Follow-up of cancer in primary care versus secondary care: systematic review

Ruth A Lewis, Richard D Neal, Nefyn H Williams, Barbara France, Maggie Hendry, Daphne Russell, Dyfrig A Hughes, Ian Russell, Nicholas SA Stuart, David Weller and Clare Wilkinson

INTRODUCTION
Following completion of treatment, most cancer patients are followed up regularly in hospital outpatient clinics. The perceived benefit of this is to facilitate diagnosis of recurrent disease, monitor the effectiveness and side-effects of treatment, manage comorbidity, and identify and treat psychosocial problems.1–4 There is also evidence that patients value the psychological and social support that cancer follow-ups provide,5–8 and find it reassuring.9–11 Conversely, hospital follow-up might also prompt unnecessary tests, raise anxiety, provide false reassurance, and delay the patient’s return to full function. For some cancer sites, such as breast and colorectal cancer, there is good evidence that routine follow-up does not provide survival benefit or lead to earlier diagnosis of recurrences, other than in terms of detecting locoregional recurrence or contralateral new primaries.12–16
Follow-up of cancer accounts for a substantial burden of outpatient activity. Financial and other drivers are putting downward pressure on ‘routine’ secondary care follow-up, and new models of care are developing, often through cancer collaboratives.16–18 In the UK, primary care, with its universal system of patient registration, generalist skills, and high satisfaction ratings, may be well placed to undertake some of this work. The UK general medical services contract encourages the review of cancer patients by including this within the Quality and Outcomes Framework. Some low-risk follow-up is already done in primary care, notably in prostate cancer, and more is advocated.19–21 However, this seems to be happening without rigorous evaluation. There is some disagreement between specialists and GPs about where care should be delivered, and debate about patient preference.22

A systematic review was conducted to compare the effectiveness and cost-effectiveness of primary versus secondary care follow-up of cancer patients. The study also evaluated the impact on primary care of discontinuing formal follow-up or replacing it with patient-initiated follow-up, as well as interventions integrating primary and secondary care for cancer follow-up. Qualitative studies were also included, but their findings are reported separately.23 (The review also looked at nurse-led follow-up as indicated in Figure 1, the findings of which are reported elsewhere.)

METHOD

The following databases were searched (from inception to February 2007) using strategies designed specifically for each database: MEDLINE, MEDLINE in process, EMBASE, CINAHL, PsychINFO, AMED, BIOSIS, Index to Scientific and Technical proceedings, Science Citation Index, Social Science Citation Index, Cochrane Central Register of Controlled Trials, Database of Abstracts of Reviews of Effects, Cochrane Database of Systematic Reviews, Health Technology Assessment database, NHS Economic Evaluation database, System for Information on Grey Literature, British Nursing Index, Health Management Information Consortium, National Research Register, and other trial registries (n = 7) available via the internet. No language restriction was used.

Each cancer site was searched separately, and full details of the search strategy are available on request and described elsewhere (R Lewis et al, unpublished data, 2007). (An example of the search strategy used for breast cancer is presented in Appendix 1.) Additional references were identified through reviewing the bibliographies of 16 retrieved systematic reviews and 42 included studies, and hand searching five conference proceedings.

How this fits in

Amid increasing debate, cancer follow-up is being shifted to primary care settings without rigorous evaluation. GP follow-up for breast cancer may be effective. A more formal involvement of primary care in routine hospital follow-up could lead to improved communication between primary and secondary care and more patients using GPs for support. Discontinuation of formal routine hospital follow-up does not appear to have an impact on primary care workload.

The search included any type of study or economic evaluation that compared cancer follow-up in primary care with that in a secondary setting. It also included studies that examined any type of intervention that involved formal primary care input in the evaluation after scanning the titles and abstracts. Total n = 263; database search n = 232 (94 NRR); handsearch* n = 31

References identified by
electronic database search
n = 43 861 (2493 NRR)

Publications excluded because they did not meet the inclusion criteria for the main review
n = 129 (discussion/commentary; literature review; uncontrolled quantitative studies; not evaluating cancer care; not evaluating cancer care FU; evaluating effectiveness of different tests in FU; evaluating effectiveness of different FU intervals; comparative patient-initiated or discontinuation of FU studies with no GP-related outcomes)

Publications evaluating
different models of FU
n = 134

Comparative nurse-led FU studies
(reported elsewhere)
n = 20 publications
n = 9 studies (6 completed studies plus 3 ongoing)

Qualitative studies reported separately
n = 28 publications
n = 21 studies (17 studies published in full, 2 published as abstracts only, and 2 unpublished)

Relevant publications n = 86 (73 NRR)
Included studies n = 13
Primary vs secondary care n = 5 (includes 1 economic evaluation; 2 published as abstracts)
M = 1 ongoing study
GP formal involvement n = 3
Patients-initiated FU (with GP outcomes) n = 3
n = 1 ongoing study
Includes 2 comparative studies (7 publications) with qualitative findings

*Handsearch of reference lists (16 systematic reviews and 42 included studies), internet searches (7 trials registries), and conference proceedings (n = 5). Cancer Research UK-funded systematic review looking at primary versus secondary care follow-up, which also evaluated the impact of alternative types of follow-up (including nurse-led follow-up) on primary care, and people’s views of follow-up irrespective of provider. Review of nurse-led follow-up was expanded to include comparative studies that did not report primary care-related outcomes (such as interim visits to GP), and is reported elsewhere. NRR = National Research Register (short abstracts without results). FU = follow-up.
routine hospital follow-up. Any type of outcome measure was included. Studies that compared follow-up with no follow-up or patient-initiated follow-up were also considered, but only if they reported data on primary care-related outcomes. The population of interest included patients of any age who had received treatment for any type and stage of cancer. Only studies that examined the follow-up of patients who were free of active disease or no longer receiving treatment for the following purposes were included: to identify recurrent tumours of new primary disease; to provide support for complications or delayed side-effects of treatments; or to identify patients who may require additional help or treatments (for example, for functional or psychological problems). Studies that examined patients who were still receiving hospital-based treatment (for example, radiotherapy) or treatment after care, rehabilitation, or specialist palliative care were excluded. Patients in cancer follow-up but receiving long-term therapy, such as hormonal treatment for breast or prostate cancer, who did not require frequent or routine hospital visits and who were free of active disease were included.

