current study.

1.1. Operational definition (as defined in scope by NICE)

- Brief advice: brief advice comprises verbal advice, discussion, negotiation or encouragement, with or without written or other support or follow-up. It could be opportunistic and can typically take from less than a minute to up to 20 minutes. It can vary from basic advice to a more extended, individually-focused discussion. The advice might be delivered in a GP surgery, health centre or other primary care setting. It may also be delivered by primary care professionals in other settings (for example, a residential home). People who may give this advice include: community nurses, GPs, heath visitors, pharmacists, physiotherapists, exercise professionals or health trainers[1].

- Local infrastructure and systems that facilitate the delivery of brief advice in primary care settings. These might include:
    - structured arrangements such as scheduled annual health checks
    - 'triggers' in computerised patient records
    - opportunistic discussion about physical activity during a GP appointment
    - incentive schemes for professionals such as the 'Quality and Outcomes Framework'

[1] Further discussion with NICE during the development of this work indicated that brief advice would be delivered in a single rather than multiple score sessions. However, it could involve 'follow up' and an addition to brief advice, with the brief advice still deliverable in one session. It was also agreed that it would not involve referral or direction to a single activity or physical activity programme.

2. Methodology

2.1. Search for evidence

The search for evidence for the economic barriers component of the review was developed and reviewed through discussions with the effectiveness review team (ScHARR) and NICE. The agreed method involved formal searches of selected databases supplemented with evidence gathered from numerous other sources, listed below.

2.1.1. Databases

A database search strategy for MEDLINE and EMBASE was developed using the search strategy for the effectiveness component of the review devised by ScHARR and agreed by NICE. Search terms to identify papers relevant to the economic barriers review were added. These terms were derived from a successful past search strategy and study around demand for physical activity (Anokye 2010) and were based on a few key indexing terms and text searches of abstracts.

Search strategies for additional databases specific to the economic evaluation and economic barriers reviews were developed based on the terms included in the Medline and Embase strategies but adapted to suit the search engines of each individual database. Where appropriate e.g. for less sophisticated search engines or for relatively small databases, the strategies for the economic evaluation and economic barriers reviews were combined. All search strategies are listed in Appendix A.

Searches were limited to papers reported in the English language and from 1990 to March/April 2012. Publications identified by the database searches were transferred to an EndNote database when possible[2] and duplicates were removed automatically to enable efficient management.

[2] Out of 2009 records identified from the database searches, 784 were sourced from databases without an available automatic transfer to Endnote facility.

2.1.2. Other sources of evidence

- Any papers about economic barriers identified by the effectiveness review team whilst conducting the effectiveness and barriers review and considered potentially relevant by the effectiveness review team were included.
- Any papers put forward by NICE were included.
- All papers fully reviewed were subject to citation searches themselves, using Google Scholar.
- Following discussion and agreement with NICE, a set of websites were searched for evidence: Department of Health; Welsh Assembly; British Heart Foundation National Centre for Physical Activity; Health England; Matrix; National Obesity Observatory; Partner for prevention and Scottish Government. Search engines for these websites varied widely in sophistication and therefore search terms were adapted accordingly (See Appendix A).

2.2. Selection strategy

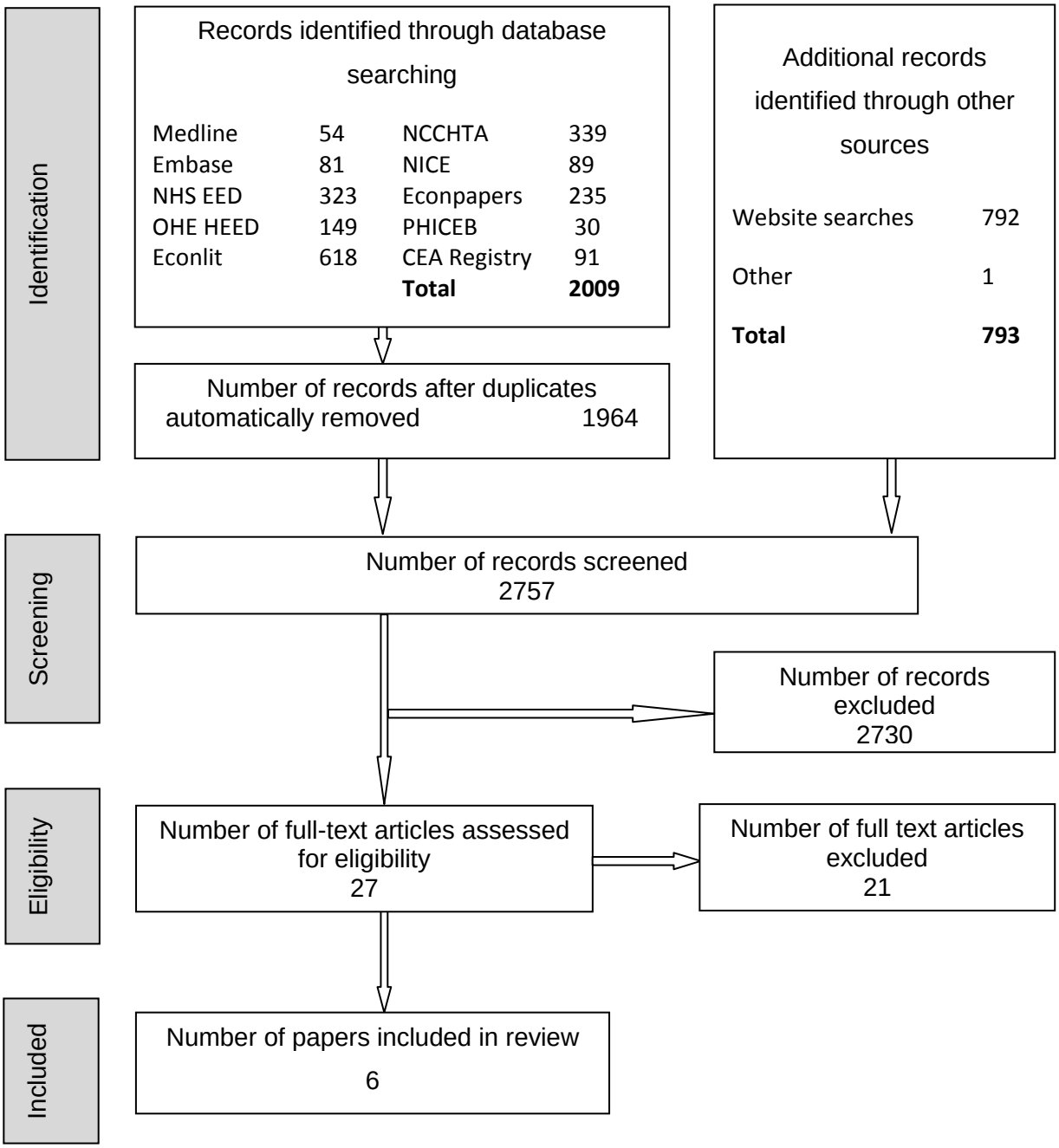
The following selection criteria were applied to papers:

> *Inclusion criteria*: (a) Quantitative estimates of the statistical association (e.g. correlation or regression coefficient) between uptake/adherence to brief advice interventions and economic variables such as prices, income, employment status, demographics, money/time costs, taste and preferences, or (b) Qualitative data (e.g. focus groups and interviews with brief intervention participants) about the economic factors relating to uptake and adherence to brief interventions.
>
> *Exclusion criteria:* Studies that do involve examining the barriers of uptake and delivery of relevant interventions, or studies that were not conducted in the UK or OECD countries.

Screening of papers was conducted in two stages. First, titles and/or abstracts were screened. Papers that clearly did not meet the inclusion criteria were excluded. Full papers were requested for the remaining sample, including those for papers whose abstracts provided insufficient detail for rejection. Papers retrieved were further assessed for inclusion in the review. Screening of all abstracts was undertaken by one reviewer (NA) and 10%

sample by a second reviewer (JFR). Both reviewers considered all full papers selected. Disagreements were resolved by discussion between reviewers. Prior to full review, the output of the screening process was approved by NICE. Figure 1 provides an audit trail of papers reviewed.

Figure 1: Audit trail of papers reviewed



2.3. Data extraction and management, quality assessment and synthesis

Two reviewers (NA & JFR) independently extracted data from each paper selected for full review. Any discrepancies were solved by discussion. Data extraction (see Appendix B for data extraction form) of the included studies included:

- background information (aim of study, year of publication, country of origin, source of funding);
- sample / intervention characteristics (sample: socio-economic demographic characteristics, sample size. Intervention and control: design, setting, location, duration, exercise programme);
- methods/analysis and results (source of data, type of analysis, theoretical approach, model used, model diagnostics, outcomes measured, main results);
- challenges (author stated limitations and strengths, strengths and gaps identified by reviewers);
- Quality appraisal in terms of applicability and study limitations and an overall grading. Quality criteria were based on NICE CPHE Methods Manual (2009) which recommends that studies are categorised according to study type and methodological rigour and quality (categories ++, + or -) and an assessment of whether any limitations are perceived as very serious, potentially serious or only likely to have a minor impact on conclusions of the reviewed paper.

The outcome of the full review of papers selected is presented descriptively as: narrative summaries of papers (plus a tabular summary per study); evidence statements according to NICE recommendations (NICE 2009); justified quality ratings of papers; and a detailed tabular summary in Appendix B, set out according to recommendations in NICE CPHE Methods Manual (2009).

3. Results

3.1. Identification and selection of studies

A number of studies were excluded (Appendix C) on the basis that they[3]:

- did not meet the definition of brief advice (n=11),
- used a population group that is not relevant to this research context (e.g. irrelevant population group with preexisting chronic condition) (n=4),
- was not a barriers study e.g. a commentary (n=3),
- investigated brief advice intervention that covered other lifestyle behavior (n=4).

Six studies were identified for full review. These included five quantitative studies (Guo et al 2002; Buchholz and Purath 2007; Patel and Parchman 2011; Podl et al 1999; Sherman and Hershman 1993), and one qualitative study (Swinburn et al 1997), of barriers and facilitators associated with the delivery and/or uptake of brief advice in primary care to promote physical activity. The quantitative studies were based on data from US populations, with the qualitative study using data from a population in New Zealand.

Only 2 studies explicitly discussed their theoretical framework; Patel and Parchman 2011 drew on the Transtheoretical model and Sherman and Hershman (1993) additionally referred to the Health Belief model.

3.2. Narrative summaries of individual papers

Table 1 gives an overview of the reviewed papers.

3.2.1. Quantitative studies

[3] The numbers don't add to 21 here due to multiple reasons for exclusion.

Buchholz and Purath (2007) ([-] Quantitative, USA) conducted a cross-sectional questionnaire survey of 148 members of the American Academy of Nurse Practitioners across the USA to "(a) examine physical activity assessment and counseling practices, (b) identify barriers to physical activity counseling, (c) describe knowledge and confidence in physical activity assessment and counseling, (d) identify personal physical activity practices, and (e) describe use of objective physical fitness measures in the primary care setting". Results, limited to descriptive analyses, showed that 95% reported that they counsel a patient regarding physical activity at least once a year and 74% reported recommending clients accumulate 30 min of moderate-intensity physical activity on most days of the week. The most common barriers to counseling were; lack of time (48%), pre-emption by more important concerns (47%) and client not receptive (43%). Other barriers were: useless as client won't follow through (15%); neighbourhoods unsafe for physical activity (13%); language barrier (12%); no reimbursement (10%); not a high priority (5%); and most clients already physically active (5%). Facilitators included greater knowledge (usually attained from conferences, workshops or self-study). Of the fitness measures used, the most commonly used was body composition. Cardiorespiratory, strength, flexibility, and balance fitness tests were used infrequently or rarely.

Guo et al (2002) ([+] Quantitative, USA) conducted a cross-sectional self-completed questionnaire survey to examine; a) the reported assessment and counseling practices for nutrition and physical activity among 110 family practice residents from 4 clinics from Texas Department of Health that had received funding from the Texas Department of Health (TDH) for implementing 'Put Prevention into Practice' and; b) potential determinants of these behaviours. 44% stated that they counseled their asymptomatic adults in >60% of the time in the last 30 days, which compared with 58% for asymptomatic obese adults. However, specific exercises or setting goals was only pursued by 40% of residents >60% of the time although assessment of exercise was said to be undertaken by 45% of residents. The main reported barrier was lack of time (61% considered it a major and 31% a minor barrier). The lack of health educators and lack of systems for tracking and promoting preventive health had similar responses (roughly 34% considered it a major and 47% a minor barrier) whereas lack of effective health education was considered by fewest to be a barrier (18% considered it a major and 58% a minor barrier). The lack of financial re-imbursement was more evenly split across response options; 20% considered it a major and 28% a minor barrier, whereas 38% did not consider it a barrier and 13% were unsure. 3-9 times as many residents stated they were unsure whether financial incentives had acted as a barrier compared with any other barrier. Results from the regression analysis showed that use of resources, perceived effectiveness and attitude regarding behavioural counseling were positively related toboth

counseling and assessment of exercise whereas residency year, gender, workload, and perceived barriers were not predictors.

Patel and Parchman (2011) ([+] Quantitative, USA) conducted a cross-sectional survey in South Texas to examine the relationship between the Chronic Care Model and exercise state of change in the belief that the CCM will be associated with the amount of time spent discussing exercise during visits to primary care clinics. A questionnaire survey of 45 primary care physicians from 20 health centres in South Texas was supplemented by direct observation and audio recordings from 162 visits as well as exit interviews with the patients involved. Results showed that the duration of visits was 19 minutes (range, 10-26mins) on average and that 22 seconds of those minutes were used to discuss exercise but that discussion may be 18 to 33 seconds longer in clinics with full implementation of the CCM compared with those with basic implementation. Bivariate analysis showed time spent discussing exercise was positively associated with: number of problems addressed during the visit ($r=0.26$, $p<0.001$); overall length of the visit ($r=0.19$, $p=0.015$); and patients in contemplation, preparation, and action stages of change with respect to exercise (compared with those in maintenance and pre-contemplation stages) ($p=0.005$). In the hierarchical regression model, the CCM score, after adjusting for patient and visit characteristics, was positively associated with time spent discussing exercise (regression coefficient:0.21), lower for females (regression coefficient:-0.46), acute visit (regression coefficient:-0.64), and pre-contemplation stage of exercise (regression coefficient:-1.03). For each 1-point increment in the CCM score, the time spent discussing exercise increased by approximately 3 seconds.

Podl et al (1999) ([+] Quantitative, USA) conducted a cross-sectional survey in north-eastern Ohio to assess the prevalence of exercise counseling by community family physicians and to ascertain patient and visit characteristics associated with provision of exercise counseling. Data included 843 directly observed outpatient visits, review of 4125 medical records, 3152 patient exit interviews and interviews with 138 family physicians. Results showed that; of the 4215 visits for which direct observation data were available, exercise counseling was performed in 20.1% and; among 3152 patients completing an exit questionnaire, 13.3% reported being counseled about exercise and 21% also reported receiving exercise counseling from the physician in the past year. During visits involving exercise counseling, physicians spent an average of 0.78 minutes providing exercise advice (range: 0.33– 6.00 minutes, SD 5 0.67). On average, visit length was significantly longer (12.5 min versus 9.8 min) when exercise counseling was delivered. Patient characteristics found not to be significant in univariate analyses were: race, health status, number of years with the practice, number of visits in the past year, smoking status, new versus established patient, patient satisfaction. The likelihood of exercise counseling being delivered was

higher when: length of visit was longer (odds ratio(OR)=1.08, CI1.06-1.09); patient was older (OR =1.09, CI 1.05-1.14)); reason of visit was for well care (OR=1.00, CI) compared with acute illness (OR=0.39, CI 0.3-0,5), chronic illness (OR=0.58, CI 0.44-0.76) or other (OR=0.35, CI0.24-0.53); diagnosed with: hypertension (OR=1.25, CI 0.99-1.58); diabetes (OR=1.50, CI 1.10-2.04); depression (OR=1.26, CI0.91-1.75); degenerative joint disease (OR=1.33, CI 0.92-1.93); Ischaemic heart disease (OR=0.92, CI 0.59-1.440; fibrositis /myalgia /arthralgia (OR=2.45, CI1.56-3.82); low back pain (OR=3.19, CI 23.03-4.99); obesity (OR=4.1, CI 2.02-=8.35). Brief advice was recalled by two thirds of patients. The 10-minute average visit duration and competing demands of primary care outpatient visits raise questions about the feasibility of incorporating longer duration health habit counseling, except among a limited number of high-risk patients at teachable moments.

Sherman and Hershman (1993) ([-] Quantitative, USA) conducted a cross-sectional questionnaire survey of 687 internal physicians in Massachusetts to assess how often they counsel patients about exercise and to identify which primary care internists counsel infrequently. 17% of respondents stated they counseled up to 25% of their patients about exercise; 22% counseled 26-50% of their patients, 28% counseled 51-75% of their patients, and 33% counseled 76-100% of their patients. Perceived economic barriers included 55% considering lack of time moderately important and 22% who stated that re-imbursement is not sufficient for time spent counseling. Other barriers included: 35% stating that counseling would not lead to change in patient's behaviour; 33% that counseling about other lifestyle changes was more important; 31% that patients were not interested in exercise; 28% being unsure what is more important in counseling patients about exercise; 11% who were not convinced exercise was beneficial; and 7% who stated lifestyle is a matter of personal choice therefore counseling is inappropriate. Univariate analysis (focussed on hypothetical healthy 55-year old patients) showed that GPs who were more likely to frequently counsel their patients about exercise were: those who spent at least 2 minutes counseling compared with those who spent less than 2 minutes) ((OR:3.24(CI 95%:1.80 -5.84)); those who felt more successful at getting their patients to begin exercising (OR:22.74(CI 95%:10.95 - 47.24)) and continue exercising (((OR:14.60(CI 95%:7.46-28.56)) and impact on QOL ((OR:8.50(CI 95%:4.49 -16.06)); those who thought exercise was more important ((OR:5.94(CI 95%:2.94 -11.99)); those not in a health maintenance organisation ((OR:2.11(CI 95%:0.82 -5.39)); those with slower resting heart beats ((OR:2.56(CI 95%:1.41 -4.76)); those who exercise more ((OR:2.69(CI 95%1.50 -4.85)), and those who were older ((OR:1.99(CI 95%:1.11 -3.58)). Based on multivariate logistic regression, GPs who were more likely to frequently counsel their patients (not clear if this is also hypothetical healthy

55-year old patients) about exercise were: those who felt more successful at getting their patients to begin exercising (OR:22.83(CI 95%:8.36 -62.31)); those who felt exercise was more important ((OR:4.86(CI 95%:1.70 -13.91)); those who were older ((OR:3.08(CI 95%:1.33 -7.15)); and those with slower resting heart beats ((OR:3.45(CI 95%:1.46 -8.18)).