Two reviewers independently assessed the results of each cancer site-specific literature search and the relevance of retrieved studies. Data were extracted by one reviewer, using a predefined form, and checked by a second independent reviewer. Quality assessments were conducted independently by two reviewers. Disagreements were resolved by discussion and, when necessary, a third reviewer was consulted.

The quality of effectiveness studies was assessed using the checklist developed by Downs and Black, modified according to the suggestions made by Deeks et al., and adapted for use on cancer follow-up studies. Economic evaluations were assessed using an updated version of the checklist developed by Drummond and Jefferson.

Due to variation in the way the outcome data were reported and analysed, a meta-analysis was not feasible, even for the same outcome measures within each follow-up group. A narrative synthesis was therefore conducted.

**RESULTS**

The electronic searches identified 43,861 references of which 232 papers were retrieved in full. Thirty-one additional studies were identified by hand searching (Figure 1).

**Primary versus secondary care**

Five studies compared primary versus secondary care follow-up, but two were only reported in abstract form (a non-randomised study of patients who had undergone haematopoietic stem cell transplantation for malignant haematologic disorders and a randomised controlled trial [RCT] of patients with cutaneous melanoma). The three published RCTs examined follow-up for breast cancer and colon cancer (Table 1, part a). One of the breast cancer studies was a non-inferiority trial, and the other incorporated a cost analysis. Two studies recruited patients who had recently completed primary treatment, and one study recruited women who were already receiving follow-up. The percentages of eligible participants who declined to be randomised to primary or secondary care follow-up were fairly high (33%, 40%, and 55%), especially for studies that recruited patients who had just completed treatment. Only one study (breast cancer) incorporated a pre-trial education session of cancer follow-up for GPs, who were also given a handbook and discharge summary information. In the remaining two studies, GPs were provided with a brief summary of the current follow-up guidance.

The three RCTs that examine primary care versus secondary care follow-up were well conducted (Table 2, part a). All used an adequate randomisation method with allocation concealed from patients and clinicians. An attempt was made to blind those measuring the main outcomes in all three studies. The sample size was fairly small in two studies (range n = 203 to 296), and large in the non-inferiority trial (n = 968). The length of follow-up ranged from 18 months to a median of 3.5 years.

There were no statistically significant differences between the intervention groups in terms of patient wellbeing (psychological morbidity and quality of life), recurrence rate, or survival, but this may be due to lack of statistical power and the short duration of the studies (Table 3 and Table 4). The non-inferiority trial found no statistically significant difference between the groups for the main outcome of recurrence-related serious clinical events (defined as spinal cord compression, pathological fracture, hypercalcaemia, uncontrolled local recurrence, brachial plexopathy, or poor functional status at the time of diagnosis of recurrence), and was unable to demonstrate statistically significant non-inferiority. Although the absolute difference between the intervention groups was small (1.9%), the observed lower band of the confidence interval (95% CI = −2.26 to 2.65) crossed the non-inferiority margin of 1.5%. The patient population included women with early-stage breast cancer (69% had stage I–II disease) for whom a serious clinical event is a rare outcome, and in whom the length of follow-up (median 3.5 or 4.5 years post diagnosis; 31% had five-year follow-up) may not have been sufficient to...
Table 1. Characteristics of (a) primary versus secondary care follow-up studies and (b) GP involvement in conventional follow-up studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Interventions</th>
<th>Length of follow-up</th>
<th>Outcomes</th>
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<tr>
<td>(a) Studies of GP follow-up</td>
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<td>Grunfeld et al, 1996, UK, RCT</td>
<td>296 women with stage I-III breast cancer in remission (completed treatment ≥3 months previously). Mean age 61 years. Mean time since diagnosis: 3.4 years.</td>
<td>GP follow-up, n = 148</td>
<td>18 months</td>
<td>Diagnostic delay; SF-36; HADS; EORTC; mean number of visits; mean length of each visit; mean total time for follow-up visits; tests ordered; costs</td>
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<td>Grunfeld et al, 2006, Canada Non-inferiority RCT</td>
<td>968 patients with early-stage breast cancer in remission. Mean age 61 years. Time since diagnosis: 9-15 months.</td>
<td>GP follow-up, n = 483</td>
<td>Median 3.5 years. Patients observed until 5 years after randomisation or until 30 June 2003, whichever came first; 32% observed for 5 years</td>
<td>Death (all causes); recurrence related serious adverse event; recurrence rate; SF-36, HADS</td>
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<td>Wattchow et al, 2006, Australia, RCT</td>
<td>203 patients with colon cancer (Dukes A, B, or C). 58% were male, 13% were under 60 years of age, and 19% over 80 years. Mean time since diagnosis was not stated; patients recruited and randomised after completing treatment.</td>
<td>GP follow-up, n = 97</td>
<td>24 months</td>
<td>Death rate (per 1000 months on trial); recurrence rate (per 1000 months on trial); time to detection of recurrence (median); SF-12; HADS; patient satisfaction; number of follow-up visits (mean); number and type of investigations (blood tests, FOB tests, colonoscopies, and radiological investigations)</td>
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<td>(b) Studies examining formal involvement of GPs in conventional hospital follow-up</td>
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<td>Holstedahl et al, 2005, Norway, RCT</td>
<td>91 cancer patients diagnosed with primary (n = 78) or relapsing (n = 13) cancer; 77 treated with curative intent. Mean age 62 years; 44% male. Patients were invited to participate after completing therapy</td>
<td>Increased contact with the patients’ GPs soon after cancer treatment (invitation to two consultations with their GP and advised to contact GP with any problems). Also received routine hospital follow-up, n = 41; conventional hospital follow-up, n = 50</td>
<td>6 months (from diagnosis)</td>
<td>EORTC QLQ C-23; GP consultation</td>
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<td>Johansson et al, 2001, Sweden, RCT</td>
<td>527 newly diagnosed cancer patients. Included sites: breast, prostate, colorectal, and gastric. Only 510 followed-up; 16 discontinued before receiving information about randomisation and 1 died. For those who completed the trial (n = 416) the age was 63 years and 34% were male.</td>
<td>Individual support starting at diagnosis: intensified primary healthcare (IPH); nutritional support, and psychological support. I PH extended information from specialist clinics, education and supervision in cancer care for GPs, and home-care nurses. Patients were referred by the project team to a home-care nurse and the GP informed of the referral, n = 260. Standard care, n = 250</td>
<td>Utilisation of specialist care: 3 months (from diagnosis). Frequency of contacts with home-care nurse: 6 months (from diagnosis; intervention, n = 178; control, n = 178)</td>
<td>Number of patients who had contact with home-care nurse (at 6 months); hospital admissions (at 3 months); days in hospital (at 3 months); visits to outpatient (at 3 months); acute hospital admissions (at 3 months); acute outpatient visits (at 3 months); frequency of contact with home-care nurse (at 6 months)</td>
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<td>Nielsen et al, 2003, Denmark, RCT</td>
<td>248 newly diagnosed cancer patients; 183 had local/tobregional disease. Cancer site: breast, gastrointestinal, germinal cell, head and neck, bladder and kidney, ovarian and cervix, sarcoma, malignant melanoma, brain, lung, and miscellaneous. 32% were 18-49 years of age and 36% were male.</td>
<td>Shared care programme: transfer of knowledge from the oncologist to the GP (discharge summary letters according to study guidelines), improved communication between parties (provision of name and contact details of hospital doctors and nurses), and active patient involvement (patients advised to visit GP with problems), n = 127. Conventional hospital care: no usual procedure of informing GPs of newly diagnosed patients, discharge summary letter (not following guidelines) sent at end of treatment period, n = 121</td>
<td>6 months</td>
<td>HRQL/performance status; contact with GP; information from GP; care from GP; GPs’ knowledge; global assessment of the GP; intersectorial cooperation (primary sector and department of oncology); global assessment of intersectorial cooperation; feeling of not being left in limbo; global assessment of perception of not being left in limbo</td>
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</table>

EORTC = European Organisation for Research and Treatment for Cancer. EORTC QLQ-C23 = EORTC Quality of Life Questionnaire Core 23. FOB = faecal occult blood tests. HADS = Hospital Anxiety and Depression Scale. HRQL = Health related quality of life. RCT = randomised controlled trial. SF-12 = Short Form 12-Item General Health Questionnaire. SF-36 = Short Form 36-Item General Health Questionnaire.
measure the serious effects of recurrent disease. Although patients remained in the trial until death, assessment for serious clinical outcomes was only done until a recurrence was detected or the trial ended.

Only two studies examined patient satisfaction. One found that satisfaction with breast cancer follow-up was higher in the GP group (6 of 12 items) than the hospital group at 9 months (midtrial), but did not report satisfaction at 18-month follow-up (end of trial). The second study reported no statistically significant difference between the groups at 2 years for colon cancer follow-up. Two studies also evaluated resource use. Hospital doctors and GPs were found to differ in the type and number of diagnostic tests ordered, as well as the length and frequency of visits. A comprehensive cost analysis (cost year 1994) found that breast cancer follow-up by the GP was less costly than routine hospital follow-up, by a mean of £130 per patient (95% CI = £112 to £149). This was due to a difference in physician cost and not because of the variation in diagnostic tests ordered.

**Formal involvement of GP in cancer care follow-up versus conventional care**

Three RCTs examined formal involvement of primary care in routine hospital follow-up. No economic evaluations were identified. All three studies included patients with cancer originating from multiple sites (Table 1, part b). The study by Holtedahl et al examined an intervention that involved patients being...
invited to attend two 30-minute consultations with their GP; one soon after completing treatment and the other 6 months later. During the consultation, patients were asked about their wellbeing and their experience of having cancer (open-ended questions provided by researchers). Patients were also advised to contact their GP if they had any cancer-related queries or problems. In addition, patients received routine hospital follow-up; the control group received routine hospital follow-up only.