3.2.2. Qualitative study

Swinburn et al (1997) ([-] Qualitative, New Zealand) conducted three focus group discussions to assess the attitudes and perceptions of GPs towards the practice of writing 'green prescriptions[4]'. The total of 25 GPs (6 from Auckland and 19 from Dunedin) came from a group of GPs who had agreed to participate and who had also completed recruitment in a randomised control trial (RCT) of 'green prescriptions'. As part of the trial, GPs had received a training session when they were given information about the benefits of exercise and how to prescribe it, an exercise assessment sheet and the 'green prescription' pad from which to provide written exercise advice to patients following counseling. An unstated set of payments were provided to GPs for training, recruitment and for the focus group. The RCT had shown that assessment and prescribing exercise took about 5 mins of the GP's time and in 79% cases walking was prescribed. Qualitative results showed that GPs thought that they had little difficulty discussing exercise as it was clearly in their remit and ability and often related to the patient's medical condition. A prescription to 'do a bit more' exercise was seen as a natural end point to a discussion. Training on understanding the benefits and risks of exercise was said to increase their confidence in discussing the subject and that setting goals with patients was a good way to 'get them started' as it was more involving of patients and like a 'contract' between GP and patient, which was considered to be a key ingredient in achieving exercise targets. However, some GPs did not believe patients would respond and therefore that giving 'green prescriptions' was a waste of time. With respect to economic variables, time taken (to quantify, discuss and prescribe exercise) was considered the main barrier to wider use of 'green prescriptions'. GPs felt using 'green prescriptions' had 'put them behind schedule'. Therefore they tended to choose quieter times to instigate discussions. Even half of the five minute average meant it would always take a large proportion of a GP consultation time. Knowing patients and becoming more practiced at discussing the topic both contributed to reduced time and remuneration (levels not given in paper) was felt to reduce barriers to providing this service. Patients seen for routine follow ups for hypertension were seen as the easiest group to target, whilst patients with heart related diseases were seen as the ones likely to benefit most from exercise advice. The

[4] Written advice by GP to exercise

value of ‘green prescriptions’ was considered to increase with appropriate follow up procedures such as; phone calls, including discussions in routine follow up appointments e.g. for hypertension (in which case the practice nurse was considered important to involve too); if it were supported by national media campaigns; and if evidence of effectiveness were provided.

Table 1: Barriers and Facilitators: Characteristics and main themes of included studies

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
Buchholz and Purath, 2007, [-]	USA	Quantitative, but only descriptive statistics	Adult Nurse Practitioners	To: (a) examine physical activity assessment and counseling practices, (b) identify barriers to physical activity counseling, (c) describe knowledge and confidence in physical activity assessment and counseling, (d) identify personal physical activity practices, and (e) describe use of objective	• 95% reported that they counsel a patient regarding physical activity at least once a year • 74% recommend that their clients accumulate 30 min of moderate-intensity physical activity on most days of the week **Physical Activity and Counseling Assessment** • Most common strategy for counseling was questioning patients about intensity and duration of exercise (95%) followed by checking BMI (88%) and assessing general appearance (34%). Patients were asked to perform physical tests in 17% cases • Most common counseling strategies were discussion (95%) and giving written materials (45%) • Advice was given to exercise several times a day (14%), daily (22%), three times a week (39%), most days of the week (57%) • Most (66%) advised exercising for 30 mins and most (65%) via a brisk walk. Others advised the 'talk test' or a target heart rate. **Barriers** • The most common barriers to counseling were lack of time (48%) and pre-emption by more important concerns (47%) and client not receptive (43%). Other barriers were: Useless as client won't follow through (15%); Neighbourhoods unsafe for physical activity (13%); Language barrier (12%); No reimbursement (10%); Not a high priority (5%); Most clients are already physically active (5%) **Knowledge and confidence in physical activity assessment and counseling** • Neither knowledge nor confidence in assessing and counseling for physical activity correlated significantly with length of practice • The majority (61%) of the ANPs reported that physical activity assessment and counseling were not part of their formal education. Their information came primarily from conferences or workshops (43%) and self-study (37%). • Those with greater knowledge from self study or courses were more confident with knowledge, assessing and counseling.

<table>
<tr><th>First author, Date, Quality</th><th>Country</th><th>Data collection and analysis methods</th><th>Population</th><th>Focus of paper (aim)</th><th>Findings</th></tr>
<tr><td></td><td></td><td></td><td></td><td>physical fitness measures in the primary care setting</td><td>Personal physical activity practices of ANPs
75% self- reported engagement in moderate physical activity 30 min most days of the week and none rated themselves as inactive.
5% relatively inactive, 17% light activity, 56% moderate activity, 22% vigorous activity
Physical fitness assessment and testing
Of fitness measures, the most commonly used was body composition. Cardiorespiratory, strength, flexibility, and balance fitness tests were used infrequently or rarely.</td></tr>
<tr><td>Guo et al. 2002 [+]</td><td>USA</td><td>Quantitative: Descriptive statistics & hierarchical linear regression model</td><td>Family practice residents</td><td>The purposes of this study were to examine the reported assessment and counseling practices for nutrition and physical activity among family practice residents and to explore possible determinants of these behaviours.</td><td>
<table>
<tr><th></th><th></th><th>Never 0%</th><th>Rarely (1-20%)</th><th>Sometimes (21-40%)</th><th>About half the time (41-60%)</th><th>Often (61-80%)</th><th>Usually or Always (81-100%)</th></tr>
<tr><td colspan="2">How often did you advise an asymptomatic adult to exercise regularly</td><td>0</td><td>12.0</td><td>20.4</td><td>24.1</td><td>21.3</td><td>22.2</td></tr>
<tr><td rowspan="3">How often did you advise an asymptomatic obese patient to:</td><td>Exercise regularly</td><td>0</td><td>2.8</td><td>20.4</td><td>18.5</td><td>19.4</td><td>38.9</td></tr>
<tr><td>Set specific exercise goals in terms of frequency duration</td><td>5.6</td><td>16.7</td><td>20.4</td><td>16.7</td><td>15.7</td><td>25</td></tr>
<tr><td>Suggest specific exercises</td><td>6.5</td><td>15.7</td><td>25</td><td>13</td><td>12</td><td>27.8</td></tr>
<tr><td colspan="2">Assessment of physical activity during health maintenance visits in past 30 days</td><td>0.9</td><td>11.1</td><td>24.1</td><td>20.4</td><td>24.1</td><td>19.4</td></tr>
</table>
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<table>
<tr><th>First author, Date, Quality</th><th>Country</th><th>Data collection and analysis methods</th><th>Population</th><th>Focus of paper (aim)</th><th>Findings</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
Resource related reasons given for barriers to delivery of preventive services for diet and nutrition
<table>
<tr><th>Resource related reasons given</th><th>Major barrier (%)</th><th>Minor barrier (%)</th><th>Not a barrier (%)</th><th>Not sure, don’t know (%)</th></tr>
<tr><td>Lack of time</td><td>61.8</td><td>30.9</td><td>6.4</td><td>0.9</td></tr>
<tr><td>Lack of availability of health educators</td><td>33.9</td><td>48.6</td><td>12.8</td><td>4.6</td></tr>
<tr><td>Lack of systems for tracking and promoting preventive health</td><td>33.9</td><td>46.8</td><td>15.6</td><td>3.7</td></tr>
<tr><td>Lack of financial re-imbursement for clinical preventive practices</td><td>20</td><td>29.1</td><td>38.2</td><td>12.8</td></tr>
<tr><td>Lack of effective patient education materials</td><td>17.6</td><td>58.3</td><td>21.3</td><td>2.8</td></tr>
</table>
Family practice residents’ perceived self- effectiveness of advice for physical activity:
Minimally effective = 18.3%
Somewhat effective = 61.5%
Quite effective = 16.5%
Extremely effective = 3.7%

Hierarchical regressions

Use of resources was positively associated with advising on asymptomatic adult patient (coefficient =0.08) and advising on asymptomatic obese adult patient (coefficient=0.30)
Perceived effectiveness was positively associated with advising patients (coefficient =0.50 to 1.59) and assessment of exercise (coefficient =0.58)
Attitude regarding behavioural counseling was positively related to assessment of exercise (coefficient =0.57).
Perceived barriers was not a significant predictor in the multivariate regression although 62% of the family practice residents cited lack of time as a major barrier to counseling (both diet and exercise) whilst 20% noted lack of financial reimbursement for clinical preventive services

</td></tr>
</table>

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
					as a barrier. • Nutrition and physical activity assessment and counseling reported by residents in our study fell short of the Healthy People 2000 guidelines. Perceived effectiveness was the only variable that predicted both assessment and counseling of patients regarding nutrition and physical activity, demonstrating its importance in the prediction of physicians' behaviors. attitude predicted assessment, but not counseling • Interventions for the components would differ: demonstrating and receiving reinforcement for assessment and counseling skills for self-efficacy and providing feedback of patient change after counseling for response efficacy • asymptomatic obese patients were more likely to be counseled for nutrition and physical activity, which is consistent with the literature
Patel and Parchman 2011 [+]	USA	Quantitative	Physicians& patients	To examine the relationship between the Chronic Care Model and exercise state of change. The hypothesis was that presence of the CCM in primary care clinics will be associated with the amount of time spent discussing exercise during the visit.	The duration of visit was 19 minutes on average (range, 10-26mins) and 22 seconds of those minutes were used to discuss exercise. Bivariate analysis showed time spent discussing exercise was positively associated with: • number of problems addressed during the visit ($r=0.26$, $p<0.001$) • overall length of the visit ($r=0.19$, $p=0.015$) • patients in contemplation, preparation, and action stages of change with respect to exercise (compared with those in maintenance and precontemplation stages) ($p=0.005$) **Stage of Change (SOC) of Exercise and If Time as Spent Discussing Exercise** SOC of exercise — Any Time Spent Discussing Exercise? Yes / No Maintenance (n = 72) 28 (38.9) 44 (61.1) Action (n = 18) 9 (50.0) 9 (50.0) Preparation (n = 35) 16 (45.7) 19 (54.35) Contemplation (n = 16) 11 (68.8) 5 (31.3) Precontemplation (n = 21) 2 (9.5) 19 (90.5) Total (n = 162) 66 (40.7) 96 (59.3) In the hierarchical regression model (see Table below) , the CCM score, after adjusting for patient and visit characteristics, was positively associated with time spent discussing exercise (regression coefficient:0.21) but lower for females (regression coefficient:-0.46), acute visit (regression

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
					coefficient:-0.64), pre-contemplation stage of exercise (regression coefficient:-1.03). For each 1-point increment in the CCM score, the time spent discussing exercise increased by approximately 3 seconds. **Multivariable Random Effects Model Predicting Time Spent Discussing Exercise** Fixed Effect Coefficient SE *P* CCM score 0.21, 0.06,<.01 Length of time (min) 0.03,0.03, .36 Age (years) -0.01,0.01, .22 Female Sex -0.46,0.21, .04 Acute visit -0.64,0.31, .05 Maintenance SOC for exercise-0.27,0.23,.27 Precontemplation SOC for exercise-1.03,0.27,<.01 Discussion of exercise may be 18 to 33 seconds longer in clinics with full implementation of the CCM compared with those with basic implementation. "patient SOC for exercise seems to predict the likelihood that a discussion about exercise will occur. It is less likely to occur with patients who are in the precontemplation and maintenance SOCs and more likely to occur with patients in the contemplation, preparation, and action SOCs. Patient- initiated health behavior discussions are more likely to receive advice if they explicitly indicated readiness to change. A discussion about exercise occurred in only 9% of encounters with patients who were in the precontemplation SOC, but a discussion about exercise occurred in 69% of encounters when the patient was in contemplation stage"
Podl et al 1999 [+]	USA	Quantitative: 1. Descriptive statistics on the prevalence of exercise counseling by multiple measures were	Physicians & patients	To assess the true prevalence of exercise counseling by community family physicians by directly observing	• Of the 4215 visits for which direct observation data were available, exercise counseling was performed in 20.1% of visits. Among 3152 patients completing an exit questionnaire, 13.3% reported being counseled about exercise and 21% also reported receiving exercise counseling from the physician in the past year. • During visits involving exercise counseling, physicians spent an average of 0.78 minutes providing exercise advice (range: 0.33– 6.00 minutes, SD 5 0.67). • On average, visit length was significantly longer (12.5 min versus 9.8 min) when exercise counseling was delivered • Patient characteristics found not to be significant in univariate analyses were: race, health status, number of years with the practice, number of visits in the past year, smoking status,

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
		calculated. 2. Student's *t*-tests and chi-square analyses were used to compare visits that did and did not include exercise counseling as measured by the direct observation checklist. 3. Significant patient, visit, and diagnosis variables were entered into a multi-variable logistic regression analysis, in order to determine which factors were independentl y associated with provision of exercise		outpatient visits, and to ascertain patient and visit characteristics associated with provision of exercise counseling.	new versus established patient status, Patient satisfaction. • The likelihood of exercise counseling being delivered was higher when length of visit was longer (odds ratio(OR)=1.08, CI1.06-1.09); patient was older (OR =1.09, CI 1.05-1.14)); reason of visit was for well care (OR=1.00, CI) compared with acute illness (OR=0.39, CI 0.3-0,5), chronic illness (OR=0.58, CI 0.44-0.76) or other (OR=0.35, CI0.24-0.53); diagnosed with: hypertension (OR=1.25, CI 0.99-1.58); diabetes (OR=1.50, CI 1.10-2.04); depression (OR=1.26, CI0.91-1.75); degenerative joint disease (OR=1.33, CI 0.92-1.93); Ischaemic heart disease (OR=0.92, CI 0.59-1.440; fibrositis /myalgia /arthralgia (OR=2.45, CI1.56-3.82); low back pain (OR=3.19, CI 23.03-4.99); obesity (OR=4.1, CI 2.02-8.35). • This brief advice is recalled by two thirds of patients. • The 10-minute average visit duration and competing demands of primary care outpatient visits raise questions about the feasibility of incorporating longer duration health habit counseling, except among a limited number of high-risk patients at teachable moments.

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
		advice during the outpatient visit.			
Sherman and Hershman 1993 [-]	USA	Quantitative (Chi2 test, stepwise logistic regression (with threshold of 0.15 for entering into the model). 'Confidence intervals were test based'	Internal physicians	To assess how often physicians counsel patients about exercise and to identify which primary care internists infrequently counsel about it.	17% of GPs counseled up to 25% of their patients about exercise; 22% counseled 26-50, 28% counseled 51-75%, and 33% counseled 76-100% of their patients **Perceived barriers – economic** • 55% lack of time was moderately important as a barrier to counseling about exercise. • 22% said re-imbursement is not sufficient for time spent counseling **Perceived barriers - other** • 35% counseling not leading to change in patient's behaviour • 33% counseling about other lifestyle changes being more important • 31% patients not interested in exercise • 28% unsure what is more important in counseling patients about exercise • 11% not convinced exercise is beneficial • 7% stated lifestyle is a matter of personal choice so counseling is inappropriate **Univariate analysis** showed that GPs who were more likely to frequently counsel their patients about exercise were (this result was focussed on hypothetical 55-year old patients, although the pattern of results was reported as consistent across all hypothetical patients): • Spending at least 2 minutes counseling compared with (OR:3.24(CI 95%:1.80 -5.84)) • feeling more successful at getting their patients to begin exercising (OR:22.74(CI 95%:10.95 -47.24)) and continue exercising (OR:14.60(CI 95%:7.46-28.56)) and impact on QOL (OR:8.50(CI 95%:4.49 -16.06)) • thought exercise was more important (OR:5.94(CI 95%:2.94 -11.99)) • not in health maintenance organization ((OR:2.11(CI 95%:0.82 -5.39)) • had slower resting heart beats (OR:2.56(CI 95%:1.41 -4.76)) • exercising more (OR:2.69(CI 95%1.50 -4.85)) • older (OR:1.99(CI 95%:1.11 -3.58)) Based on **multivariate logistic regression**, GPs who were more likely to frequently counsel their patients about exercise were:

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
					• feeling more successful at getting their patients to begin exercising (OR:22.83(CI 95%:8.36 -62.31)) • feeling exercise was more important ((OR:4.86(CI 95%:1.70 -13.91)) • were older ((OR:3.08(CI 95%:1.33 -7.15)) • having slower resting heart beats ((OR:3.45(CI 95%:1.46 -8.18)) • (There was no association with BMI, smoking status or gender).
Swinburn et al 1997 [-]	New Zealand	Qualitative thematic analysis (part of an RCT comparing effectiveness of 'green prescriptions' versus advice alone among sedentary patients which showed an increase in recreational activity from 54-81% after 6 weeks and an average increase in duration of 78 minutes)	GPs	To assess the attitudes and perceptions of GPs towards the practice of writing 'green prescriptions'	The RCT had shown that assessment and prescribing exercise took about 5 mins of the GP's time and in 79% cases walking was prescribed. **Quantifying and prescribing exercise** • GPs had little difficulty discussing exercise and felt it was clearly in their remit and ability. It was not a difficult subject to broach and often was related to patient's medical conditions. They felt a prescription to 'do a bit more' exercise was a natural end point. • Training on benefits and risks of exercise had helped discussions with benefits and harms and was considered to increase their confidence in discussing the subject. • Setting goals with patients to 'get them started' was considered positive, more personally involving of patients and to be like a 'contract' between GP and patient and a key ingredient in achieving exercise targets. • Some did not believe patients would respond and therefore that giving prescriptions was a waste of time. **Time taken** • Time taken (to quantify, discussion and prescribe exercise) was considered the main barrier to wider use of green prescriptions. GPs felt using 'green prescriptions' had 'put them behind schedule'. Therefore they tended to choose quieter times to instigate discussions. • At 5 mins on average the process of providing 'green prescriptions' would always take a large proportion of a GP consultation time, even if the time were cut in half given practice. • Knowing patients and becoming more practiced both contributed to reduced time. • Patients seen for routine follow ups for hypertension were seen as the easiest group to target, whilst patients with heart related diseases were seen as the ones likely to benefit most from exercise advice. • Remuneration (levels not given in paper) reduced the barriers to providing this service.

First author, Date, Quality	Country	Data collection and analysis methods	Population	Focus of paper (aim)	Findings
					• Resources and training provided to GPs were considered of good value. **Perceived value of green prescriptions** • Writing down goals increased weight to the verbal advice. • The 'green prescription' was seen as ' a very high note to end the consultation' and at times was expected by patients who could feel 'cheated' if they didn't receive a piece of paper. • GPs considered it a simple, worthy and natural extension of what they do anyway. • It was considered of most value to the patients with heart disease and diabetes. • The value would be increased with appropriate follow up procedures such as; phone calls, including it in routine follow up appointments e.g. for hypertension (in which case the practice nurse was considered important to involve too); and if it were supported by national media campaigns. • Evidence of effectiveness would increase the value subscribed to such a programme

3.3. Economic barriers and facilitators

The included studies mostly focused on the views of health professionals (n=4) with only two studies also including patients (Patel and Parchman 2011; Podl et al 1999). All studies centred on the views of GPs, with the exceptions of Buchholz and Purath (2007) that considering nurses. As none of the studies identified were conducted in the UK (5 from USA and 1 from New Zealand) findings will only be partial applicable to the UK.