The study by Johansson et al examined an intervention that was part of the Support-Care-Rehabilitation project, which involved individual patient support in terms of intensified primary health care, nutritional support, and psychological support. The intervention was implemented as soon as possible after randomisation, and patients were referred to a home-care nurse, who contacted the patient and suggested follow-up contacts during the period of primary treatment and rehabilitation or palliative care. GPs of these patients were informed of the cancer diagnosis and the referral to the home-care nurse. Intensified primary health care involved extended information from the specialist clinics (GPs and home-care nurses received copies of the medical records each time the patient was discharged from hospital after a period of inpatient care or attended outpatient clinic); education (in diagnostics and treatments of cancer, pain and diet management, psychosocial support, and palliative care); and supervision in cancer care for GPs and home-care nurses. The control included standard care, which routinely did not include follow-up contacts made by home-care nurses.

Nielsen et al examined an intervention which involved the use of discharge letters that followed predefined guidelines, which were developed for the study. These included details of the investigations, treatment, and information the patient had received; described in detail which physical, psychological, and social problems the patient had or might expect to get; contained information about what the oncologist expected the GP to do; and provided information about the patient’s type of cancer, treatment plans, and prognosis as well as information about treatment of common side effects and pain. The names and phone numbers of the hospital doctors and nurses who were responsible for the patient were also attached to the discharge letters. Patients received both oral and written information about the information package given to their GPs, and were advised to contact their GP if they had any problems they thought could be solved in this setting. The control group received routine hospital care, where the GP was rarely informed of the patient’s cancer diagnosis, and summary discharge letters did not follow any guidelines.

The interventions were complex and, in two studies, involved educating GPs and/or home-care nurses about cancer. The unit of randomisation was the patient in both of these studies, although a type of cluster randomisation was used in one. In one study, once a patient from a practice was randomised, all subsequent patients from the same practice were automatically assigned to the same group. In the second study patients in the control group could have a GP (or home-care nurse) who had received the educational component of the intervention, or a GP who had not, but this was not taken into account in the analysis. Two studies included newly diagnosed patients and the intervention was initiated prior to the follow-up

Table 3. Results of survival and recurrence.

<table>
<thead>
<tr>
<th>Study details</th>
<th>Survival</th>
<th>Recurrence</th>
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<tbody>
<tr>
<td>Grunfeld et al, 1996.</td>
<td>Not reported</td>
<td>Diagnostic delay: GP n = 22 versus hospital n = 21; mean difference 1.5 (95% CI = –13 to 22). Assessed at a single date; recurrence rate GP n = 10 (6.8%) versus hospital n = 16 (10.6%). No comprehensive review at end of trial to identify missed recurrences.</td>
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<td>Cancer site: breast. Length of follow-up: 18 months. Sample size: n = 296; GP n = 148, hospital n = 148</td>
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<td>Grunfeld et al, 2006.</td>
<td>Deaths (all cause): GP 29 (6.0%), versus hospital 30 (6.2%); difference: 0.18% (95% CI = –2.90 to 3.26)</td>
<td>Recurrence-related serious clinical events: GP n = 17 (3.5%) versus hospital n = 18 (3.7%); difference: 0.19% (95% CI = –2.26 to 2.65). Recurrence or new contralateral breast cancers: GP n = 54 (11.2%) versus hospital n = 64 (13.2%); difference: 2.02% (95% CI = –2.13 to 6.16). Comprehensive review at end of trial found no missed recurrence.</td>
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<td>Cancer site: breast. Length of follow-up: median 3.5 years. Sample size: n = 968; GP n = 483, hospital n = 485</td>
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<td>Wattchow et al, 2006.</td>
<td>Death rates (per 1000 months on trial): GP n = 6.6 versus hospital n = 5.4; P = 0.67, Fisher’s exact test. Median survival (months): GP 31 versus hospital 20; P = 0.69, log rank test</td>
<td>Recurrence rate (per 1000 months on trial): GP n = 7.1 versus hospital 8.0; P = 0.92, Fisher’s exact test. Median time to detection (months): GP n = 9.5 versus hospital 8.0; P = 0.76, log rank test. Recurrence rate obtained from state-based cancer registries.</td>
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<td>Cancer site: colon. Length of follow-up: 24 months. Sample size: n = 203; GP n = 97, hospital n = 106</td>
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<td>Study</td>
<td>Psychological morbidity</td>
<td>Quality of life</td>
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<td>Grunfeld et al, 1996.</td>
<td>Mean change from baseline for HADS score; difference in means (95% CI):</td>
<td>Mean change from baseline for SF-36 score; difference in mean change from baseline (95% CI):</td>
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<tr>
<td>Cancer site: breast. Length of follow-up: median 18 months. Sample size: n = 296; GP n = 148, H n = 148. Questionnaire response rates after denominators adjusted for those who died or went away (n = 2); GP 137/141 (97%), H 119/135 (88%)</td>
<td>Anxiety GP 0.3 vs H 0.1; 0.4 (0.3 to 1.2)</td>
<td>Physical GP –1.6 vs H –4.7; 3.1 (–1.1 to 7.5)</td>
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<td>Depression GP 0.6 vs H 0.2; 0.4 (0.2 to 1.1)</td>
<td>Functioning Pain GP –0.6 vs H –4.4; 3.8 (~1.5 to 9.2)</td>
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<td>Role functioning GP 5.2 vs H 1.0; 4.1 (~5.6 to 13.9)</td>
<td>Social GP –4.8 vs H –3.0; –1.8 (~7.2 to 3.5)</td>
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<td>– physical Role functioning GP 1.9 vs H 0.1; 1.8 (~7.3 to 10.8)</td>
<td>– emotional General health perception Fatigue GP –2.0 vs H –2.6; 0.6 (~3.6 to 4.8)</td>
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<td>– emotional General health perception Fatigue GP –1.6 vs H –2.1; 0.5 (~4.1 to 5.1)</td>
<td>Mental health GP 1.3 vs H –2.5; 3.8 (~0.7 to 8.3)</td>
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<td>– emotional General health perception Fatigue GP 1.5 vs H 3.7; ~2.2 (~6.5 to 2.2)</td>
<td>Vitality GP 0.1 vs H 2.7; ~2.6 (~8.0 to 2.8)</td>
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<td>– emotional General health perception Fatigue GP 0.1 vs H 2.7; ~2.6 (~8.0 to 2.8)</td>
<td>Sleep GP –1.7 vs H 2.0; ~3.7 (~10.4 to 2.9) disturbances</td>
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<td>– emotional General health perception Fatigue GP 3.0 vs H 7.6; ~4.6 (~9.8 to 0.6)</td>
<td>Appetite loss GP 1.4 vs H 4.1; ~2.7 (~7.4 to 2.3)</td>
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<td>Grunfeld et al, 2006.</td>
<td>Using a growth model, there were no statistically significant differences (P &gt; 0.05, likelihood ratio test) between the groups over time for mean SF-36 physical or mental component scores. (Mean response profiles were presented but no raw data given. SF-36 measured during interval the patient was recurrence free)</td>
<td>Using a growth model, there were no statistically significant differences (P &gt; 0.05, likelihood ratio test) between the groups over time for mean SF-36 physical or mental component scores. (Mean response profiles were presented but no raw data given. SF-36 measured during interval the patient was recurrence free)</td>
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<td>Cancer site: breast. Length of follow-up: median 3.5 years. Sample size: n = 968; GP n = 483, H n = 485. Questionnaire response (at 60 months) after denominators adjusted for those who died: GP 106/480 (22%), H 104/483 (22%)</td>
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<td>Watchchow et al, 2006.</td>
<td>Median (interquartile range) HADS score; P adjusted analysis for baseline differences: Anxiety GP 4.0 (5.0) vs H 5.0 (4.5); P = 0.11</td>
<td>Median (interquartile range) SF-12 score; P adjusted analysis for baseline differences: Physical GP 48.5 (17.7) vs H 50.4 (14.4); component Mental GP 54.4 (17.7) vs H 55.9 (14.4);</td>
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<td>Cancer site: colon. Length of follow-up: 24 months. Sample size: n = 203; GP n = 97, H n = 106. Questionnaire response after denominators adjusted for those who died: GP 76/89 (85%), hospital 79/95 (83%)</td>
<td>Depression GP 4.0 (5.0) vs H 3.0 (4.0); P = 0.80</td>
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Table 4 continued. Results of psychological morbidity, quality of life and patient satisfaction.

<table>
<thead>
<tr>
<th>Study</th>
<th>Psychological morbidity</th>
<th>Quality of life</th>
<th>Patient satisfaction</th>
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<tbody>
<tr>
<td>Holte Dahl et al., 2005</td>
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<td>Cancer site: multiple sites. Length of follow-up: 6 months. Sample size: Int $n = 41$, H $n = 50$. Questionnaire response rate was Int: 88%, H: 90%</td>
<td>Mean change from baseline for EORTC QLQ-C30; estimate for differences between groups (95% CI):</td>
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### Functional scales

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<tr>
<th></th>
<th>Int ($M = 4.0$) vs H ($M = 3.3$); $95%$ CI: $(-1.4 \pm -0.10)$</th>
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<td>(EORTC QLQ-C30: European Organisation for Research and Treatment for Cancer. EORTC QLQ-C30 = European Organisation for Research and Treatment for Cancer Quality of Life Questionnaire Core 30; a high score on functional scale represents healthy level of function; a high global health status score represents high quality of life; a high score of symptom scale represents a high level of symptoms/problems). GP = GP follow-up group. H = routine hospital follow-up group. HADS = Hospital Anxiety and Depression Scale (higher scores indicate greater level of anxiety and depression). Int = intervention group, involving the integration of primary and secondary care. SF-12 = Short Form 12-item General Health Questionnaire (higher scores indicate better quality of life). SF-36 = Short Form 36-item General Health Questionnaire (higher scores indicate better quality of life). QoL = Quality of life. Note: Johansson et al. did not include any relevant outcomes for this table.</td>
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Table 5. Results relating to primary care consultations.