A number economic (time, resources) and non-economic factors (e.g. patient characteristics, exercise profile of provider, reason for visit to GP) were found to be related to the delivery of brief advice on physical activity (see Table 1). This summary focusses only on the two economic factors represented: time and resources, both of which offer explanations for higher and lower rates of provision.

3.3.1. Time

Time was mainly specified as the minutes available or taken for consultations. It was measured using a range of methods including direct observation via audio recording/time keeping (Patel and Parchman 2011; Podl et al 1999), Likert-scale type questionnaires *(*Buchholz and Purath 2007; Sherman and Hershman 1993; Guo et al 2002) and estimated within focus group discussions (Swinburn et al 1997).

There is moderate evidence from 5 cross-sectional studies suggesting a weakly positive correlation between time spent on or available for counseling and the delivery of brief advice for physical activity in primary care regardless of whether provision is by GP or nurse:

- Sherman and Hershman (1993 [−]) found that GPs who spent at least 2 minutes counseling (compared with those who spent less than 2 minutes) were more likely (OR:3.24(CI 95%:1.80-5.84)) to frequently counsel their patients about exercise. However, this was only found in a bivariate and not multivariate analysis;
- Patel and Parchman (2011 [+]) found a small positive association between time spent discussing exercise and length of the visit to the GP (r=0.19, p=0.015);
- Podl et al (1999 [+]) showed that the likelihood of exercise counseling being delivered was higher when length of visit was longer (odds ratio (OR)=1.08);

- Guo et al (2002 [+]) found that although 62% of the family practice residents cited lack of time as a major barrier to counseling it was not a significant predictor in the multivariate regression model;
- Buchholz and Purath (2007[+]) showed while less than half of the nurse practitioners cited lack of time as a barrier to brief advice, it was the most frequently cited barrier.

Qualitative research from focus group discussions conducted by Swinburn et al (1997[-]) showed that time taken (to quantify, discuss and prescribe exercise) was considered the main barrier to wider use of brief advice on physical activity. GPs felt giving brief advice 'put them behind schedule' and hence they tended to choose quieter times to instigate discussions. At 5 minutes on average, GPs thought brief advice took a large proportion of consultation time, even if the time were cut in half given practice. Knowing the patients and becoming more practiced, however, contributed to reduced time.

3.3.2. Resources

The resource issue most frequently reported (in four papers) was re-imbursement or remuneration. Views on reimbursement were elicited through Likert-scale type questionnaires (Sherman and Hershman 1993; Buchholz and Purath 2007; Guo et al 2002) or focus groups (Swinburn et al 1997). However, insufficient information was provided on what existing reimbursement levels constituted in terms of size, frequency or mechanism. For example, knowing that 10% cited 'no reimbursement' as a barrier (Buchholz and Purath 2007) does not distinguish whether 10% received no reimbursement, or whether no-one received reimbursement and only 10% thought this was a barrier or even whether the 10% who received no reimbursement just 'missed out' (for example by not achieving a binary target). Additional it does not indicate what levels of reimbursement did exist.

Weak evidence from 3 cross sectional studies indicates that perceived inadequate financial reimbursement is positively, but very weakly, related to the delivery of brief advice for physical activity in the primary care irrespective of whether counseling is provided by nurse or GP: Guo et al 2002 ([+]) reported that while 20% of GPs considered lack of financial re-imbursement for clinical preventive practices a major barrier to brief advice, 29% thought it was a minor barrier. Similarly, both Sherman and Hershman (1993 [−]), and Buchholz and Purath (2007[+]) in their descriptive quantitative analysis found that 22% and 10% (respectively) stated that inadequate reimbursement is a hindrance to the delivery of brief advice. However, neither Sherman and Hershman (1993) nor Guo et al (2002) reported an

association within their uni- or multi-variate analyses. Focus group discussions with GPs (Swinburn et al (1997[−]) provided qualitative evidence that remuneration was considered to have encouraged the delivery of counseling on exercise. However, despite 3 levels of remuneration being set (for recruitment, delivery and attendance of focus group discussion) no details such as the fee or variation in total amounts received were given in paper.

Two other papers considered the impact of resources other than financial payments (Buchholz and Purath (2007[+] and Guo et al 2002 ([+]). Buchholz and Purath (2007) raise the interesting point about the quality of human resources in terms of having relevant knowledge and indicated that those with greater knowledge (gleaned by 37% from self-study and by 43% from attending conferences) were more confident in assessing and counseling for physical activity. Qualitative evidence from Swinburn et al (1997) also suggests that GPs perceived training on harms and benefits of physical activity to increase their confidence in handling discussions of activity. However, these analyses remained at a descriptive level and provide insufficient evidence of association.

There is evidence from one good study (Guo et al 2002 ([+]) that the use of resources is statistically significantly related to the frequency of physical activity advice given to asymptomatic adult patients (whether obese or not). However, the definition of use of resources is difficult to interpret as it is a summary of a likert-based conglomeration of self-reported inputs including: how often residents used: 1) summary lists or flowcharts of preventive services in patient charts; 2) a computerized tracking or prompting system; 3) reminder notices or stickers on patient charts; 4) reminder notices or postcards mailed to patients; 5) prescription pads for preventive services; 6) patient-held mini records for preventive services; 7) nursing or office staff to track care; 8) pamphlets or brochures; 9) health risk appraisal instruments; and 10) counseling by nursing or other office staff.

3.4. Quality assessment

The studies were spread across 2 levels of quality. The issues with quality primarily bordered on inadequate exploration of sample selection bias and insufficient adjustment of potential confounders. Table 2 describes the quality grades given to the studies and the main reasons behind the grades.

Table 2: Quality assessment

Studies	Quality of evidence	Reason(s)
Guo et al 2002	+	(i)The sample used could have introduced bias given that they were funded to hold a similar programme and hence could have been more enthusiastic or given social desirable responses (ii)The main independent variable is 'perceived effectiveness' which is not objectively measured and it doesn't differentiate between confidence of physicians in their own abilities and belief patients will follow advice.
Buchholz and Purath 2007	-	Major problems with bias due to low response rate to one off survey and only one group providing care being targeted with no confounders controlled for.
Patel and Parchman 2011	-	(i)Multiple explanatory variables were used although it appears other important confounders had been left . Could have included ethnicity, physician characteristics, for example. (ii)Unclear that sample size was large enough for the ~8 independent variables used
Podl et al 1999	+	Good study especially for range in types of data collected. However issues exist around: selection of explanatory variables, especially physician attributes; lack of model diagnostics; sample selection bias; and representativeness of sample.
Sherman and Hershman 1993	-	(i)Selection bias possible given only 61% responded and would expect these to be physicians who more often counsel exercise. The study might have considered testing for this bias using registry data e.g. type of practices. (ii)Range of explanators and some adjusting for potential confounders (of which some are objectively assessed). (iii)Self reported outcomes.
Swinburn et al 1997	-	This was a very short paper for reporting qualitative research. More space may have helped address some of the issues raised. (i) Insufficient consideration of non-response bias (ii) Not clear why alternative methods such as in-depth interviews were not used. (iii) No comparative analysis presented. (iv) Little referencing to text extracts (v) Lack of details on coding and underlying theoretical frame

4. Discussion

Economic barriers and facilitators were included in six papers. However, it is notable that not only was a theoretical base rarely referred to, there was no reference to economic theory in any paper. Exposition of economic theories to underpin analysis might have included for example; consumer choice where individuals or households choose to spend time and/or money to engage in physical activity to maximise their utility given time and budget constraints (e.g. Crawley 2004, Humphreys and Ruseski 2006, Brown and Roberts J 2011, Anokye et al 2012) and account, for example for perceptions of life time risk in consumption decisions for food and exercise (Levy 2002) or the concept of a physiological maximum (e.g. Bolin and Lindgren 2012) ; the value of changing norm-based reference points that help frame individual decision-making (Zimmerman 2009); the role of technological change and other supply factors that may affect the demand for physical activity (e.g. Morris and Gravelle 2008); models that develop from Grossman's demand for health production (Grossman 1972) as stocks of health capital which can use healthy weight as a measure and consider the production of health and examine the effects of time use, purchased inputs and household characteristics on the production of a healthy weight (e.g. Kolodinsky and Goldstein 2011, Humphreys et al 2011); or models of provider behaviour accounting for different payment mechanisms (e.g. McGuire 2000) and theory of supplied induced demand (e.g. Grytten J., Sørensen R. 2001)

One reason for the lack of consumer based theories is that, while patients were occasionally approached and their 'characteristics' used as explanatory variable, all evaluations were only undertaken from the provider perspective. Thus patient/participant characteristics are only used to explain provider behaviour. No account was taken of whether patients would be likely to attend advice if offered the opportunity or engage in physical activity once given brief advice. These conclusions are comparable to Campbell et al (2012), who concluded that the 'main barrier practitioners cited as affecting their ability to discuss and/or prescribing physical activity was a lack of time in the consultation' and that the evidence base on barriers and facilitators affecting brief advice for physical activity was 'strongly skewed towards the views of providers'.

The papers reviewed here suggests that time constraints are the main economic barrier to the delivery of brief advice for physical activity in primary. There was only weak quality slight evidence, pointing to insufficient reimbursement as a potential barrier to delivery of brief advice.

However, a number of issues justify some caution in interpreting the findings. Most data reviewed to assess the barriers or facilitators were based on self-reports (via Likert type scales) or observational cross-sectional data. Because physical activity is a high priority on public health agendas, health professionals may have stronger incentives to provide social desirable responses, which challenges the stability of responses observed (Brown et al 2009). Related to this, is the real potential of considerable sample selection bias (some samples were funded to provide brief advice and then provide views and some samples were high selected in practice given the very low response rates) (Guo et al 2002; Buchholz and Purath 2007; Sherman and Hershman 1993) and inadequate consideration of potential context bias in the qualitative data collection/analysis (i.e. focus group discussions of GPs working in the same area who had participated in an RCT of brief advice) (Swinburn et al 1997). Using observational cross sectional data might be common practice in estimations of impact of time or money inputs (Deaton 1987, 1990), but longitudinal data would be more useful because it is relatively better equipped to adjust for temporal trends in confounding variables (e.g. experience of practitioners) that might impact on delivery.

A second issue related to the measurement of financial barriers. The papers tended to capture financial barriers through reimbursement but there was lack of information on what it means. For example, no information was provided on what the reimbursement levels are. This makes it impossible to interpret the findings as there is little basis for comparison between studies and no indication of the amount of compensation or structure of remuneration required to encourage delivery of brief advice. As no studies derive from UK populations, this compounds difficulties as incentive mechanisms facing primary care providers are differ substantially in the USA and New Zealand (MacDonald and Roland 2009, Schoen et al 2006).

Thirdly, the inadequate coverage of preferences of patients is a concern because the promotion of brief advice for physical activity hinges on both their uptake and delivery. As NICE (2006a) acknowledges, there are problems with public health interventions, particularly for physical activity, as they don't incorporate the preferences of individuals given the gap in evidence on what factors may have improved the uptake of such interventions. A recent study (Anokye et al 2011) suggested that the benefits that people expect to derive from sports and exercise participation, for example, may offset the costs of doing it and the net effect may be increased rates of participation in physical activity. This *may* mean that if brief advice to promote physical activity, given delivery, is linked to information that helps people appreciate the perceived benefits more, it could be more effective and consequently cost-

effective than the one without it. Evidence is required to inform this moot point and to design the information carefully.

Six papers were identified for full review using a comprehensive, systematic search and selection process agreed with NICE. Whilst from the start we had aimed just to focus on economic variables[5], we are aware that some publications with relevant date are not included. The accompanying review (Campbell et al 2012), which will also inform development of revised guidance on brief interventions (PH2), identified 20 papers[6] as relevant to either 'time resources and conflicting priorities' or 'financial incentives'. Three of these overlap with our six papers (Buchholz and Puraz 2007, Patel and Parchman 2011 and Swinburn et al 1997) and three were in addition to those found by Campbell et al (2012). We reviewed the reasons for differences and found the following:

- The searches on Medline and Embase were virtually identical except that this review placed an additional restriction at the end of the search that focused only on economic variables listed in the title or abstract[7].
- Different databases were used: Campbell et al 2012 focused on several databases with psychological journals and this review focused on several databases with economics papers.
- There is some ambiguity surrounding 2 papers in Campbell et al (2012) as 2 papers (Albright et al 2000 and Bull et al 2010) were listed in both included and excluded papers.
- One paper (Douglas (a) et al 2006) was rejected in the review of economic evaluations as it was a barriers paper. Unfortunately it was not found using the search terms for the barriers review herein.
- None of the abstracts from the remaining 14 papers were selected as abstracts for our initial review.

The main differences in methods between this review and Campbell et al (2012) are: the restriction of Medline and Embase searches to a list of economic variables and the use of different data bases, with Campbell et al more focused on psychology journals and this review focused on economic papers. We recommend that PHIAC review the two reports

[5] Not only given the focus but also to avoid duplication with the accompanying review by Campbell et al (1202)
[6] Seen in an early draft
[7] economic$ or socio?economic$ or cost$ or price$ or pricing$ or budget$ or money or cash or expen$ or financ$ or valu$ or voucher$ or gift$ or time or fiscal or monet$) adj5 (demand$ or preferenc$ or choice$ or determin$ or factor$ or correlate$ or facilitator$ or barrier$ or hindrance$ or hinder$ or block$ or obstacle$ or restrict$ or restrain$ or inhibit$ or impede$ or delay$ or constrain$ or refus$ or incentive$ or access)).ti,ab.

together as a whole and that in the future NICE consider ensuring economic databases and economic questions are added to the barriers and facilitators reviews.

In spite of the range of limitations, the findings from this literature review indicate the potential for generating policy relevant information on supply-side constraints for brief advice for physical activity in primary care. For example, reducing the amount of time taken for brief advice through improving GPs knowledge about patients or training GPs more in provision of brief advice might promote delivery (Swinburn et al 1997). However, it is recommended that further analysis addressing the above limitations are undertaken to provide a more robust evidence base. It is also important that future analysis consider economic theories of both supply of and demand for services.

5. Summary Evidence Statements

1. Weak quality evidence from 3 cross sectional studies indicates that perceived inadequate financial reimbursement is positively, but very weakly, related to the delivery of brief advice for physical activity in the primary care irrespective of whether counseling is provided by nurse or GP

2. There is no interpretable policy relevant evidence on the role of remuneration for brief advice for physical activity

3. There is no interpretable evidence on the role of other resources in the delivery of brief advice for physical activity

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NICE (2006a) *Rapid review of the economic evidence of physical activity interventions*. MATRIX available at http://www.matrixknowledge.com/wp content/uploads/physical_activity_economic_review_april20061.pdf

NICE (2006b) *Modelling the cost-effectiveness of physical activity interventions* MATRIX available at http://www.matrixknowledge.com/wpcontent/uploads/physical_activity_economic_modelling_report_april20061.pdf

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7. Appendices

7.1. Appendix A: Literature search strategies

MEDLINE

Economic Barriers

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

1 patient education as topic/ (63551)

2 health education/ (48771)

3 health literacy/ (648)

4 directive counseling/ or counseling/ (25881)

5 pamphlets/ (2829)

6 (patient$ education or health education or health literacy).ti,ab. (30640)

7 (patient$ adj2 (counseling or counseling or advice)).ti,ab. (5036)

8 (patient$ adj2 (leaflet$ or flyer$ or information or pamphlet$ or booklet$ or poster$)).ti,ab. (16485)

9 ((brief or opportunist$ or concise or short or direct or lifestyle or written or oral or verbal or personali?ed or individuali?ed) adj2 (advice or counseling or counseling or negotiation$ or guidance or discussion$ or encouragement or intervention$ or program$ or meeting$ or session$)).ti,ab. (17519)

10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 (181534)

11 exp exercise/ or Sports/ or physical fitness/ or fitness centers/ (121978)

12 exp running/ or Swimming/ or walking/ or baseball/ or basketball/ or bicycling/ or boxing/ or football/ or golf/ or gymnastics/ or hockey/ or yoga/ or Tai Ji/ or dancing/ or gardening/ or hobbies/ or leisure activities/ (60003)

13 (Physical activit$ or exercise$ or fitness).ti,ab. (227330)

14 ((promot$ or uptake$ or encourag$ or increas$ or start$ or adher$) adj2 (physical activit$ or aerobics or circuits or swimming or aqua or tai chi or tai ji or jogging or running or

bicycling or biking or yoga or pilates or football or walk$ or sport$ or gym$ or dancing or gardening)).ti,ab. (9479)

15 ((barrier$ or hinder$ or block$ or obstacle$ or restrict$ or restrain$ or inhibit$ or impede$ or delay$ or constrain$ or hindrance or refus$) adj2 (physical activit$ or aerobics or circuits or swimming or aqua or tai chi or tai ji or jogging or running or bicycling or biking or yoga or pilates or football or walk$ or sport$ or gym$ or dancing or gardening)).ti,ab. (2205)

16 ((sport$ or fitness or leisure) adj2 (centre$ or center$ or facilit$)).ti,ab. (694)

17 ((promot$ or uptake$ or encourag$ or increas$ or start$ or adher$) adj2 stair$).ti,ab. (128)

18 (Keep$ fit or fitness class$ or brisk walk$).ti,ab. (433)

19 ((Fitness or sport$ or keep fit) adj2 (class$ or session$ or lesson$)).ti,ab. (337)

20 ((decreas$ or reduc$ or discourag$) adj2 (sedentary or deskbound)).ti,ab. (277)

21 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 (303803)

22 Primary Health Care/ (46568)

23 Primary prevention/ (12383)

24 Physicians, Family/ or general practitioners/ or physicians primary care/ (15293)

25 exp general Practice/ (59413)

26 primary care nursing/ (34)

27 Public health nursing/ (9398)

28 Family nursing/ (862)

29 Physician-Patient Relations/ (54664)

30 (practice nurse$ or primary care or gp$ or general practitioner$ or family physician$ or health visitor$ or pharmacist$ or health trainer$ or primary healthcare or primary health care).ti,ab. (214247)

31 (gp$ adj2 (surger$ or care or service$ or centre$ or clinic$ or facilit$)).ti,ab. (1664)

32 ((family or general or physician$ or doctor$) adj practice$).ti,ab. (38341)

33 exp Medical records systems, computerized/ (20492)

34 Quality indicators, health care/ (8024)

35 (annual health check$ or patient record$ or quality outcome$ framework or qof or infrastructure or information system$ or validated questionnaire$ or care pathway$).ti,ab. (37066)

36 GPPAQ.ti,ab. (0)

37 General Practice Physical Activity Questionnaire$.ti,ab. (0)

38 or/22-37 (401254)

39 10 and 21 and 38 (1595)

40 limit 39 to (english language and humans and yr="1990 -Current") (1351)

41 ((economic$ or socio?economic$ or cost$ or price$ or pricing$ or budget$ or money or cash or expen$ or financ$ or valu$ or voucher$ or gift$ or time or fiscal or monet$) adj5 (demand$ or preferenc$ or choice$ or determin$ or factor$ or correlate$ or facilitator$ or barrier$ or hindrance$ or hinder$ or block$ or obstacle$ or restrict$ or restrain$ or inhibit$ or impede$ or delay$ or constrain$ or refus$ or incentive$ or access)).ti,ab. (225302)

42 40 and 41 (54)

Database Name	Medline
Database host	OVID
Database coverage dates	1946-current
Subtopic of search	Barriers
Searcher	T Jones
Search date	16/03/2012
Search strategy checked by	P Levay
Number of records retrieved	54
Name of Endnote library	NICE Physical Activity.enl
Number of records loaded into Endnote	54
Reference numbers of records in Endnote library	225-278
Number of records after de-duplication in Endnote library	53

EMBASE

Economic Barriers

S1 mjemb.Exact("patient education")

S2 mjemb.Exact("health education")

S3 mjemb.Exact("health literacy")

S4 mjemb.Exact("counseling")

S5 mjemb.Exact("publication")

S6 AB,TI(“patient* education” or “health education” or “health literacy”)

S7 AB,TI(patient* NEAR/2 (counseling or counseling or advice))

S8 AB,TI(patient* NEAR/2 (leaflet* or flyer* or information or pamphlet* or booklet* or poster*))

S9 AB,TI((brief or opportunist* or concise or short or direct or lifestyle or written or oral or verbal or personali?ed or individuali?ed) NEAR/2 (advice or counseling or counseling or negotiation* or guidance or discussion* or encouragement or intervention* or program* or meeting* or session*))

S10 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9

S11 MJEMB.EXACT.EXPLODE("exercise") or MJEMB.EXACT.EXPLODE("sport") or MJEMB.EXACT.EXPLODE("fitness") or MJEMB.EXACT.EXPLODE("health center")

S12 MJEMB.EXACT(running or swimming or walking or baseball or basketball or bicycle or boxing or football or "physical education" or yoga or "Tai Chi" or dancing or gardening or leisure)

S13 AB,TI(“physical activit*” or exercise* or fitness)

S14 AB,TI((promot* or uptake* or encourag* or increas* or start* or adher*) NEAR/2 ("physical activit*" or aerobics or circuits or swimming or aqua or "tai chi" or "tai ji" or jogging or running or bicycling or biking or yoga or pilates or football or walk* or sport* or gym* or dancing or gardening))

S15 AB,TI((barrier* or hinder* or block* or obstacle* or restrict* or restrain* or inhibit* or impede* or delay* or constrain* or hindrance or refus*) NEAR/2 ("physical activit*" or aerobics or circuits or swimming or aqua or "tai chi" or "tai ji" or jogging or running or bicycling or biking or yoga or pilates or football or walk* or sport* or gym* or dancing or gardening))

S16 AB,TI((sport* or fitness or leisure) NEAR/2 (centre* or center* or facilit*))

S17 AB,TI((promot* or uptake* or encourag* or increas* or start* or adher*) NEAR/2 stair*)

S18 AB,TI("Keep* fit" or "fitness class*" or "brisk walk*")

S19 AB,TI((Fitness or sport*) NEAR/2 (class* or session* or lesson*))

S20 AB,TI((decreas* or reduc* or discourag*) NEAR/2 (sedentary or deskbound))

S21 S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20

S22 mjemb.Exact(“primary health care”)

S23 mjemb.Exact(“primary prevention”)

S24 mjemb.Exact("general practitioner" or "primary medical care")

S25 mjemb.Exact("doctor patient relation")

S26 mjemb.Exact("general practice")

S27 mjemb.Exact("community health nursing")

S28 mjemb.Exact("family nursing")

S29 mjemb.Exact("professional practice")

S30 mjemb.Exact(pharmacy)

S31 AB,TI("practice nurse*" or "primary care" or "primary healthcare" or "primary health care" or gp* or "general practitioner*" or "family physician*" or "health visitor*" or pharmacist* or "health trainer*")

S32 AB,TI((family or general or physician* or doctor*) NEAR/ practice*)

S33 mjemb.Exact("electronic medical record")

S34 mjemb.Exact("health care quality")

S35 AB,TI("annual health check*" or "patient record*" or "quality outcome* framework" or qof or infrastructure or "information system*" or "validated questionnaire*" or "care pathway*" or GPPAQ)

S36 S22 or S23 or S24 or S25 or S26 or S27 or S28 or S29 or S30 or S31 or S32 or S33 or S34 or S35

S37 S10 and S21 and S36

S38 (S10 and S21 and S36) AND la.exact("ENG")

S39 AB,TI((economic* or socio?economic* or cost* or price* or pricing* or budget* or money or cash or expen* or finance* or valu* or voucher* or gift* or time or fiscal or monet*) NEAR/5 (demand* or preferenc* or choice* or determin* or factor* or correlate* or facilitator* or

barrier* or hindrance* or hinder* or block* or obstacle* or restrict* or restrain* or inhibit* or impede* or delay* or constrain* or refus* or incentive* or access)).

S40 DTYPE(letter)

S41 DTYPE(editorial)

S42 DTYPE(note)

S43 S40 or S41 or S42

S44 S39 not S43

S45 AB,TI(metabolic NEAR cost)

S46 AB,TI((energy or oxygen) NEAR cost)

S47 AB,TI((energy or oxygen) NEAR expenditure)

S48 S45 or S46 or S47

S49 S44 not S48

S50 EMB.EXACT.EXPLODE("animal")

S51 EMB.EXACT.EXPLODE("animal experiment")

S52 EMB.EXACT.EXPLODE("nonhuman")

S53 AB,SU,TI(rat or rats or mouse or mice or hamster or hamsters or animal or animals or dog or dogs or cat or cats or bovine or sheep)

S54 S50 or S51 or S52 or S53

S55 EMB.EXACT.EXPLODE("human")

S56 EMB.EXACT.EXPLODE("human experiment")

S57 S55 or S56

S58 S54 not (S54 and S57)

S59 S49 not S58

S60 S38 and S59

S61 S60 AND pd(19900101-20121231))

Database Name	Embase and Embase Alert
Database host	ProQuest Dialog
Database coverage dates	1947-current
Subtopic of search	Barriers
Searcher	T Jones
Search date	19/04/2012
Search strategy checked by	P Levay
Number of records retrieved	81
Name of Endnote library	NICE Physical Activity.enl
Number of records loaded into Endnote	81
Reference numbers of records in Endnote library	749-830
Number of records after de-duplication in Endnote library	81

NHS EED

All dates

(physical activity) or (physical activities) or leisure or sport or sports or fitness or exercise or exercising

and

(patient education) or (patients education) or (health education) or (health literacy) or advice or counseling or counseling or negotiation or negotiations or guidance or discussion or discussions or encouragement or intervention or interventions or program or programme or programs or programmes or meeting or meetings or session or sessions

and

(practice nurse) or (practice nurses) or (primary care) or (primary healthcare) or (primary health care) or gp or (general practitioner) or (general practitioners) or (family physician) or (family physicians) or (health visitor) or (health visitors) or pharmacist or pharmacists or (health trainer) or (health trainers) or ((family or general or physician or doctor or physicians

or doctors) and (practice or practices)) or (annual health check) or (patient record) or (quality outcome framework) or (annual health checks) or (patient records) or (quality outcomes framework) or qof or infrastructure or (information system) or (validated questionnaire) or (care pathway) or (information systems) or (validated questionnaires) or (care pathways) or GPPAQ

Database Name	*NHS EED*
Database host	NIHR Centre for Reviews and Dissemination
Database coverage dates	All dates to date of search
Subtopic of search	Economic evaluation and barriers
Searcher	THJones
Search date	10/05/2012
Search strategy checked by	N Anokye
Number of records retrieved	323
Name of Endnote library	NICE Physical Activity.enl
Number of records loaded into Endnote	323
Reference numbers of records in Endnote library	831-1153
Number of records after de-duplication in Endnote library	323

OHE HEED search strategy

Abstract search, all dates

(physical activity) or (physical activities) OR sport OR sports OR leisure OR exercise OR exercises OR fitness

Database Name	*OHE EED*
Database host	Wiley Online Library
Database coverage dates	All dates
Subtopic of search	Economic evaluation and barriers

Searcher	T Jones
Search date	18/05/2012
Search strategy checked by	N Anokye
Number of records retrieved	149
Name of Endnote library	NICE Physical Activity.enl
Number of records loaded into Endnote	149
Reference numbers of records in Endnote library	1821-1970
Number of records after de-duplication in Endnote library	149

Econlit

Economic Barriers

((physical activit*) or sport* or fitness* or exercis*)

The papers identified were transferred to Endnote where further search terms were added:

and (demand* OR preferenc* OR determin* OR factor* OR correlate* OR facilitator* OR barrier* OR hindrance* OR hinder* OR block* OR obstacle* OR restrain* OR inhibit* OR impede* OR delay* OR constrain* OR refus* OR incentive*) and (health or education or welfare) 618

Database Name	Econlit
Database host	Econlit fro AEA members accessed via Vivisimo Search Software
Database coverage dates	1886-current
Subtopic of search	Barriers
Searcher	T Jones
Search date	24/04/2012
Search strategy checked by	N Anokye
Number of records retrieved	618

Name of Endnote library	NICE Physical Activity.enl
Number of records loaded into Endnote	618
Reference numbers of records in Endnote library	1154-1771
Number of records after de-duplication in Endnote library	618

For some of the databases that were searched no efficient method of transferring the papers identified to an EndNote (or similar) database for management was available to us, therefore the papers identified from these searches were printed for review if possible or, in the case of Econpapers where a printed list of identified references was not available to us, the papers were individually studied on-line for the first review stage. The papers identified from these databases were therefore not included in the automatic deletion of duplicates step that had been applied to the databases listed above thus inflating the apparent total number of individual papers identified. The searches of these databases are detailed below.

CEA Registry Harvard

Search strategy: “physical activity”, leisure, sport, exercise, fitness. All terms searched individually using the ‘simple search’.

a. Search term “physical activity” 14 results
b. Leisure - None found
c. Sport 17 results
e. Exercise 59 results
f. Fitness 1 results

Search conducted 26/03/2012 identified 91 papers (T Jones)

Econpapers

Search strategy - Economic barriers

Limits: JEL-code I,

Health, Education, and Welfare among working papers and articles

((physical activit*) or sport* or fitness* or exercis*) and (demand* OR preferenc* OR determin* OR factor* OR correlate* OR facilitator* OR barrier* OR hindrance* OR

hinder* OR block* OR obstacle* OR restrain* OR inhibit* OR impede* OR delay* OR constrain* OR refus* OR incentive*)

Search conducted 24/04/2012 identified 235 papers (T Jones)

NICE publications

Search terms “Physical activity” applied separately to each section of the database

a. (Health Development Agency) Number of papers found = 62
b. (Health Development Agency) Number of papers found = 1
c. (Health Development Agency) Number of papers found = 26

Search conducted 27/03/2012 identified 89 papers (T Jones)

NCCHTA

Carried out as: Site search, 30/04/2012. Results indexed by relevance

Economic Barriers

Your search for ((physical activit*) or sport* or fitness* or exercis*) and (determin* or factor* or preferenc* or delay* or block* or demand* or inhibit* or constrain* or correlat* or barrier* or refus* or restrain* or impede* or obstacle*) matched 299 Documents.

Your search for ((physical activit*) or sport* or fitness* or exercis*) and (facilitator* OR hindrance* OR hinder* OR incentive*) matched 40 Documents. (T Jones)

Public health Interventions Cost effectiveness database

Search strategy - PH Area of “Physical activity”, Target Group of “Adults”

Results - Economic evaluations and Economic barriers

Search conducted 30/04/2012 identified 30 papers (T Jones)

Web site search strategies

1. Department of Health

The following search terms were used:
"physical activit*" or leisure* or sport* or fitness* or exercis*

2. Search conducted 1/05/2012 identified 141 papers (N Anokye)

3.

4. Welsh Assembly Government

The following search terms were used:
'physical activity'

Limits: research and publications

Search conducted 1/05/2012 identified 30 papers (N Anokye)

5. British Heart Foundation National Centre for Physical Activity and Health

The following search terms were used:
'physical activity'.

Search conducted 1/05/2012 identified 176 papers (N Anokye).

HEALTH ENGLAND

As the website did not offer a search engine, papers were identified by looking at all available publications.

Search conducted 12/04/12 identified 13 papers (N Anokye)

MATRIX

As the website did not offer a search engine, papers were identified by looking at all available publications.

Search conducted 12/04/12 identified 42 papers (N Anokye)

National obesity observatory

("physical activit*" or leisure* or sport* or fitness* or exercis*) and ("patient* education" or "health education" or "health literacy" or advice or counseling or counseling or negotiation* or guidance or discussion* or encouragement or intervention* or program* or meeting* or session*) and ("practice nurse*" or "primary care" or "primary healthcare" or "primary health care" or gp* or "general practitioner*" or "family physician*" or "health visitor*" or pharmacist* or "health trainer*" or ((family or general or physician* or doctor*) and practice*) or "annual health check*" or "patient record*" or "quality outcome* framework" or qof or infrastructure or "information system*" or "validated questionnaire*" or "care pathway*" or GPPAQ)

Search conducted 1/05/12 identified 334 papers (N Anokye)

Partner for prevention

As the website did not offer a search engine, papers were identified by looking at all available publications.

Search conducted 30/04/12 identified 19 papers (N Anokye)

Scottish Government

Barriers

The following search terms were used:
Subject of 'sport',
Limit: publications
demand OR preference OR determination OR factor OR correlate OR facilitator OR barrier OR hindrance OR hinder OR block OR obstacle OR restrain OR inhibit OR impede OR delay OR constrain OR refuse OR incentive

Search conducted 10/05/12 identified 37 papers (N Anokye)

7.2. Appendix B: Data extraction sheets for included studies

BLOCK 1: BACKGROUND INFORMATION OF STUDY	
Reviewed by	JFR & NA
Date of review	26.05.2012
Title	Nutrition and Physical Activity Counseling Practices of Family Practice Residents
Author(s)	Guo et al
Aim of study	The purposes of this study were to examine the reported assessment and counseling practices for nutrition and physical activity among family practice residents and to explore possible determinants of these behaviors.
Year of publication	2002
Origin of study (country, including developer or developing; public of private health system)	4 clinics from Texas Department of Health, USA
Source of funding for study (gov (NHS), voluntary/charity, pharmaceutical) *Note anything about role of funders*	Data were collected under a contract from the Texas Department of Health to the second author.

BLOCK 2: SAMPLE/INTERVENTION	
Characteristics of participants	
Gender	Male 65.5%
Age	Not given
Ethnicity	Not given
Other details given	• Residency year = 1st: 35.5%, 2nd: 33.6%, 3rd: 30.9% • Patient Load in past 30 days: No patients 154.2 (SD112.6); % new patients 24.2% (SD 21%)

	• Ages of patients sees in past 30 days: Number >18yrs 67.2%, 13-17 yrs 12.4%, 0-12yrs 22.5% • Type of visits in past 30 days: check up/maintenance 20.2%; follow-up/chronic disease 18.6%; treatment of acute illness 34.2% • Year completed MD: 1979 - 1.8%; 1987-1989 – 2.7%; 1992-1997 – 95.4%
Method of allocation to intervention/control (Describe how the selected individuals/clusters were allocated to receive either intervention or control. How was confounding minimised?) OR methods of selecting sample	Observational study
Sample size Total n = Intervention n = Control n =	110 family practice residents (response rate 93.2%)
Description of intervention	
Design (what delivered, by whom)	received funding from the Texas Department of Health (TDH) for the future implementation of the Put Prevention into Practice (PPIP) office system program.
Setting (e.g. primary school, community centre etc)	Residents office, primary care.
Location (urban / rural)	Texas, rurality not stated.
Duration (how often, how long for)	Advice during course of visits to family practitioner
Exercise program	The physical activity counseling included ‘asking patients about exercise habits, determining the patient's level of physical activity, encouraging patients to increase the physical activity in their daily lives, assisting patients to develop medically safe, enjoyable, convenient, structured exercise plans, and, finally, involving nursing and office staff in monitoring, providing support, and routinely following up with patients.’
Description of comparator/control group	
Design (what delivered, by whom)	Na
Setting (e.g. primary school, community centre etc)	Na
Location (urban / rural)	Na

Duration (how often, how long for)	Na

BLOCK 3: ANALYSIS	
Source of data	A questionnaire administered in December 1997 to January 1998. Few details are given, although the 7-point scales on measurement and counseling during visits were subject to testing of internal validity using Cronbach's Alpha (0.87)). Tables are presented on 'perceived effectiveness of change patients' exercise behaviour, resident's physical (and nutrition) counseling, residents physical activity counseling during past 30 days. Use of an office system was assessed through summation of ten items. The residents were asked how often they used: 1) summary lists or flowcharts of preventive services in patient charts; 2) a computerized tracking or prompting system; 3) reminder notices or stickers on patient charts; 4) reminder notices or postcards mailed to patients; 5) prescription pads for preventive services; 6) patient-held minirecords for preventive services; 7) nursing or office staff to track care; 8) pamphlets or brochures; 9) health risk appraisal instruments; and 10) counseling by nursing or other office staff. Items were measured on a three-point Likert scale (1 = never or don't know, 2 = sometimes, 3 = routinely).
Type of analysis (qualitative/quantitative)	Quantitative: Descriptive statistics & hierarchical linear regression model
What theoretical approach/framework was used?	No specific theoretical approach was elucidated other than 'perceived effectiveness', 'attitude regarding behavioural counseling' and 'use of resources'. Also evidential links between physical activity and disease are provided in introduction, including citing data form a 25 year cohort study linking exercise to various cancers.
Model used	3 Hierarchical linear regressions for physical activity
Model diagnostics	R^2 (Adjusted R^2); f value
What primary outcome/dependent variable was reported (how were they specified in practice)?	Frequency of physical activity counseling in previous 30 days (This was operationalised in 3 ways a) frequency of assessment of exercise b) advising an asymptomatic adult patient

(note whether these were validated or not and whether objective or subjective)	c) advising an asymptomatic an asymptomatic obese adult patient All 3 were assessed via a summative score of 3 via items measured in a scale ranging from 3 to 21. Reliability was measured using Cronbach alpha (and it was found to be 0.87) .
What secondary outcomes/independent variable were reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Regressed on: -'Perceived effectiveness to change patients' exercise and dietary behaviors (operationalized in each case as an item measured on a four-point Likert scale from 1 (minimally effective) to 4 (extremely effective)) -'Attitude regarding behavioral counseling (operationalized as "physicians should do more counseling about lifestyle and behavior than they currently do" and measured on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree)') -Use of resources described as 'Use of an office system' assessed through summation of ten items in terms of how often residents used: 1) summary lists or flowcharts of preventive services in patient charts; 2) a computerized tracking or prompting system; 3) reminder notices or stickers on patient charts; 4) reminder notices or postcards mailed to patients; 5) prescription pads for preventive services; 6) patient-held minirecords for preventive services; 7) nursing or office staff to track care; 8) pamphlets or brochures; 9) health risk appraisal instruments; and 10) counseling by nursing or other office staff. Items were measured on a three-point Likert scale (1 = never or don't know, 2 = sometimes, 3 = routinely)."