<table>
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<tr>
<th>Study details</th>
<th>Number of patient contacts with primary care</th>
<th>Frequency of patient contact with primary care</th>
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<tr>
<td><strong>Holtedahl et al, 2005.</strong></td>
<td>Number of consultations with GP — patient reported: Int 13 (n = 31) versus H 28 (n = 46); (RR 0.69, 95% CI = 0.43 to 1.11)</td>
<td>Frequency of GP consultations — reported by GPs: mean number of consultations in the intervention group was 1.68 (ranged 0–8); number of patients not stated. Data for control group not reported. Mean number of consultations — patient reported: Int 1.26 (n = 31; range 1–7 per patient) versus H 1.04 (n = 46; range 1–5 per patient)</td>
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<td>Cancer site: multiple sites. Length of follow-up: 6 months.</td>
<td>Contact with home-care nurse — patient reported: Int 96 (n = 203) versus H 11 (n = 178); f &lt;0.05, χ² test (RR 1.7, 95% CI = 1.38 to 2.14)</td>
<td>Contact with home-care nurse — patient reported: frequency of contact with nurse was greater in the intervention group than control (number of patients not stated; f &lt;0.001, Mann–Whitney U test)</td>
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<tr>
<td>Sample size: Int n = 260, H n = 250</td>
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<tr>
<td><strong>Johansson et al, 2001.</strong></td>
<td>Contact with GP — patient reported: Int 46 (n = 77) — versus H 40 (n = 91); f = 0.046, χ² test (RR 1.36, 95% CI = 1.01 to 1.83)</td>
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<tr>
<td>Cancer site: multiple site. Length of follow-up: 6 months since diagnosis. Sample size: Int n = 121, H n = 127</td>
<td>Breast-related GP referral (to hospital): PI 4 versus H 3; (RR 1.38, 95% CI = 0.34 to 5.64)</td>
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<td><strong>Nielsen et al, 2003.</strong></td>
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<td>Total number of GP visits — patient reported (number of visits/patient not reported): PI 53 (4 cancer related) versus H 53 (7 cancer related)</td>
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<tr>
<td>Cancer site: multiple site. Length of follow-up: 6 months since diagnosis. Sample size: n = 193; PI 97, H 96</td>
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<tr>
<td>Brown et al, 2002.</td>
<td>—</td>
<td>Median number of GP visits — patient reported: data on GP visits based on a random sample of 50 patients selected from the two intervention groups, PI 4 (n = 24) versus H 2 (n = 26), f = 0.33, Mann–Whitney U test (no visit due to symptom problem)</td>
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<tr>
<td>Cancer site: breast. Length of follow-up: 12 months. Sample size: n = 62; PI 30, H 31 (one patient did not return questionnaires)</td>
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<td><strong>Guilford et al, 1997.</strong></td>
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<tr>
<td>Cancer site: breast. Length of follow-up: median 16 months. Sample size: n = 193; PI 97, H 96</td>
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<td><strong>Kjeldsen et al, 1999.</strong></td>
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<tr>
<td>Cancer site: colorectal. Length of follow-up: not stated. Sample size: n = 320; PI 161, H 159. Data based on a subgroup of 50 patients who were included in a RCT of frequent versus virtually no follow-up during 1983–1994.</td>
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H = routine hospital follow-up group. Int = intervention group. PI = patient-initiated. RCT = randomised controlled trial. RR = relative risk.

period, after completing cancer treatment. The study by Holtedahl et al included patients with primary or relapsing cancer who had completed treatment. The percentages of eligible patients included in the trials were low and ranged from 41% to 47%. Study quality ranged from poor to moderate, and all three were poorly reported (Table 2, part b). In the study by Holtedahl et al, patients were randomised to intervention or control using sealed envelopes based on a table of random numbers, but it was not clear when and how envelopes were allocated; therefore, allocation concealment could not be assured. Although randomisation by Johansson et al was based on a computer-generated allocation schedule and was stratified for diagnosis and stage, allocation concealment was not reported. More patients with advanced breast cancer were randomised to the intensified primary healthcare group than the control. A type of cluster randomisation was used by Nielsen et al. Patients in the intervention group were younger (n = 47, 39%, aged 18–49 years) than those in the control group (n = 32, 25%, aged 18–49 years) and more patients in the intervention group (n = 99, 82%) were treated with curative intent than in the control group (n = 94, 74%). Blind data collection and analysis of outcomes were not reported by Johansson et al. Blinding of outcomes assessment was also not reported by the remaining two studies. The main outcomes were based on data from questionnaires completed by the patient, and it was unclear whether researchers handling data were blinded to treatment allocation. Sample size ranged from small (n = 91) to moderate (n = 527). Thirteen (14%) patients in the study by Holtedahl et al had relapsing cancer. The length of follow-up in all three studies was 6 months, although only 3-month data were reported for most outcomes from the study by Johansson et al.

There were no statistically significant differences between the intervention groups in terms of patient wellbeing, or patient satisfaction relating to GP.
contact, intersectoral cooperation, and patients' feelings of being left in limbo (Table 4). Two studies found that the intervention was associated with a statistically significant increase in the contact with either the GP or home-care nurse at 6 months (Table 5). However, the Holtedahl et al. study found that an intervention comprising two pre-arranged formal consultations with the GP did not result in a significant increase in additional GP visits at 6 months. There was no statistically significant difference between the intervention groups for hospital admissions and outpatient visits.

**Effect of hospital-based patient-initiated or minimal follow-up on primary care**

Three RCTs evaluated the effect of patient-initiated or (virtually) no follow-up on primary care. Two studies included women with breast cancer, and patients in the intervention group were advised to either telephone the nurse, or request an immediate appointment if they had any problems. Women received an annual mammogram in both studies. One study included patients who had received treatment for colorectal cancer, and were advised to see their GP if they had any abdominal pain or change in bowel habits lasting more than two weeks. The quality ranged from poor to good. There were no important differences between the groups for the number of GP visits or cancer-related GP referrals.

**DISCUSSION**

**Summary of main findings**

There were no statistically significant differences between primary and secondary care follow-up of cancer patients (breast or colon) in terms of patient wellbeing, psychological morbidity, and patient satisfaction. However, this may be due to the duration of follow-up and sample size rather than the interventions being equivalent. The findings did not demonstrate any harmful effects of GP-led follow-up. GP-led follow-up for breast cancer was less costly than routine hospital follow-up, due to a difference in physician costs (cost year used 1994). Some interventions that involved improved integration between primary and secondary care resulted in an increase in patient contact with primary care. There were no significant differences between the groups in terms of patient wellbeing and satisfaction. However, these findings are based on poorly reported studies with a short duration of follow-up. The discontinuation of routine hospital follow-up or patient-initiated follow-up did not appear to have an impact on primary care, but this was based on three small RCTs. Overall, the quality of the data was generally poor, and no firm conclusions can be made.