BLOCK 4: RESULTS								
Main results			Never 0%	Rarely (1-20%)	Sometimes (21-40%)	About half the time (41-60%)	Often (61-80%)	Usually or Always (81-100%)
	How often did you advise an asymptomatic adult to exercise regularly		0	12.0	20.4	24.1	21.3	22.2
	How often did you advise	Exercise regularly	0	2.8	20.4	18.5	19.4	38.9

and asymptomatic obese patient to:	Set specific exercise goals in terms of frequency duration	5.6	16.7	20.4	16.7	15.7	25
	Suggest specific exercises	6.5	15.7	25	13	12	27.8
Assessment of physical activity during health maintenance visits in past 30 days		0.9	11.1	24.1	20.4	24.1	19.4

Resource related reasons given for barriers to delivery of preventive services for diet and nutrition

Resource related reasons given	A major barrier (%)	Minor barrier (%)	Not a barrier (%)	Not sure, don't know (%)
Lack of time	61.8	30.9	6.4	0.9
Lack of availability health educators	33.9	48.6	12.8	4.6
Lack of systems for tracking and promoting preventive health	33.9	46.8	15.6	3.7
Lack of financial re-imbursement for clinical preventive practices	20	29.1	38.2	12.8
Lack of effective patient education materials	17.6	58.3	21.3	2.8

Family practice residents' perceived self- effectiveness of advice for physical activity:
Minimally effective = 18.3%
Somewhat effective = 61.5%
Quite effective = 16.5%

	Extremely effective = 3.7% **Hierarchical regressions** • Use of resources was positively associated with advising on asymptomatic adult patient (cf=0.08) and advising on asymptomatic obese adult patient (coefficient=0.30) • Perceived effectiveness was positively associated with advising patients (coefficient =0.50 to 1.59) and assessment of exercise (coefficient =0.58) • Attitude regarding behavioural counseling was positively related to assessment of exercise (coefficient =0.57). • Perceived barriers was not a significant predictor in the multivariate regression although 62% of the family practice residents cited lack of time as a major barrier to counseling (both diet and exercise) whilst 20% noted lack of financial reimbursement for clinical preventive services as a barrier. • nutrition and physical activity assessment and counseling reported by residents in our study fell short of the Healthy People 2000 guidelines Perceived effectiveness was the only variable that predicted both assessment and counseling of patients regarding nutrition and physical activity, demonstrating its importance in the prediction of physicians' behaviors. attitude predicted assessment, but not counseling • Interventions for the components would differ: demonstrating and receiving reinforcement for assessment and counseling skills for self-efficacy and providing feedback of patient change after counseling for response efficacy • asymptomatic obese patients were more likely to be counseled for nutrition and physical activity is consistent with the literature

Attrition details (Indicate the number lost to follow-up and whether the proportion lost to follow-up differed by group (i.e. intervention v control)	Na

BLOCK 4: CHALLENGES	
Author-stated limitations	• single measure of perceived effectiveness does not distinguish between two components: the residents' self-efficacy or perceived confidence to carry out the behaviour and their response efficacy, i.e., belief that patients will follow through on the residents' recommendations • Self-reports of assessment and counseling tend to overestimate the numbers of services provided. Having observational or chart-audit measures of these behaviors would have provided a more accurate indicator of actual practice or, in the case of chart audits, documentation of assessment and counseling. • Doesn't cover effectiveness of actual interventions
Author-stated strengths	Measurement of the residents' activities, attitudes, and skills related to risk assessment and counseling indicates gaps between the real world of family practice residencies, the recommended core educational guidelines from the AAFP, and patient-desired counseling.
Strengths identified by review team	• Testing of reliability of scaling • Detailed literature presented on frequency of counseling. • Detailed specification of frequency of counseling providing interesting differential results
Evidence gaps and/or recommendations for future research	• Limiting scale testing to Chronbach's alpha • No explanation for choice of sample • No evidence of validity in summed scores and the interpretation of individual coefficients is not given or intuitive. • No discussion of the time period of the research (Dec/Jan) and potential seasonal effects relevant to both physicians and patients. • Improve specification of the perceived effects measure

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
Population						
1.1 Is the source population or source area well described? Was the country (e.g. developed or nondeveloped, type of healthcare system), setting (primary schools, community centres etc.), location (urban, rural), population demographics etc. adequately described?		+				A range of workload and educational variables provided. No information on location or context facing patients.
1.2 Is the eligible population or area representative of the source population or area? Was the recruitment of individuals/clusters/areas well defined (e.g. advertisement, birth register)? Was the eligible population representative of the source? Were important groups underrepresented?		+				Not clear if all clinics receiving funding from Texas DoH were asked; we just know 4 were. The use of family practices that received funding from the DH(Texas) might limit applicability to US where the health system is not solely state-financed. Not clear if all residents were invited to complete questionnaire,

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						although there is a high response rate from those asked.
1.3 Do the selected participants or areas represent the eligible population or area? Was the method of selection of participants from the eligible population well described? What % of selected individuals/clusters agreed to participate? Were there any sources of bias? Were the inclusion/exclusion criteria explicit and appropriate?		+				93.5% selected completed questionnaire. Basis of selecting residents or programs/clinics not clear.
Method of selection of exposure (or comparison) group						
2.1 Selection of exposure (and comparison) group. How was selection bias minimised?					Na	
2.2 Was the selection of explanatory variables based on a sound theoretical basis? How sound was the theoretical basis for selecting the explanatory variables?		+				A list of findings from other studies provided although methods for selecting variables is unclear. Summative scores were provided with evidence of reliability but not for validity.

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
2.3 Was the contamination acceptably low? Did any in the comparison group receive the exposure? If so, was it sufficient to cause important bias?					Na	
2.4 How well were likely confounding factors identified and controlled? Were there likely to be other confounding factors not considered or appropriately adjusted for? Was this sufficient to cause important bias?		+				Although possible explanators of counseling via the literature appeared to have been adjusted for, little reasoning given for selection into model. For example, a variable indicating the year family practice residents completed MD (a possible indicator of experience) was collected but was unclear whether it was included in the model. Some control factors showed no relationship and this is not

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						discussed.
2.5 Is the setting applicable to the UK? Did the setting differ significantly from the UK?		+				US family practice setting attempting to reach 'Healthy People 2000 guidelines'.
Outcomes						
3.1 Were the outcome measures and procedures reliable? Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels [++] vs self-reported smoking [−]). How reliable were outcome measures (e.g. inter or intra-rater reliability scores)? Was there any indication that measures had been validated (e.g. against a gold standard measure or assessed for content validity)?			-			Chronbach Alpha coefficients are given for summed scores and are high enough but no other measures of reliability are reported. All data were self reported.
3.2 Were the outcome measurements complete? Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?	++					Most were interviewed but note the target population is not clear.
3.3 Were all the important outcomes assessed? Were all the important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?			-			There was no discussion of the potential harms of

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						physical exercise.
3.4 Was there a similar follow-up time in exposure and comparison groups? If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).					Na	30 day period considered for all over a 2 month period (covering Dec/Jan)
3.5 Was follow-up time meaningful? Was follow-up long enough to assess long-term benefits and harms? Was it too long, e.g. participants lost to follow-up?					Na	
Analyses						
4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)? A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard. Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?			-			No power calculations reported. An n=110 is unlikely to be adequate for the type of analysis undertaken (multivariate with over 10 independent variables)
4.2 Were multiple explanatory variables considered in the analyses? Were there sufficient explanatory variables considered in the analysis?			-			Several tested, although not clear how. Not interpretation of significant variables given

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						other than positive or negatively related. Interpretation of the significant variables is not clear as they are all summed variables.
4.3 Were the analytical methods appropriate? Were important differences in follow-up time and likely confounders adjusted for?		+				Not clear why using linear regression for censored data. Why not Tobit?
4.4 Was the precision of association given or calculable? Is association meaningful? Were confidence intervals (CIs) and/or pvalues for effect estimates given or possible to calculate? Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?		+				
Summary						
5.1 Are the study results internally valid (i.e. unbiased)? How well did the study minimise sources of bias (i.e. adjusting for potential confounders)? Were there significant flaws in the study design?			-			No report on how missing data is handled. Also there is no measurement of patient behaviours and

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						no controlling for risk The main variable is 'perceived effectiveness' which is not objectively measured and it doesn't differentiate between confidence of physicians in their own abilities and belief patients will follow advice. It is also not clear how to interpret the results of the regression with respect to any of the specific coefficients.

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						The sample used could have introduced bias given that they were funded to hold a similar programme and hence could have been more enthusiastic or given social desirable responses
5.2 Are the findings generalisable to the source population (i.e. externally valid)? Are there sufficient details given about the study to determine if the findings are generalisable to the source population? Consider: participants, interventions and comparisons, outcomes, resource and policy implications.		+				Family physicians in US who give physical activity advice so some likely similarities but a very different health system with very different incentives facing providers.
OVERALL GRADING		+				

BLOCK 1: BACKGROUND INFORMATION OF STUDY	
Reviewed by	JFR & NA
Date of review	1st August
Title	Physical activity and physical fitness counseling patterns of adult nurse practitioners (ANPs)
Author(s)	Buchholz and Purath
Aim of study	to (a) examine physical activity assessment and counseling practices, (b) identify barriers to physical activity counseling, (c) describe knowledge and confidence in physical activity assessment and counseling, (d) identify personal physical activity practices, and (e) describe use of objective physical fitness measures in the primary care setting
Year of publication	2007
Origin of study (country, including developer or developing; public of private health system)	Nationwide study in USA
Source of funding for study (gov (NHS), voluntary/charity, pharmaceutical) *Note anything about role of funders*	Mu Omega Chapter of Sigma Theta Tau International.

BLOCK 2: SAMPLE/INTERVENTION	
Characteristics of participants	
Gender	95% female (n=140/148)
Age	50 years (range = 31–67; SD = 7.1).

Ethnicity	Na
Other details given	• members of the American Academy of Nurse Practitioners • average career as an NP was 11 years (range = 1–30; SD = 6.2) • 45% described their practice site as suburban, 32% urban, and 23% rural. • provided care to an average of 57% women and 42% men, who had a mean age of 51 years (range = 15–85; SD = 15.6).
Method of allocation to intervention/control (Describe how the selected individuals/clusters were allocated to receive either intervention or control. How was confounding minimised?) OR methods of selecting sample	Randomly selected group from membership. Each participant selected received a letter that invited them to complete a web-based questionnaire about physical activity and fitness. The letter explained the study and instructed recipientshowto access the questionnaire using the Internet. Participants received no monetary compensation.
Sample size Total n = Intervention n = Control n =	Researchers mailed 1500 letters, and 148 ANPs (10%) answered the web-based survey. Of these, 140 were women (95%). The results are reported for a total sample of 96 people.
Description of intervention	
Design (what delivered, by whom)	health promotion, health protection, and disease prevention provided by ANP
Setting (e.g. primary school, community centre etc)	'Office' (GP surgery)
Location (urban / rural)	45% practiced in suburban, 32% urban, and 23% rural areas.
Duration (how often, how long for)	Na
Exercise program	Physical activity counseling (Physical activity was defined as bodily movement produced by skeletal muscle contraction that results in energy expenditure and further described as including a wide range of body

	movement, including traditional exercise as well as recreational and leisure-time physical activity (Caspersen, Powell, & Christenson, 1985). Physical fitness was defined as various attributes that enable an individual to be able to engage in physical activity easily (Caspersen et al.).)
Description of comparator/control group	
Design (what delivered, by whom)	n/a
Setting (e.g. primary school, community centre etc)	n/a
Location (urban / rural)	n/a
Duration (how often, how long for)	n/a

BLOCK 3: ANALYSIS	
Source of data	Questionnaire of 2 parts: a) a 1997 nationally distributed questionnaire by Burns, Camaione, and Chatterton (2000) that examined how ANPs prescribe physical activity. The questionnaire uses multiple-choice, Likert-scale, and fill-in-the-blank questions to assess (a) physical activity assessment and counseling practices, (b) barriers to assessment and counseling, (c) knowledge and confidence with regard to counseling about physical activityand fitness, and (d) personal physical activity practice a) ANPs' practices regarding physical fitness assessment: included cardiorespiratory fitness, muscular strength, flexibility, body composition, and balance. Each measure was named and briefly described. The ANPs rated whether they (a) were not familiar with the test, (b) were familiar with the test but did not use it, or (c) used the test in their office.
Type of analysis (qualitative/quantitative)	Quantitative, but only descriptive statistics
What theoretical approach/framework was used?	No theoretical approach specified, although discussion noted that "Healthcare delivery can have a positive impact by approaching patients not only via a disease management paradigm but also via

	the concept of performance enhancement"
Model used	No modelling used
Model diagnostics	-
What primary outcome/dependent variable was reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Physical activity assessment and counseling: This could have been via multiple-choice, Likert-scale, and fill-in-the-blank questions (as information in the paper was not clear as to which one was used). It was measured using an previously existing questionnaire. The questionnaire was checked for content validity.
What secondary outcomes/independent variable were reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	(a)barriers to assessment and counseling, (b) knowledge and confidence in relation counseling about physical activity and fitness (Likert-scale type), (c) Personal physical activity practices. 'A' and 'C' could have been via multiple-choice, Likert-scale type, and fill-in-the-blank questions (as information in the paper was not clear as to which one was used). It was measured using an previously existing questionnaire. The questionnaire was checked for content validity.

BLOCK 4: RESULTS	
Main results	• 95% reported that they counsel a patient regarding physical activity at least once a year • 74% recommend that their clients accumulate 30 min of moderate-intensity physical activity on most days of the week **Physical Activity and Counseling Assessment** • Most common strategy for counseling was questioning patients about intensity and duration of exercise (95%) followed by checking BMI (88%) and assessing general appearance (34%). Patients were asked to perform physical tests in 17% cases • Most common counseling strategies were discussion (95%) and giving written materials (45%) • Advice was given to exercise several times a day (14%), daily (22%), three times a week

	(39%), most days of the week (57%) • Most (66%) advised exercising for 30 mins and most (65%) via a brisk walk. Others advised the 'talk test' or a target heart rate. **Barriers** • The most common barriers to counseling were lack of time (48%) and pre-emption by more important concerns (47%) and client not receptive (43%). Other barriers were: Useless as client won't follow through (15%); Neighbourhoods unsafe for physical activity (13%); Language barrier (12%); No reimbursement (10%); Not a high priority (5%); Most clients are already physically active (5%) **Knowledge and confidence in physical activity assessment and counseling** • Neither knowledge nor confidence in assessing and counseling for physical activity correlated significantly with length of practice • The majority (61%) of the ANPs reported that physical activity assessment and counseling were not part of their formal education. Their information came primarily from conferences or workshops (43%) and self-study (37%). • Those with greater knowledge from self study or courses were more confident with knowledge, assessing and counseling. **Personal physical activity practices of ANPs** • 75% self- reported engagement in moderate physical activity 30 min most days of the week ad none rated themselves as inactive. • 5% relatively inactive, 17% light activity, 56% moderate activity, 22% vigorous activity **Physical fitness assessment and testing** • Of fitness measures, the most commonly used was body composition. Cardiorespiratory, strength, flexibility, and balance fitness tests were used infrequently or rarely.
Attrition details (Indicate the number lost to follow-up and whether the proportion lost to follow-up differed by group (i.e. intervention v	90% did not reply to original letter

control)	

BLOCK 4: CHALLENGES	
Author-stated limitations	“A limitation of this study is the low response rate (<10%). Because there was no formal consent, the researchers were unable to track non-respondents and send reminder notices. Responses may have been sparse because the survey was long and lacked incentives or compensation. The low response rate, coupled with the fact that 75% of the respondents engaged in physical activity, suggests that the respondents were ANPs who had an interest or belief in the importance of the topic. Such self-selection could have biased the sample, restricting generalizability.”
Author-stated strengths	Findings consistent with previous literature
Strengths identified by review team	
Evidence gaps and/or recommendations for future research	Whilst sample was randomly selected the 10% response rate is self-selected, which is not accounted for in the analysis. All based on self report Authors concluded “‘Further exploration of the knowledge and use of physical activity counseling and physical fitness measures by NPs is warranted in order to assist NPs to help patients improve their overall health.’

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
Population						
1.1 Is the source population or source area well described? Was the country (e.g. developed or nondeveloped, type of healthcare system), setting (primary schools, community centres etc.), location (urban, rural), population demographics etc. adequately described?	++					
1.2 Is the eligible population or area representative of the source population or area? Was the recruitment of individuals/clusters/areas well defined (e.g. advertisement, birth register)? Was the eligible population representative of the source? Were important groups underrepresented?			-			90% non-response
1.3 Do the selected participants or areas represent the eligible population or area? Was the method of selection of participants from the eligible population well described? What % of selected individuals/clusters agreed to participate? Were there any sources of bias? Were the inclusion/exclusion criteria explicit and appropriate?			-			Randomly selected, although note methods of random selection not clear. 90% non-response.
Method of selection of exposure (or comparison) group						
2.1 Selection of exposure (and comparison) group. How was selection bias minimised?					x	
2.2 Was the selection of explanatory variables based on a sound theoretical basis? How sound was the theoretical basis for selecting the explanatory variables?		+				Not explicitly stated, but given it was based on a previous literature and

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						questionnaire could imply an evidence base for selection
2.3 Was the contamination acceptably low? Did any in the comparison group receive the exposure? If so, was it sufficient to cause important bias?					NA – no comparison group	
2.4 How well were likely confounding factors identified and controlled? Were there likely to be other confounding factors not considered or appropriately adjusted for? Was this sufficient to cause important bias?					NA – no controls	The study was descriptive and not multivariate
2.5 Is the setting applicable to the UK? Did the setting differ significantly from the UK?			-			**Morgan S** (2010) What are the differences in nurse practitioner training and scope of practice in the US and UK? *Nursing Times*; 106: 27, points out differences in role and training of nurse practitioners in US and UK

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
Outcomes						
3.1 Were the outcome measures and procedures reliable? Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels [++] vs self-reported smoking [−]). How reliable were outcome measures (e.g. inter or intra-rater reliability scores)? Was there any indication that measures had been validated (e.g. against a gold standard measure or assessed for content validity)?			-			All data self reported based on a previously administered questionnaire though content validity was checked
3.2 Were the outcome measurements complete? Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?			-			90% non response rate
3.3 Were all the important outcomes assessed? Were all the important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?			-			Benefits and harms not considered
3.4 Was there a similar follow-up time in exposure and comparison groups? If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).					NA	
3.5 Was follow-up time meaningful? Was follow-up long enough to assess long-term benefits and harms? Was it too long, e.g. participants lost to follow-up?					NA	
Analyses						
4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)? A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard.	++					reports sample had a power >0.80

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?						
4.2 Were multiple explanatory variables considered in the analyses? Were there sufficient explanatory variables considered in the analysis?					NA	This was a descriptive study and hence cofounders not adjusted for
4.3 Were the analytical methods appropriate? Were important differences in follow-up time and likely confounders adjusted for?			-			Few explanators
4.4 Was the precision of association given or calculable? Is association meaningful? Were confidence intervals (CIs) and/or pvalues for effect estimates given or possible to calculate? Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?			-			No confounders accounted for
Summary						
5.1 Are the study results internally valid (i.e. unbiased)? How well did the study minimise sources of bias (i.e. adjusting for potential confounders)? Were there significant flaws in the study design?			-			No attempt other than original randomisation attempted to minimise bias
5.2 Are the findings generalisable to the source population (i.e. externally valid)? Are there sufficient details given about the study to determine if the findings are generalisable to the source population? Consider: participants, interventions and comparisons, outcomes, resource and policy implications.			-			Probably not because of low response rate nature of sample (active population)

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						may affect generalsibility.
OVERALL GRADING			-			Major problems with bias due to low response rate to one off survey and only one group providing care being targeted with no confounders controlled for.