**Strengths and limitations of the study**

A strength of the review was the comprehensive literature search. However, to make it manageable, separate searches were carried out of the electronic databases for each cancer site, and a general search was not undertaken using the term ‘cancer’ (or tumour) alone. Although the searches did identify studies evaluating multiple cancer sites, it is not possible to be certain that none were missed. However, database searches were supplemented by a search of conference proceedings and reference lists of included studies and other reviews, which were not narrowed by cancer site.

The review concentrated on the use of primary care as an alternative setting for cancer follow-up and did not address any other issues relating to follow-up. Because of the small number of relevant studies, it was not possible to assess for any publication bias. The inconsistent methods used to analyse and report most outcome measures meant that no data could be pooled in a meta-analysis.

There are limitations of the available evidence relating to primary- versus secondary-care follow-up, as it is small and only covers two cancer sites: the breast and colon. Limitations of the included non-inferiority RCT meant that the evidence for assessing the equivalence of the primary and secondary care settings for breast cancer follow-up was lacking. There is also a paucity of economic evidence on primary versus secondary care follow-up. Further evidence relating to the effectiveness and cost-effectiveness of primary care follow-up may be provided by an RCT of primary care follow-up for cutaneous melanoma, and an ongoing RCT of symptomatic follow-up of colorectal cancer in primary care augmented with monitoring of tumour markers or intensive imaging in hospital (http://www.facs.soton.ac.uk/).

The length of follow-up and sample size were insufficient to measure delayed diagnosis of recurrences or survival rates, which means that the impact of various types of follow-up on such outcomes is not clear. Duration of follow-up is also likely to affect the outcome of patient satisfaction, as patients are likely to have a different perspective of their follow-up needs during the first 2 years after completing treatment, than later in their cancer journey.

The data-collection tools used for psychological morbidity, health-related quality of life, and patient satisfaction were limited. Although the Hospital Anxiety and Depression Scale and Short Form-36 are good instruments to measure global function, they are not designed to measure cancer survivor symptoms. On the whole, patient satisfaction
questionnaires were not well developed, and the response rates were poor, making the findings potentially unreliable.

The patient population evaluated in the comparative studies may not have been representative of the population attending cancer follow-up as a whole, because patients who did not want primary care follow-up may not have been randomised.

**Comparison with existing literature**

Other reviews of cancer follow-up have included comparisons between different models of follow-up, providers, and location. Only one other systematic review looking at primary versus secondary care follow-up has been identified. This review evaluated RCTs of alternative methods of follow-up in breast cancer, including reduced frequency of visits. It included seven RCTs: two that compared primary with secondary care follow-up, two that evaluated nurse-led patient-initiated follow-up, one that evaluated nurse-led routine follow-up, and two that examined different frequencies of follow-up. The authors concluded that all trials were of inadequate power or duration to establish the ideal frequency of appointments or safety of alternative models of follow-up, but the alternative methods of follow-up had no detrimental effect on survival or outcome. Two further reviews evaluating the effectiveness of breast cancer follow-up found that patient survival and quality of life were not affected by location of care. A systematic review of follow-up for cutaneous melanoma found no studies that examined differences between different providers or locations of follow-up.

Previous systematic reviews found that the only effective follow-up procedures in breast cancer were mammography and physical examination. Systematic reviews of colorectal cancer found that intensive hospital follow-up led to an overall survival benefit of about 20% when compared with less-intensive follow-up. The survival benefit appeared to be associated with the measurement of carcinoembryonic antigen combined with liver imaging. A systematic review of follow-up for cutaneous melanoma found no evidence to support high-intensity follow-up. Only medical history and physical examination appeared to be cost-effective. However, new technological developments in follow-up methods may change the picture of what to do.

**Implications for future research and clinical practice**

With further training for GPs, rapid access to hospital specialists, and annual mammography, breast cancer follow-up would be feasible in primary care. However, further psychosocial studies are needed to determine its acceptability. The follow-up of colorectal cancer might also be feasible, but the evidence base is limited. Results of research in progress are awaited. Primary-care follow-up for breast cancer might also be cost-effective. However, it is dependent on the unit cost of GP care, and would require additional funding as it is not a core activity. The willingness of primary care to undertake this additional work is unknown, but interventions that improved communication between primary and secondary care were found to increase GP involvement in cancer care. Poor communication between primary and secondary care was seen as a barrier in the current authors’ joint publication of qualitative studies, and improved communication is a key recommendation of the National Institute for Health and Clinical Excellence guidelines on breast and colorectal cancer. The willingness of GPs to undertake this role may also be hampered by a perceived lack of specialist knowledge. Only one study of primary care follow-up (breast cancer) incorporated a pre-trial education session of cancer follow-up for GPs. Continued professional education in oncology will be needed if this role is to be extended.

Further RCTs are needed of primary versus secondary care follow-up in cancer where the ideal hospital-based follow-up is transferable to a primary care setting. The studies need to be of sufficient size and duration to ensure that important differences between the intervention groups are identified. They should also include robust psychosocial outcome measures. Future research should include a health-economic analysis that takes into account the current cost of general practice and the additional funding required for this non-core activity.