BLOCK 1: BACKGROUND INFORMATION OF STUDY	
Reviewed by	JFR & NA
Date of review	2nd Aug 2012
Title	The Chronic Care Model and Exercise Discussions during Primary Care Diabetes Encounters
Author(s)	Patel and Parchman,
Aim of study	To examine the relationship between the Chronic Care Model and exercise state of change. The hypothesis was that presence of the CCM in primary care clinics will be associated with the amount of time spent discussing exercise during the visit.
Year of publication	2011
Origin of study (country, including developer or developing; public of private health system)	20 primary care clinics in South Texas, USA in 2002 and 2003 involving 45 primary care physicians

Source of funding for study (gov (NHS), voluntary/charity, pharmaceutical) *Note anything about role of funders*	Agency for Healthcare Research and Quality (AHRQ K08 HS013008-03) and the Bureau of Health Professions; Health Resources and Services Administration Department of Health and Human Services grant D01 HP08795; The John A Hartford Foundation Center for Excellence in Geriatrics Education; and by the Department of Veterans Affairs

BLOCK 2: SAMPLE/INTERVENTION	
Characteristics of participants	
Gender	Not given
Age	Age patient 58 (13.1)
Ethnicity	Patients: Hispanic 54%
Other details given	Patients presenting with established diagnosis of type 2 diabetes High school graduate (%) 72.0 Self-rated health fair or poor (%) 44.1 Diagnoses (mean _SD_) 5.1 (2.2) Chronic medications (mean _SD_) 6.7 (3.1) Visit characteristics Acute visit (%) 23.0 Duration of visit, min (mean _SD_) 18.1 (8.2) Time discussing exercise, sec (mean _SD_) 20.0 (36.0) 45 Primary care physicians included: 11 solo physician clinics (11 physicians); 3 group practice settings (10 physicians); 1 community health center (1 physician); 2 Veterans Affairs primary care clinics (11 physicians); and 3 city/county health clinics for uninsured patients (12 physicians).
Method of allocation to intervention/control (Describe how the selected individuals/clusters were allocated to receive either	This cross-sectional study recruited 8-10 consecutive patients in each clinic who presented with an established diagnosis of type 2 diabetes between 2002-2003.

intervention or control. How was confounding minimised?) OR methods of selecting sample	
Sample size Total n = Intervention n = Control n =	162 visits by patients to 45 primary care physicians from 20 health centres.
Description of intervention	
Design (what delivered, by whom)	Primary care visits among sites following the Chronic Care Model (the model that postulates that a discussion between informed patients and prepared care teams produces better outcomes) and for those diagnosed with type 2 diabetes
Setting (e.g. primary school, community centre etc)	20 primary care clinics 45 primary care physicians: 11 solo physician clinics (11 physicians); 3 group practice settings (10 physicians); 1 community health center (1 physician); 2 Veterans Affairs primary care clinics (11 physicians); and 3 city/county health clinics for uninsured patients (12 physicians).
Location (urban / rural)	Texas region, rurality not stated
Duration (how often, how long for)	Data collected over a 1 year period
Exercise program	Exercise discussion with GP
Description of comparator/control group	
Design (what delivered, by whom)	No comparator
Setting (e.g. primary school, community centre etc)	Na
Location (urban / rural)	Na
Duration (how often, how long	Na

for)	

BLOCK 3: ANALYSIS	
Source of data	Each physician completed the "Assessment of Chronic Illness Care survey (ACIC) to determine the degree to which care in each clinic was consistent with the CCM. This 25-item survey, which measures the presence of the elements of the CCM, was completed by all clinicians in each clinic (physicians, nurse practitioners, and physician assistants). Each item is scored on a 0 to 11 scale and provides subscale scores for each of the 6 CCM components" Direct observation and an audio recording of each primary care visit were collected. The Davis Observation Code is a reliable and valid interactional analysis system that has been used to characterize differences in physician practice styles (the occurrence or non occurrence of each of 20 clinically significant behaviors during successive 15-second observation intervals of the medical encounter, including a code for the discussion of exercise. Data was coded by a trained coder "to discriminate the presence or absence of discrete behaviours that have been operationally defined, systematically minimizing". After the visits, patients complete an exit interview and were asked about their SOC for self-care behaviours for exercise (which were coded later) as well as other patient characteristics (age, sex, race/ethnicity, and self-reported health status (excellent, very good, good, fair, poor).
Type of analysis (qualitative/quantitative)	Quantitative
What theoretical approach/framework was used?	The State of Changes (SOCs) were adopted from the Transtheoretical Model: precontemplation, contemplation, preparation, action, and maintenance. The medical model followed was the Chronic Care Model.
Model used	Bivariate and multilevel random effects model
Model diagnostics	Not provided
What primary outcome/dependent variable was reported (how were they	The number of 15-second intervals spent discussing exercise

specified in practice)? (note whether these were validated or not and whether objective or subjective)	
What secondary outcomes/independent variable were reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Patient level data • Whether patient is in the maintenance stage of change for the selfcare behaviour or not (i.e. patient is in maintenance stage of change ie being exercising for 6 months) • Whether in one of 5 SOCs for exercise (precontemplation, contemplation, preparation, action, or maintenance) • age, sex, race/ethnicity, and self-reported health status (excellent, very good, good, fair, poor). • Number symptoms/problems raised by patient • Number symptoms/problems addressed • Length of visit • Reason for visit (acute or not) Clinic level data • CCM score (the degree to which care in clinic care elements are based CCM. It was measured using a validated 25-item survey, which measures the presence of the elements of the CCM, and was completed by all clinicians in each clinic)

BLOCK 4: RESULTS	
Main results	The duration of visit was 19 minutes (range, 10-26mins) on average and 22 seconds of those minutes were used to discuss exercise. Bivariate analysis showed time spent discussing exercise was positively associated with: • number of problems addressed during the visit ($r=0.26$, $p<0.001$) • overall length of the visit ($r=0.19$, $p=0.015$) • patients in contemplation, preparation, and action stages of change with respect to

exercise (compared with those in maintenance and precontemplation stages) (p=0.005)

Stage of Change (SOC) of Exercise and If Time as Spent Discussing Exercise

SOC for exercise		Any Time Spent Discussing Exercise? Yes	No
Maintenance	(n = 72)	28 (38.9)	44 (61.1)
Action	(n = 18)	9 (50.0)	9 (50.0)
Preparation	(n = 35)	16 (45.7)	19 (54.35)
Contemplation	(n = 16)	11 (68.8)	5 (31.3)
Precontemplation	(n = 21)	2 (9.5)	19 (90.5)
Total	(n = 162)	66 (40.7)	96 (59.3)

In the hierarchical regression model (see Table below) , the CCM score, after adjusting for patient and visit characteristics, was associated with time spent discussing exercise was positively associated with CCM score (regression coefficient:0.21) but negatively related with females (regression coefficient:-0.46), acute visit (regression coefficient:-0.64), pre-contemplation stage of exercise (regression coefficient:-1.03). For each 1-point increment in the CCM score, the time spent discussing exercise increased by approximately 3 seconds.

Multivariable Random Effects Model Predicting Time Spent Discussing Exercise

Fixed Effect	Coefficient	SE	*P*
CCM score	0.21	0.06	_.01
Length of time (min)	0.03	0.03	.36
Age (years)	_0.01	0.01	.22
Female Sex	_0.46	0.21	.04
Acute visit	_0.64	0.31	**.05**
Maintenance SOC for exercise	_0.27	0.23	.27
Precontemplation SOC for exercise	_1.03	0.27	_.01

Discussion of exercise may be 18 to 33 seconds longer in clinics with full implementation of the CCM Compared with those with basic implementation.

“patient SOC for exercise seems to predict the likelihood that a discussion about exercise will occur. It is less likely to occur with patients who are in the precontemplation and maintenance

	SOCs and more likely to occur with patients in the contemplation, preparation, and action SOCs. Patient- initiated health behavior discussions are more likely to receive advice if they explicitly indicated readiness to change. A discussion about exercise occurred in only 9% of encounters with patients who were in the precontemplation SOC, but a discussion about exercise occurred in 69% of encounters when the patient was in contemplation stage"
Attrition details (Indicate the number lost to follow-up and whether the proportion lost to follow-up differed by group (i.e. intervention v control)	26/188 visits in Spanish were discarded and not coded

BLOCK 4: CHALLENGES	
Author-stated limitations	• cross-sectional nature of the data….. possible that some physician characteristics would result in both the presence of the CCM and a longer discussion of exercise. • inability to draw any conclusion or causality or the direction of observed relationships because of the cross-sectional nature of the data. We do not know whether the SOC was influencing the time spent discussing exercise or if visit time spent discussing exercise was influencing exercise SOC. Possible that some unrecognized factor may influence both the CCM score and the reason for increased time spent by physicians advising about exercise. • Potential omitted variable bias

Author-stated strengths	• Findings are consistent with other studies suggesting that the CCM is related to clinician behaviour
Strengths identified by review team	• Accounting for clinic and patient factors • Objective measurement of time assessed via validated measure (via Davis Observation Code)
Evidence gaps and/or recommendations for future research	• "Prospective studies are needed to further evaluate the effect of CCM on the time spent discussing exercise and whether this time equates to patient behaviour change." • Model testing not presented • A larger sample size • Incorporation of possible confounders such as socio economic status, and language particularly given the exclusion of the Spanish recordings • Replication to the other parts of US as Texas, given the high Hispanic population, may not representative of other US states • Use of physician factors as additional explanatory variables.

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	**++**	**+**	**-**	**NR**	**NA**	**Comments**
Population						
1.1 Is the source population or source area well described? Was the country (e.g. developed or nondeveloped, type of healthcare system), setting (primary schools, community centres etc.), location (urban, rural), population demographics etc. adequately described?	++					

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
1.2 Is the eligible population or area representative of the source population or area? Was the recruitment of individuals/clusters/areas well defined (e.g. advertisement, birth register)? Was the eligible population representative of the source? Were important groups underrepresented?	++					
1.3 Do the selected participants or areas represent the eligible population or area? Was the method of selection of participants from the eligible population well described? What % of selected individuals/clusters agreed to participate? Were there any sources of bias? Were the inclusion/exclusion criteria explicit and appropriate?		+				Well described but not well justified and not compared against local population. Missing analysis of encounters in Spanish
Method of selection of exposure (or comparison) group						
2.1 Selection of exposure (and comparison) group. How was selection bias minimised?					No comparison group	
2.2 Was the selection of explanatory variables based on a sound theoretical basis? How sound was the theoretical basis for selecting the explanatory variables?		+				CCM and SOC variable well explained. Other control variables less so.
2.3 Was the contamination acceptably low? Did any in the comparison group receive the exposure? If so, was it sufficient to cause important bias?					No comparison group	Language could be a confounder

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						(given exclusion of the recordings in Spanish)
2.4 How well were likely confounding factors identified and controlled? Were there likely to be other confounding factors not considered or appropriately adjusted for? Was this sufficient to cause important bias?		+				Ethnicity not accounted for. Some Spanish speakers excluded. Authors noted population may not be applicable beyond Texas. Therefore range of potential biases.
2.5 Is the setting applicable to the UK? Did the setting differ significantly from the UK?		+				US setting CCM model
Outcomes						
3.1 Were the outcome measures and procedures reliable? Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels [++] vs self-reported smoking [−]). How reliable were outcome measures (e.g. inter or intra-rater reliability scores)? Was there any indication that measures had been validated (e.g. against a gold standard measure or assessed for content validity)?		+				Validity well documented but not objective measures.
3.2 Were the outcome measurements complete? Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?			-			Spanish only encounters excluded

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
3.3 Were all the important outcomes assessed? Were all the important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?			-			No harms assessed
3.4 Was there a similar follow-up time in exposure and comparison groups? If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).					No comparison group	
3.5 Was follow-up time meaningful? Was follow-up long enough to assess long-term benefits and harms? Was it too long, e.g. participants lost to follow-up?					NA	One visit
Analyses						
4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)? A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard. Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?				NR		No power calculation presented. Further checks in related papers referenced by the reviewed study as source of methods information (e.g. Kaissi et al 2009) also revealed no details on power.
4.2 Were multiple explanatory variables considered in the analyses?		+				Multiple

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
Were there sufficient explanatory variables considered in the analysis?						explanatory variables were used although it appears other important confounders had been left (2.4). Could have included ethnicity, physician characteristics for example.
4.3 Were the analytical methods appropriate? Were important differences in follow-up time and likely confounders adjusted for?		+				Model not tested enough
4.4 Was the precision of association given or calculable? Is association meaningful? Were confidence intervals (CIs) and/or pvalues for effect estimates given or possible to calculate? Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?	++					
Summary						
5.1 Are the study results internally valid (i.e. unbiased)? How well did the study minimise sources of bias (i.e. adjusting for potential confounders)? Were there significant flaws in the study design?		+				Missing Spanish speakers
5.2 Are the findings generalisable to the source population (i.e. externally valid)? Are there sufficient details given about the study to determine if the findings are generalisable to the source population? Consider: participants, interventions and comparisons, outcomes, resource and policy implications.		+				Missing ethnicity and Spanish

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						recordings..
OVERALL GRADING		+				Exclusion of potential confounders Unclear sample size was large enough for the ~8 independent variables used

BLOCK 1: BACKGROUND INFORMATION OF STUDY	
Reviewed by	JFR & NA

Date of review	25.05.2012
Title	Direct Observation of Exercise Counseling in Community Family Practice
Author(s)	Podl et al
Aim of study	To assess the true prevalence of exercise counseling by community family physicians by directly observing outpatient visits, and to ascertain patient and visit characteristics associated with provision of exercise counseling.
Year of publication	1999
Origin of study (country, including developer or developing; public of private health system)	USA, members of the Ohio Academy of Family Physicians practicing in north-eastern Ohio
Source of funding for study (gov (NHS), voluntary/charity, pharmaceutical) *Note anything about role of funders*	National Cancer Institute (1RO1 CA80862 and 2RO1 CA80862), a Family Practice Research Center grant from the American Academy of Family Physicians, and a Robert Wood Johnson Foundation Generalist Physician Faculty Scholar Award

BLOCK 2: SAMPLE/INTERVENTION	
Characteristics of participants	
Gender	63.3% female (no counseling delivered during visit) 57.2% females (counseling delivered during visit). But, no details of gender of participating physician.
Age	Sample restricted to patients 2 yrs and older. 41.8yrs (no counseling delivered during visit) 49.4yrs (counseling delivered during visit)
Ethnicity	No details given, although race was collected by observation.
Other details given	138/531 physicians invited chose to participate 73% of GPs residency trained; 97% provided inpatient care

Method of allocation to intervention/control (Describe how the selected individuals/clusters were allocated to receive either intervention or control. How was confounding minimised?) OR methods of selecting sample	members of the Ohio Academy of Family Physicians practicing in northeastern Ohio were invited to participate in a study of the content of family practice. Of the 531 physicians solicited, 138 agreed to participate
Sample size Total n = Intervention n = Control n =	138/531 physicians invited 4215 visits (physician counseling observed in 20.1%) 3152 patients completed an exit questionnaire (13.3% reported being counseled about exercise and 21% also reported receiving exercise counseling from the physician in the past year) A study of practice rather than a comparative evaluation.
Description of intervention	
Design (what delivered, by whom)	Delivery of exercise counseling by family physicians
Setting (e.g. primary school, community centre etc)	Primary care
Location (urban / rural)	71% urban
Duration (how often, how long for)	Na
Exercise program	Exercise counseling
Description of comparator/control group	
Design (what delivered, by whom)	There is no control group

Setting (e.g. primary school, community centre etc)	Na
Location (urban / rural)	Na
Duration (how often, how long for)	Na

BLOCK 3: ANALYSIS	
Source of data	• non-obtrusive direct observation of the patient visit (viewing gender and race, time recording counseling on physical activity Davis Observation Code, The major reason for visit (acute illness, chronic illness, or well care) and the length of the visit), • patient exit questionnaires (modified version 13 of the MOS 6-item Health Survey.1 Patient satisfaction was assessed with the MOS 9-item visit rating scale) • Physician questionnaire • medical record review of all directly observed visits (patient characteristics including age, smoking status, blood pressure, whether or not they were a new patient, number of years with the practice, and number of visits made to the physician within the previous year), • Provided by practice: ICD9-CM billing diagnoses.
Type of analysis (qualitative/quantitative)	Quantitative: 4. Descriptive statistics on the prevalence of exercise counseling by multiple measures were calculated. 5. Student's *t*-tests and chi-square analyses were used to compare visits that did and did not include exercise counseling as measured by the direct observation checklist. 6. Significant patient, visit, and diagnosis variables were entered into a multi-variable logistic regression analysis, in order to determine which factors were independently associated with provision of exercise advice during the outpatient visit.
What theoretical approach/framework was used?	None mentioned
Model used	Multivariable logistic model

Model diagnostics	None mentioned
What primary outcome/dependent variable was reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Exercise counseling; (a) Time spent on exercise counseling or history taking was assessed through the validated Davis Observation Code. (b) exercise discussed or not: was measured via a questionnaire that asked patients if the physician had discussed exercise during the visit.
What secondary outcomes/independent variable were reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Patient characteristics: (a)'age, smoking status, blood pressure, whether or not they were a new patient, number of years with the practice, and number of visits made to the physician within the previous year were assessed from the medical record'. (b) 'The patient's gender and race were measured by the research nurse by direct observation'. (c)'Health status was measured on the patient exit questionnaire using a modified version of the MOS 6-item Health Survey'. (d) 'Patient satisfaction was assessed with the MOS 9-item visit rating scale'. (e)gender and ethnicity was measured via direct observation Visit characteristics; (a) 'Major reason for visit (acute illness, chronic illness, or well care) and the length of the visit were assessed by direct observation'. (b)'Billing data on ICD-9-CM diagnoses were provided by the practices and grouped into diagnosis clusters' (% with diagnosis for hypertension, diabetes mellitus, depression/anxiety, degenerative joint disease, ischaemic heart disease, fibrositus/myalgia/arthralgia, low back pain, obesity).

BLOCK 4: RESULTS	
Main results	• Of the 4215 visits for which direct observation data were available, exercise counseling was performed in 20.1% of visits. Among 3152 patients completing an exit questionnaire, 13.3% reported being counseled about exercise and 21% also reported receiving exercise counseling from the physician in the past year. • During visits involving exercise counseling, physicians spent an average of 0.78 minutes

	providing exercise advice (range: 0.33– 6.00 minutes, SD 5 0.67). • On average, visit length was significantly longer (12.5 min versus 9.8 min) when exercise counseling was delivered • Patient characteristics found not to be significant in univariate analyses were: race, health status, number of years with the practice, number of visits in the past year, smoking status, new versus established patient status, Patient satisfaction. • The likelihood of exercise counseling being delivered was higher when length of voist was longer (odds ratio(OR)=1.08); patient was older (OR =1.09); reason of visit was for well care (OR:1.00); diagnosed with: hypertension (OR:1.25);diabetes (OR:1.50); depression (OR:1.26);degenerative joint disease(OR:1.33);fibrositis/myalgia/arthralgia (OR:2.45);low back pain (OR:3.19);obesity • This brief advice is recalled by two thirds of patients. • The 10-minute average visit duration and competing demands of primary care outpatient visits raise questions about the feasibility of incorporating longer duration health habit counseling, except among a limited number of high-risk patients at teachable moments.
Attrition details (Indicate the number lost to follow-up and whether the proportion lost to follow-up differed by group (i.e. intervention v control)	Not relevant here

BLOCK 4: CHALLENGES	
Author-stated limitations	1. the direct observation estimate of the duration of time spent counseling on exercise, there was no delineation of the character or exact content of what was discussed with patients. 2. We have no data on how receptive the patients were to any counseling offered nor how effective it

	was. 3. The generalizability of this physician sample, while likely to be largely representative of residency trained family physicians across the country, requires judgment in extrapolation to other groups of clinicians. 4. The sample over-represented residency trained and female physicians
Author-stated strengths	1. The sample is similar to national samples of family physicians in age and number of patients seen per week 2. As “the actual frequency of exercise counseling is not known, since physician self-report has been shown to overestimate rates of service delivery, while medical record review underestimates provision of health habit counseling”… this paper contributes to knowledge
Strengths identified by review team	Range of assessment methods; observational, routine and patient reported Brief advice delivered in routine practice
Evidence gaps and/or recommendations for future research	No comparator No details on methods of selection of sample – possibility of selection bias Little detail on modelling (not accounted for cluster effect of physicians) Few details accounted or controlled for at physician level Lack of theoretical model against which to examine findings. Analysis did not account for clustering of physicians or attempt to explain delivery of counseling in terms of physician attributes.

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
Population						
1.1 Is the source population or source area well described? Was the country (e.g. developed or nondeveloped, type of healthcare system), setting (primary schools, community centres etc.), location (urban, rural), population demographics etc. adequately described?	++					
1.2 Is the eligible population or area representative of the source population or area? Was the recruitment of individuals/clusters/areas well defined (e.g. advertisement, birth register)? Was the eligible population representative of the source? Were important groups underrepresented?		+				Physician selection not described in this paper (but is in accompanying paper). Few details of patient population. Only one part of Ohio State.
1.3 Do the selected participants or areas represent the eligible population or area? Was the method of selection of participants from the eligible population well described? What % of selected individuals/clusters agreed to participate? Were there any sources of bias? Were the inclusion/exclusion criteria explicit and appropriate?		+				Target population numbers given and response rate. The response rate was very low. The final sample was compared against some national data to judge representativeness (indicating issues of sample selection).
Method of selection of exposure (or comparison) group						
2.1 Selection of exposure (and comparison) group. How was selection bias					NA	

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
minimised?						
2.2 Was the selection of explanatory variables based on a sound theoretical basis? How sound was the theoretical basis for selecting the explanatory variables?		+				Whilst no theory was stated, the list was fairly comprehensive
2.3 Was the contamination acceptably low? Did any in the comparison group receive the exposure? If so, was it sufficient to cause important bias?					NA	Study split observed group into 2 mutually exclusive groups. Therefore there could be no 'contamination' by design.
2.4 How well were likely confounding factors identified and controlled? Were there likely to be other confounding factors not considered or appropriately adjusted for? Was this sufficient to cause important bias?		+				Although no explicitly theoretical base used to select the explanators, bivariate analysis were used to inform theior subsequent selection into the model. Missing physician attributes.
2.5 Is the setting applicable to the UK? Did the setting differ significantly from the UK?		+				Family physicians but in US therefore different setting. It excludes other staff delivering

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						physical activity counseling/advice too.
Outcomes						
3.1 Were the outcome measures and procedures reliable? Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels [++] vs self-reported smoking [−]). How reliable were outcome measures (e.g. inter or intra-rater reliability scores)? Was there any indication that measures had been validated (e.g. against a gold standard measure or assessed for content validity)?		+				Observation by external person but unclear how all could be observed. Some taken from routine data with no discussion of likely accuracy.
3.2 Were the outcome measurements complete? Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?			-			Only 138 of 531 physicians invited participated. The final sample differed from the national population. No information was given on completion rates of collected data.
3.3 Were all the important outcomes assessed? Were all the important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?			-			No harms considered
3.4 Was there a similar follow-up time in exposure and comparison groups? If groups are followed for different lengths of time, then more events are likely to occur in					Na	

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).						
3.5 Was follow-up time meaningful? Was follow-up long enough to assess long-term benefits and harms? Was it too long, e.g. participants lost to follow-up?					Na	
Analyses						
4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)? A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard. Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?		+				No discussion of sampling requirements. Power of analysis not given but sample size appears adequate (n=4215) as CI are relatively tight round odds ratios for age, gender, reason for visit and some diseases.
4.2 Were multiple explanatory variables considered in the analyses? Were there sufficient explanatory variables considered in the analysis?		+				Several explanatory variables tested in multiple regression. Some found to be significant elsewhere have not been included (e.g. confidence in own knowledge,

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						belief in value of exercise, personal exercise regime)
4.3 Were the analytical methods appropriate? Were important differences in follow-up time and likely confounders adjusted for?		+				Fairly wide range of confounders accounted for although no relation to wider literature considered.
4.4 Was the precision of association given or calculable? Is association meaningful? Were confidence intervals (CIs) and/or pvalues for effect estimates given or possible to calculate? Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?	++					
Summary						
5.1 Are the study results internally valid (i.e. unbiased)? How well did the study minimise sources of bias (i.e. adjusting for potential confounders)? Were there significant flaws in the study design?		+				Observational study using a range of observed, routine data and patient reported data. Not clear how visits to participants were selected and if all were observed. No analysis of the large % of non-responding

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						physicians accounted for. Therefore potential for significant bias.
5.2 Are the findings generalisable to the source population (i.e. externally valid)? Are there sufficient details given about the study to determine if the findings are generalisable to the source population? Consider: participants, interventions and comparisons, outcomes, resource and policy implications.		+				US based, although authors query representativeness to res of USA.. Focus is family physicians so more relevant to GP practices. However, a very large % provided in patient care too.
OVERALL GRADING		+				Good study especially for range in types of data collected. However issues exist around: selection of explanators especially physician attributes; lack of model diagnostics; potential issue of sample selection bias; and

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						representativeness of sample.

BLOCK 1: BACKGROUND INFORMATION OF STUDY	
Reviewed by	JFR & NA
Date of review	3rd August
Title	Exercise Counseling: How do General Internists do?
Author(s)	Sherman and Hershman
Aim of study	To assess how often physicans counsel patients about exercise and to identify which primary care internists infrequently counsel about it.
Year of publication	1993
Origin of study (country, including developer or developing; public of private health system)	Massachusetts, USA public/private health system (primary care internists)
Source of funding for study (gov (NHS), voluntary/charity, pharmaceutical) *Note anything about role of funders*	Not stated

BLOCK 2: SAMPLE/INTERVENTION

Characteristics of participants	
Gender	Male = 75%
Age	<31 = 4%, 31-40 = 46%, 41-50 = 27%, 51-60=13% >60=11% (Median = 41yrs)
Ethnicity	Not given
Other details given	Fellowship: no training = 58%, some subspecialty training = 32%, general intern or geriatrics = 10% Practice type: private = 50%, academic medical centre = 14%, HMO = 23%, urgent care centre = 2% other =11% Average of 60 patients seen per week (SD 35) Practice 28 hours per week (SD15) on internal medicine
Method of allocation to intervention/control (Describe how the selected individuals/clusters were allocated to receive either intervention or control. How was confounding minimised?) OR methods of selecting sample	All internal physicians in Massachusetts identified. Randomly selected 1000 for mailed questionnaire that met 3 exclusion criterion (board certification in any (sub)specialty outside internal medicine, primary address outside Massachusetts, not currently practising). 2 further contacts made non-respondents. 687/1000 met eligibility criteria (195 not located, 118 not currently practicing).
Sample size Total n = Intervention n = Control n =	422/687 (61% response rate) but regression analysis only based on n=208 (NB all data on sample characteristics given for n=422)
Description of intervention	
Design (what delivered, by whom)	Exercise counseling by GP
Setting (e.g. primary school, community centre etc)	Primary care

Location (urban / rural)	52% of practices were based in urban areas, 43% in suburban areas, and 5% in rural areas
Duration (how often, how long for)	NA
Exercise program	Exercise counseling
Description of comparator/control group	
Design (what delivered, by whom)	n/a
Setting (e.g. primary school, community centre etc)	n/a
Location (urban / rural)	n/a
Duration (how often, how long for)	n/a

BLOCK 3: ANALYSIS	
Source of data	80-item questionnaire on physican attitidues, beliefs and practices re conselling patients about exercise. This took 10-15 mins to complete. The questionnaire covered: physician demographics, counseling practices, perceived risks and benefits of exercise, perceived success in counseling, barriers to counseling (asked using a 5-point scale: 'not important' to 'moderately important' to 'extremely important') and personal habits (including height, weight, resting heart rate, frequency of own exercise and enjoyment of exercise). Frequency of counseling was recorded as 0-25%, 26-50%, 51-75%, 76-100% of patients.
Type of analysis (qualitative/quantitative)	Quantitative (Chi2 test, stepwise logistic regression (with threshold of 0.15 for entering into the model). 'Confidence intervals were test based'
What theoretical approach/framework was used?	Health Belief model and the Transtheoretical model through the work or Prochaska and DiClemente. Hypothesised that a clinician is more likely to provide counseling if they believe a)

	exercise has significant benefit and b) that counseling is efficient and effective.
Model used	Logistic regression
Model diagnostics	No specific diagnostic tests used. However, results were examined by omitting success of counseling. Reran analysis for 50% of less versus >75%; results same except age wasn't a predictor) Reran analysis excluding physicians who reported any subspecialty training (results similar).
What primary outcome/dependent variable was reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Frequency of counseling health patients about exercise comparing those recording counseling. This was rated as 0-25%; 26-50%, 51-75%, 76-100% but only the bottom and top 25% were used as the dichotomous groups in the regression. However, it's not entirely clear, but it seems that physicians were asked about hypothetical patients (a healthy 35- year-old, a healthy 55-year-old, a healthy 75-year-old, or a person with coronary artery disease). Results for two tables are labelled for a hypothetical health 55yr old and 1 not labelled but the total n's match the hypothetical 55 year old. Consequently it is possible that the multivariate regression is also just for a hypothetical 55 year old patient despite not being labelled as such.
What secondary outcomes/independent variable were reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	All data was self-reported. All variables were categorical except for number of patients seen per hour, physican BMI, physican frequency of exercise) GPs characteristics used included: • Perceived risks and benefits of exercise: • Perceived success in counseling (measured on a 4 point scale covering 'not sucessful' to 'very successful') • barriers to counseling were asked using a 5-point scale: ('not important' to 'moderately important' to 'extremely important') • perceived importance of exercise were asked using a 5-point scale: ('not important' to 'moderately important' to 'extremely important') • Personal health habits (height, weight, resting heart rate, frequency and type of exercise, & personal enjoyment of exercise) • Demographics (e.g. age, gender, type of fellowship training undertaken) • Patients seen per hour

BLOCK 4: RESULTS	
Main results	17% of GPs counseled their patients up to 25% of their patients about exercise; 22% counseled 26-50% of their patients, 28% did for 51-75% of their patients, and 33% dis for 76-100% of their patients Perceived barriers - economic 55% lack of time was moderately important as a barrier to counseling about exercise. 22% said re-imbursement is not sufficient for time spent counseling Perceived barriers - other 35% counseling not leading to change in patient's behaviour as barrier 33% counseling about other lifestyle changes being more important as barrier 31% patients not interested in exercise as barrier to counseling 28% unsure what is more important in counseling patients about exercise 11% not convinced exercise is beneficial 7% stated lifestyle is a matter of personal choice so counseling is inappropriate Univariate analysis showed that GPs who were more likely to frequently counsel their patients about exercise were (this result was focussed on hypothetical 55-year old patients, although the patterm of results was reported as consistent across all hypothetical patients): • those who spent more at least 2 minutes counseling compared with those who spent less than 2 minutes) ((OR:3.24(CI 95%:1.80 -5.84)) • those who felt relatively more successful at getting their patients to begin exercising (OR:22.74(CI 95%:10.95 -47.24)) and continue execsising (((OR:14.60(CI 95%:7.46-28.56)) and impact on on QOL ((OR:8.50(CI 95%:4.49 -16.06)) • those who felt exercise was relatively more important ((OR:5.94(CI 95%:2.94 -11.99)) • those not in health maintenance organization ((OR:2.11(CI 95%:0.82 -5.39)) • those with slower resting heart beats ((OR:2.56(CI 95%:1.41 -4.76)) • those who exercise relatively more ((OR:2.69(CI 95%1.50 -4.85)) • those were relatively older ((OR:1.99(CI 95%:1.11 -3.58))

	Based on multivariate logistic regression, GPs who were more likely to frequently counsel their patients about exercise were: • those who felt relatively more successful at getting their patients to begin exercising (OR:22.83(CI 95%:8.36 -62.31)) • those who felt exercise was relatively more important ((OR:4.86(CI 95%:1.70 -13.91)) • those were relatively older ((OR:3.08(CI 95%:1.33 -7.15)) • those with slower resting heart beats ((OR:3.45(CI 95%:1.46 -8.18)) • There was no association with BMI, smoking status or gender.
Attrition details (Indicate the number lost to follow-up and whether the proportion lost to follow-up differed by group (i.e. intervention v control)	No details on non-responders, although 2 additional attempts to contact physicians were made to minimise response.

BLOCK 4: CHALLENGES	
Author-stated limitations	1. The sample may not be representative of physicians in the US because the sample based on: (a) GP's in Massachusetts (b) GP's practising internal medicine 2. Potential bias due to self-report data bias (especially exaggerated claims as this paper is about reporting 'good' behaviour) 3. High non-response rate may have led to sample selection bias as 39% of the eligible subjects did not respond and hence those who responded may have been different from the non-responders
Author-stated strengths	1. Results were robust to a range of samples included 2. Sample included a range of practice types and locations 3. Sample was limited to those in internal medicine 4. Self reported practice patterns have been shown (in one study cited) to match variations across practitioners even if not to the degree.

Strengths identified by review team	1. A theory based approach to questionnaire design 2. Validation of the questionnaire (via 2 pilots) 3. Relatively tightly define sample across varied practice settings.
Evidence gaps and/or recommendations for future research	1. Broaden the sample to include all GPs potentially involved in exercise counseling 2. Improve response rate as it is consequential for selection bias 3. link to any objective measures of process or outcome

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	**++**	**+**	**-**	**NR**	**NA**	**Comments**
Population						
1.1 Is the source population or source area well described? Was the country (e.g. developed or nondeveloped, type of healthcare system), setting (primary schools, community centres etc.), location (urban, rural), population demographics etc. adequately described?	++					
1.2 Is the eligible population or area representative of the source population or area? Was the recruitment of individuals/clusters/areas well defined (e.g. advertisement, birth register)? Was the eligible population representative of the source? Were important groups underrepresented?			-			Good for Massachusetts but not beyond.
1.3 Do the selected participants or areas represent the eligible population or area? Was the method of selection of participants from the eligible population well described?		+				A 61% response rate for self reporting 'good' behaviour is

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
What % of selected individuals/clusters agreed to participate? Were there any sources of bias? Were the inclusion/exclusion criteria explicit and appropriate?						likely to indicate response bias. Many less favourable responses likely to be missing.
Method of selection of exposure (or comparison) group						
2.1 Selection of exposure (and comparison) group. How was selection bias minimised?					NA	
2.2 Was the selection of explanatory variables based on a sound theoretical basis? How sound was the theoretical basis for selecting the explanatory variables?	++					Based in part on the health belief model And work of Prochaska and DiClemente.
2.3 Was the contamination acceptably low? Did any in the comparison group receive the exposure? If so, was it sufficient to cause important bias?					NA	
2.4 How well were likely confounding factors identified and controlled? Were there likely to be other confounding factors not considered or appropriately adjusted for? Was this sufficient to cause important bias?			-			Non response bias was not accounted for and, reasonably, considered by the authors to be a potential threat, although no indications were given to how to reinterpret the

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						results. Not clear why some data on non-responders not accounted for
2.5 Is the setting applicable to the UK? Did the setting differ significantly from the UK?			-			US setting with specialists in internal medicine therefore likely to be quite different from GP delivering care in UK
Outcomes						
3.1 Were the outcome measures and procedures reliable? Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels [++] vs self-reported smoking [−]). How reliable were outcome measures (e.g. inter or intra-rater reliability scores)? Was there any indication that measures had been validated (e.g. against a gold standard measure or assessed for content validity)?			-			All outcome/process data were self report.
3.2 Were the outcome measurements complete? Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?						Only 61% of internal medicine specialists responded.
3.3 Were all the important outcomes assessed? Were all the important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?			-			No potential harms were considered.
3.4 Was there a similar follow-up time in exposure and comparison groups? If groups are followed for different lengths of time, then more events are likely to occur in					NA	

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).						
3.5 Was follow-up time meaningful? Was follow-up long enough to assess long-term benefits and harms? Was it too long, e.g. participants lost to follow-up?					NA	
Analyses						
4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)? A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard. Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?			-			No power calculations given. CI were notably large.
4.2 Were multiple explanatory variables considered in the analyses? Were there sufficient explanatory variables considered in the analysis?	++					Assuming that the dependent variable related to a hypothetical healthy 55 yr-old patient characteristics could not be an explanator.
4.3 Were the analytical methods appropriate? Were important differences in follow-up time and likely confounders adjusted for?		+				Not clear whether enough confounders were selected. Little justification for dichotomising dependent variable (why >75% and not

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						>50%)
4.4 Was the precision of association given or calculable? Is association meaningful? Were confidence intervals (CIs) and/or pvalues for effect estimates given or possible to calculate? Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?		+				Data given and CI were wide.
Summary						
5.1 Are the study results internally valid (i.e. unbiased)? How well did the study minimise sources of bias (i.e. adjusting for potential confounders)? Were there significant flaws in the study design?			-			Selection bias possible given only 61% responded and would expect these to be physicians who more often counsel exercise. The study might have considered testing for this bias using registry data e.g. type of practices. Range of explanators and some adjusting for potential confounders (of which some are objectively

BLOCK 5: QUALITY APPRAISAL FOR QUANTITATIVE STUDIES	++	+	-	NR	NA	Comments
						assessed). Wide CI, non response bias, self reported outcomes.
5.2 Are the findings generalisable to the source population (i.e. externally valid)? Are there sufficient details given about the study to determine if the findings are generalisable to the source population? Consider: participants, interventions and comparisons, outcomes, resource and policy implications.			-			Generalisable only to a specific population of internists, possibly not across whole of USA. The range of interventions (type of advice) used in practice is not well specified.
OVERALL GRADING			-			

BLOCK 1: BACKGROUND INFORMATION OF STUDY	
Reviewed by	JFR & NA
Date of review	4th August
Title	Green prescriptions: attitudes and perceptions of general practitioners towards prescribing exercise
Author(s)	Swinburn et al
Aim of study	To assess the attitudes and perceptions of GPs towards the practice of writing green prescriptions

Year of publication	1997
Origin of study (country, including developer or developing; public of private health system)	GPs from Aukland and Dunedin (2 major cities in New Zealand)
Source of funding for study (gov (NHS), voluntary/charity, pharmaceutical) *Note anything about role of funders*	Hillary Commission for Sport, Fitness and Leisure, and coordinated by the National Heart Foundation of New Zealand.