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**Ethical approval**

Not applicable

**Competing interests**

No applicable

**Acknowledgments**

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Robert G. Pascoe
The University of Manchester
Manchester M13 9PL
United Kingdom
E-mail: robert.pascoe@manchester.ac.uk
Appendix 1. Search strategy.

Search strategy

The following search strategy for breast cancer was used in MEDLINE (using the OVID interface), and subsequently translated and adapted for use in other databases (and for other cancer sites).

1. Patient discharge/

2. ((followup$ or follow-up$ or follow up or follow ups) adj4 (discharg$ or discontin$)).ti,ab.

3. ((checkup$ or check-up$ or check up$ or check ups) adj4 (discharg$ or discontin$)).ti,ab.

4. ((followup$ or follow-up$ or follow up or follow ups) adj4 (stop or stops or stopping or stopped)).ti,ab.

5. ((followup$ or follow-up$ or follow up or follow ups) adj4 (cease or ceases or ceasing or ceased or cessation)).ti,ab.

6. ((checkup$ or check-up$ or check up or check ups) adj4 (cease or ceases or ceasing or ceased or cessation)).ti,ab.

7. ((followup$ or follow-up$ or follow up or follow ups) adj4 (end or ends or ending or ended)).ti,ab.

8. ((checkup$ or check-up$ or check up or check ups) adj4 (end or ends or ending or ended)).ti,ab.

9. ((followup$ or follow-up$ or follow up or follow ups) adj4 (terminate$)).ti,ab.

10. ((followup$ or follow-up$ or follow up or follow ups) adj4 (finish$)).ti,ab.

11. ((followup$ or follow-up$ or follow up or follow ups) adj4 (withdraw$)).ti,ab.

12. ((followup$ or follow-up$ or follow up or follow ups) adj4 (cut-off or cut off$)).ti,ab.

13. Continuity of patient care/

14. ((minimal or conventional) adj2 (surveillance$ or followup$ or follow-up$ or follow up or follow ups)).ti,ab.

15. (routine adj2 (followup$ or follow-up$ or follow up or follow ups or visit$)).ti,ab.

16. (routine adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.

17. (surveillance$ adj2 (recur$ or relaps$ or protocol$ or routine$ or regular$ or followup$ or follow-up$ or follow up or follow ups)).ti,ab.

18. (surveillance$ adj2 (test or tests or testing or tested or hospital or outpatient$ or out-patient or outpatient$ or standard$)).ti,ab.

19. (intensive or frequent or aggressive) adj2 (surveillance$ or followup$ or follow-up$ or follow up or follow ups)).ti,ab.

20. active$ monitor$.ti,ab.

21. (routine adj2 exam$)).ti,ab.

22. (routine adj2 review$)).ti,ab.

23. (outpatient$ adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

24. (outpatient$ adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.

25. (systematic adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

26. (scheduled adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

27. (scheduled adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.

28. (scheduled adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.

29. (regular$ adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

30. (regular$ adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.

31. (specialist$ adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

32. (hospital$ adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

33. (hospital$ adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.

34. ((clinic or clinics) adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.

... continued
### Appendix 1 continued. Search strategy.

35. ((clinic or clinics) adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.
36. (initiated adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.
37. (initiated adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.
38. ((general practitioner$ or GP$ or practice or physician) adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.
39. ((general practitioner$ or GP$ or practice or physician) adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.
40. ((telephone or phone$) adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.
41. ((telephone or phone$) adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.
42. ((followup$ or follow-up$ or follow up or follow ups) adj2 (secondary or primary)).ti,ab.
43. ((checkup$ or check-up$ or check up or check ups) adj2 (secondary or primary)).ti,ab.
44. (nurse$ adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.
45. (nurse$ adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.
46. (standard$ adj2 (followup$ or follow-up$ or follow up or follow ups)).ti,ab.
47. (standard$ adj2 (checkup$ or check-up$ or check up or check ups)).ti,ab.
48. ((followup$ or follow-up$ or follow up or follow ups) adj2 regime$).ti,ab.
49. ((followup$ or follow-up$ or follow up or follow ups) adj2 (postsurgery or post-surgery or postsurgery or post surgical or post surgical$ or postoperat$ or post-operat$ or postoperat$)).ti,ab.
50. ((checkup$ or check-up$ or check up or check ups) adj2 (postsurgery or post-surgery or postsurgery or post surgical or post surgical$ or postoperat$ or post-operat$ or postoperat$)).ti,ab.
51. ((followup$ or follow-up$ or follow up or follow ups) adj2 appointment$).ti,ab.
52. ((checkup$ or check-up$ or check up or check ups) adj2 appointment$).ti,ab.
53. or/1–52
54. exp Breast Neoplasms/
55. ((breast or breasts or mammar$) adj3 (cancer$ or neoplas$ or malignant$ or carcinoma$ or sarcoma$ or oncolog$ or tumo$r$ or adenocarcinoma$ or infiltrat$ or medullary or intraductal)).ti,ab.
56. ((breast or breasts or mammar$) adj3 (duct or ducts or ductal)).ti,ab.
57. ((breast or breasts or mammar$) adj3 (lobule$ or lobe or lobes or lobular)).ti,ab.
58. ((breast or breasts or mammar$) adj3 (metastas$ or metastatic$)).ti,ab.
59. 54 or 55 or 56 or 57 or 58
60. 53 and 59

The strategy is based on the one used for an unpublished scoping review (looking at follow-up for breast cancer) undertaken by the Centre for Reviews and Dissemination, University of York as part of a project with the National Cancer Research Network Coordinating Centre.