BLOCK 2: SAMPLE/INTERVENTION	
Characteristics of participants	
Gender	Not given
Age	Not given
Ethnicity	Not given
Other details given	The GPs had recruited an average of 15 patients each for the trial (range 1-39). Those who participated 'were a mix of enthusiastic and less enthusiastic recruiters and probably not very different from the participating GPS who could not attend the focus group discussions.
Method of allocation to intervention/control (Describe how the selected individuals/clusters were allocated to receive either intervention or control. How was confounding minimised?)	In Aukland 10/11 invited GPs participated from a possible 800 (no indication was given of how these were selected. In Dunedin all 110 GPs were invited and 27 responded. However, only 25/37 responders were involved in the focus group discussions. No reasons were given for the drop out or the stage they dropped out (which could have been before or after training, during or after completion of recruitment). All who had completed recruitment were invited for the focus groups (and were re-imbursed for attendance). Those who did not attend had recruited similar numbers to the trial.

OR methods of selecting sample	
Sample size Total n = Intervention n = Control n =	25 GPs(6 from Auckland and 19 from Dunedin)
Description of intervention	
Design (what delivered, by whom)	A training session for GPs before trial when they were given information about the benefits of exercise and how to prescribe it, an exercise assessment sheet and the green prescription pad. 2 weeks after completing recruitment they were invited for a focus group. Payments to GPs were made for training, recruitment and for the focus group. Written exercise advice was given by GPs to patients following counseling.
Setting (e.g. primary school, community centre etc)	Primary care
Location (urban / rural)	100% urban
Duration (how often, how long for)	6 week period
Exercise program	
Description of comparator/control group	
Design (what delivered, by whom)	Verbal advice on exercise
Setting (e.g. primary school, community centre etc)	Primary care
Location (urban / rural)	100% urban
Duration (how often, how long for)	6 weeks

BLOCK 3: ANALYSIS

Source of data	3 structured focus groups lasting 90-120 mins that were recorded and transcribed verbatim. The focus groups covered topics on exercise assessment, goal attention, the prescribing process, the effectiveness of resources and training provided, perceived value of the green prescription, and how GPs visualized its use in their future practice.
Type of analysis (qualitative/quantitative)	Qualitative thematic analysis (part of an RCT comparing effectiveness of green prescriptions versus advice alone among sedentary patients which showed an increase in recreational activity from 54-81% after 6 weeks and an average increase in duration of 78 minutes)
What theoretical approach/framework was used?	Not stated. In discussion the authors noted that the green prescription operated from an 'authoritarian' paradigm but that this was mediated by GP's having to listen to patients' needs and suggestions and therefore the practice was more likely to represent some form of negotiation. Such 'mutual participation' was considered by authors to be 'an important prerquisite for effective health promotion in general practice'.
Model used	Na
Model diagnostics	Na
What primary outcome/dependent variable was reported (how were they specified in practice)? (note whether these were validated or not and whether objective or subjective)	Na
What secondary outcomes/independent variable were reported (how were they specified in practice)? (note whether these were validated or	Na

not and whether objective or subjective)	

BLOCK 4: RESULTS	
Main results	The RCT had shown that assessment and prescribing exercise took about 5 mins of the GP's time and in 79% cases walking was prescribed. **Quantifying and prescribing exercise** • GPs had little difficulty discussing exercise and felt it was clearly in their remit and ability. It was not a difficult subject to broach and often was related to patient's medical conditions. They felt a prescription to 'do a bit more' exercise was a natural end point. • Training on benefits and risks of exercise had helped discussions with benefits and harms and was considered to increase their confidence in discussing the subject. • Setting goals with patients to 'get them started' was considered positive, more personally involving of patients and to be like a 'contract' between GP and patient and a key ingredient in achieving exercise targets. • Some did not believe patients would respond and therefore that giving prescriptions was a waste of time. **Time taken** • Time taken (to quantify, discussion and prescribe exercise) was considered the main barrier to wider use of green prescriptions. GPs felt using green prescriptions had 'put them behind schedule'. Therefore they tended to choose quieter times to instigate discussions. • At 5 mins on average this would always take a large proportion of a GP consultation time, even if the time were cut in half given practice. • Knowing patients and becoming more practiced both contributed to reduced time. • Patients seen for routine follow ups for hypertension were seen as the easiest group to

	target, wWhilst patients with heart related diseases were seen as the ones likely to benefit most from exercise advice. • Remuneration (levels not given in paper) reduced the barriers to providing this service. • Resources and training provided to GPs were considered of good value. **Perceived value of green prescriptions** • Considered that writing down goals increased weight to the verbal advice. • The green prescription was sees as ‘ a very high note to end the consultation’ and at times was expected by patients who could feel ‘cheated’ if they didn’t receive a piece of paper. • GPs considered it a simple, worth and natural extension of what they do anyway. • It was considered of most value to the patients with heart disease and diabetes. • The value would be increased with appropriate follow up procedures such as; phone calls, including it in routine follow up appointments e.g. for hypertension (in which case the practice nurse was considered important to involve too); and if it were supported by national media campaigns. • Evidence of effectiveness would increase the value subscribed to such a programme
Attrition details (Indicate the number lost to follow-up and whether the proportion lost to follow-up differed by group (i.e. intervention v control)	

BLOCK 4: CHALLENGES	
Author-stated limitations	• GPs participating in the trial were more likely to be a motivated and innovative group that their peers • 'Despite the direct observation estimate of the duration of time spent counseling on exercise, there was no delineation of the character or exact content of what was discussed with patients. We have no data on how receptive the patients were to any counseling offered nor how effective it was'. • 'The generalizability of this physician sample, while likely to be largely representative of residencytrained family physicians across the country, requires judgment in extrapolation to other groups of clinicians'.
Author-stated strengths	As 25% of GPs in Dunedin indicated a willingness to be involved in the trial, this indicates a sizeable proportion of supporters for the basic concept.
Strengths identified by review team	Possibility of linking qualitative evidence to trial results
Evidence gaps and/or recommendations for future research	Lack of attempt to canvass GPs not involved in the trial. Not clear when GPs were dropped for inclusion in the analysis.

	The analysis could have usefully compared and contrasted views (and quantitative data on time taken) among supporters and protagonists of the scheme. Lack of detail about how themes were determined, evaluated and analysed. No indication that respondents had any role in interpreting the results from FGs. Replicating the study in a real setting not alongside an RCT. It is possible GPs gave socially desirable answers because they were part of a trial. In addition to this, the GPs involved in the trial could be argued to be more keen about exercise prescription. Although the authors argue that the responders in the focus groups were similar to the non-responders it does not alter the possibility that those who participated in the trial in first place (based in which the sample for the focus groups were selected) were enthusiastic. In addition, money was not considered a constraint because of the remuneration given in the study No explicit discussion of underlying theory

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
Theoretical approach	**Appropriate**	**Inappropriate**	**Not sure**	**Comments**
1. Is a qualitative approach appropriate? e.g Does the research question seek to understand processes or structures, or illuminate subjective experiences or meanings? Could a quantitative approach better have addressed the research question?	x			
2. Is the study clear in what it seeks to do? For example: Is the purpose of the study discussed – aims/objectives/research question/s? Is there adequate/appropriate reference to the literature? Are underpinning values/assumptions/ theory discussed?	**Clear**	**Unclear**	**Mixed** **x**	**Comments** Little justification for choice of focus groups given aims of study. Main barriers to implementing exercise advice are

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
				referred to briefly. Some assumptions are discussed. Not clear what the underlying theoretical approach was. Additional value of study beyond the 11 cited not clarified.
Study design	**Defensible**	**Indefensible**	**Not sure**	**Comments**
3. How defensible/rigorous is the research design/methodology? For example: Is the design appropriate to the research question? Is a rationale given for using a qualitative approach? Are there clear accounts of the rationale/ justification for the sampling, data collection and data analysis techniques used? Is the selection of cases/sampling strategy theoretically justified?		x		The selection of interviewees fits the working of the trial and there is a clear need for qualitative data to answer the question posed. However, it would have been helpful to have seen analysis in the light of how many were supporters and how many

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
				were not and to see compare and contrast comments made by both groups. In the context of the above it would have made sense to try an sample those who did not try to join the trial to help understand engagement. Stating 25% were willing to join the trial is not s sufficient argument to justify accepting all the 'positive' findings here as relevant to the population of GPs, afterall 75% did not accept to join the trial.
Data collection	**Appropriate**	**Inappropriate**	**Not sure**	**Comments**

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
			/inadequately reported	
4. How well was the data collection carried out? For example: Are the data collection methods clearly described? Were the appropriate data collected to address the research question? Was the data collection and record keeping systematic?	x			
Trustworthiness				
5. Is the role of the researcher clearly described? For example: Has the relationship between the researcher and the participants been adequately considered? Does the paper describe how the research was explained and presented to the participants?	**Clear**	**Unclear** **x**	**Not described**	**Comments** No details given on how each of the authors were involved or who the trained interviewer was (or what this training was). The purpose and training of the trial and FG is clearly presented to the GPs.
6. Is the context clearly described? For example: Are the characteristics of the participants and settings clearly defined? Were observations made in a sufficient variety of circumstances? Was context bias considered?	**Clear**	**Unclear** **x**	**Not sure**	**Comments** GPs characteristics partly described only

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
				in terms of location and how many patients recruited to trial. Few details given on situation of focus groups or impact of individual characteristics on dynamics of each group. Differences in circumstances not considered directly (other than comparing unlinked recruitment rates to trial). The likelihood of bias largely dismissed as no analysis supports consideration of in this issue.
7. Were the methods reliable? For example: Was data collected by more than one method?	**Reliable**	**Unreliable** **x**	**Not sure**	**Comments** Only collects data using

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
Is there justification for triangulation, or for not triangulating? Do the methods investigate what they claim to?				focus groups, although 3 are used. Note however, there is no comparison across the 3 groups. No consideration is given to 2 people analysing the data separately and comparing and contrasting findings (which would have been possible given availability of transcripts).
Analysis	**Rigorous**	**Not rigorous**	**Not sure/not reported**	**Comments**
8. Is the data analysis sufficiently rigorous? For example: Is the procedure explicit – i.e. is it clear how the data was analysed to arrive at the results? How systematic is the analysis, is the procedure reliable/dependable? Is it clear how the themes and concepts were derived from the data?			x	No detail given as to why and how themes were selected and validated in the analysis. The questions seem appropriate

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
				however. No indication was given other than data was analysed by themes. Even the listing of original themes selected is not given of the approach to deriving and testing themes. No details given on coding or e.g. inter-rater coding.
9. Are the data 'rich'? For example: How well are the contexts of the data described? Has the diversity of perspective and content been explored? How well has the detail and depth been demonstrated? Are responses compared and contrasted across groups/sites?	**Rich**	**Poor** **x**	**Not sure/not reported**	**Comments** There is almost no comparative analysis of any kind.
10. Is the analysis reliable? For example: Did more than one researcher theme and code transcripts/data? If so, how were differences resolved?	**Reliable**	**Unreliable** **x**	**Not sure/not reported**	**Comments** No indication of more than one researcher

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
Did participants feed back on the transcripts/data if possible and relevant? Were negative/discrepant results addressed or ignored?				looking at this or any feedback from respondents allowed.
11. Are the findings convincing? For example: Are the findings clearly presented? Are the findings internally coherent? Are extracts from the original data included? Are the data appropriately referenced? Is the reporting clear and coherent?	**Convincing**	**Not convincing** **x**	**Not sure**	**Comments** The findings are clearly presented. Extracts from original data are presented, although not in a way that can be attributed to characteristics of respondents. Largely presented in a coherent way too but not all points were supported by extracts, e.g. 'quantifying and prescribing exercise' were referenced; barriers and perceived value were

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
				not. Reasons given for findings not convincing due to self-selected sample and lack of comparative analysis.
12. Are the findings relevant to the aims of the study?	**Relevant**	**Irrelevant**	**Partially relevant** **x**	**Comments** The choice of GPs linked only to the trial is selective and has a higher probability of bias as those who did not participate in the trial may be less positive.
13. Conclusions For example: How clear are the links between data, interpretation and conclusions? Are the conclusions plausible and coherent? Have alternative explanations been explored and discounted? Does this enhance understanding of the research topic? Are the implications of the research clearly defined? Is there adequate discussion of any limitations encountered?	**Adequate**	**Inadequate** **x**	**Not sure**	**Comments**

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
Ethics	**Appropriate**	**Inappropriate**	**Not sure/not reported**	**Comments**
14. How clear and coherent is the reporting of ethics? For example: Have ethical issues been taken into consideration? Are they adequately discussed e.g. do they address consent and anonymity? Have the consequences of the research been considered i.e. raising expectations, changing behaviour? Was the study approved by an ethics committee?			x	Not clear if ethics approval was given (may be reported elsewhere as part of trial)
OVERALL GRADING	**++**	**+**	**-**	**Comments**
As far as can be ascertained from the paper, how well was the study conducted (see guidance notes)?			-	This was a very short paper for reporting qualitative research. More space may have helped address some of the issues raised. 1.Insufficient consideration of non-response bias 2. Not clear why alternative methods such as indepth interviews

BLOCK 5: QUALITY APPRAISAL FOR QUALITATIVE STUDIES				
				were not used. 3.No comparative analysis presented. 4. Little referencing to text extracts 4.Lack of details on coding and underlying theoretical frame

7.3. Appendix C: Excluded papers

Paper	Reason(s) for exclusion
Harland et al (1999) The Newcastle exercise project: a randomised controlled trial of methods to promote physical activity in primary care. BMJ 319:828-32	Not brief advice : An effectiveness study that did not evaluate brief advice per se as brief advice was the control arm
Petrella et al (2009). An office-based instrument for exercise counseling and prescription in primary care. The step test exercise prescription (STEP). Arch Family Medicine. 9	Not brief advice: Intervention was a step test, patient counseling as well as 3 follow up appointments against a comparator of 'general advice'
Wilson et al (1992).Health promotion in the general practice consultation: a minute makes a difference. BMJ 304:227-30	Not brief advice: General practice consultations
Gribben et al (2000). The early experience of general practitioners using green prescriptions. New Zealand Medical Journal. 113; 372-3	Not brief advice: too intensive
He (2011). Diabetes preventive services and policy implications in the US. Diabetes Care 34:8-13	Brief advice covered other lifestyle behaviour
Lentzner et al (2003).Do paediatric cardiologist discusses cardiovascular risk factors with patients and families? Cardiol Young; 13; 551-58	Brief advice covered other lifestyle behavior
Jilcott et al (2004). Implementing the WISEWOMAN program in local health departments: staff attitudes, beliefs, and perceived barriers. Journal of Women's Health. 13, 5.	Brief advice covered other lifestyle behaviour
Eley S and Eley R (2009). How do rural GPs manage their inactive and overweight patients? A pilot study of rural GPs in Queensland Australian Family Physician Vol. 38, No. 9,	Not brief advice: Study was about asking GP the barriers facing patients' general participation in exercise and not barriers for brief intervention per se
He et al (2010). Childhood overweight and obesity management: a national perspective of primary health care providers views, practices, perceived barriers and needs. Paedetric Child 15.7	Irrelevant patient group: childhood obesity related interventions
Suija et al (2010). Physical activity of Estonian family doctors and their counseling for a healthy lifestyle: a cross-sectional study. BMC Family Practice 11:48	Not barriers study: Study investigated the important topics in lifestyle counseling and which disease group patients tend to seek counseling on physical activity

Paper	Reason(s) for exclusion
Peeters et al (2008). Evaluation of a cancer exercise program: patient and physician beliefs. Pscho-Oncology 18:898-902	1.Irrelevant patient group: Cancer patients 2.Not brief advice: individualized exercise programme
Ampt et al (2009). Attitudes, norms and controls influencing lifestyle risk factor management in general practice. BMC family practice. 10:59	Brief advice covered other lifestyle behaviour
Christian et al (2011).A computer support program that helps clinicians provide patients with metabolic syndrome tailored counseling to promote weight loss. *J Am Diet Assoc. 2011;111:75-83.*	Not barriers study: Study addresses the effectiveness of a computer program
Bell and Orpin (2006): Self-management of chronic conditions: implications for rural physicians of a demonstration project Down Under Can J Rural Med 2006; 11 (1)	Not brief advice: Self-management of chronic conditions
Swinburn and Sager (2003). Promotion of exercise prescription in general practice for older population. Geriatrics & Aging 2003; 6, 7	Not brief advice: Exercise referral scheme
Caldwell et al (2011): The use of focused electronic medical record forms to improve health-care outcomes. Journal of the American Podiatric Medical Association. Vol. 101; 4	Not brief advice: Structured walking programme
Ziebland et al (1998) Lack of willpower or lack of wherewithal? Internal and external barriers to changing diet and exercise in a year follow-up of participants in a health check. Soc.Sci.Med. vol.46; 461-5	Not brief advice: Study was about the barriers to general participation in exercise and not to brief advice per se
Blackburn (2002): Establishing an effective framework for physical activity counseling in primary care settings. Nutrition in Care, Vol.5, No.3, 95-102	Not barriers study: Study describes a framework for exercise counseling
Wiesemann eta l (2004). Cardiovascular risk factors and motivation for a healthy life-style in a German community—results of the GP-based Oestringen study. Patient Education and Counseling 55 , 40-7	Not brief advice: Study was about the barriers to general participation in exercise and not to brief advice per se
Walker at al (2007). A qualitative study of primary care clinicians' views of treating childhood obesity. BMC Family Practice, 8:50	Irrelevant patient group: childhood obesity related interventions
Woolford et al (2009) Feasibility and acceptability of a 1-page tool to help physicians assess and discuss obesity with parents of preschoolers. Clinical Paediatrics Vol.48; 9	Irrelevant patient group: childhood obesity related interventions