



Interventions to improve care coordination between primary healthcare and oncology care providers: a systematic review

Jennifer R Tomasone,¹ Melissa C Brouwers,² Marija Vukmirovic,² Eva Grunfeld,³ Mary Ann O'Brien,³ Robin Urquhart,⁴ Melanie Walker,⁵ Fiona Webster,³ Margaret Fitch⁶

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ABSTRACT

Coordination of patient care between primary care and oncology care providers is vital to care quality and outcomes across the cancer continuum, yet it is known to be challenging. We conducted a systematic review to evaluate current or new models of care and/or interventions aimed at improving coordination between primary care and oncology care providers for patients with adult breast and/or colorectal cancer. MEDLINE, EMBASE, CINAHL, Cochrane Library Database of Systematic Reviews, and the Centre for Reviews and Dissemination were searched for existing English language studies published between January 2000 and 15 May 2015. Systematic reviews, meta-analyses, randomised controlled trials (RCTs) and non-randomised studies were included if they evaluated a specific model/intervention that was designed to improve care coordination between primary care and oncology care providers, for any stage of the cancer continuum, for patients with adult breast and/or colorectal cancer. Two reviewers extracted data and assessed risk of bias. Twenty-two studies (5 systematic reviews, 6 RCTs and 11 non-randomised studies) were included and varied with respect to the targeted phase of the cancer continuum, type of model or intervention tested, and outcome measures. The majority of studies showed no statistically significant changes in any patient, provider or system outcomes. Owing to conceptual and methodological limitations in this field, the review is unable to provide specific conclusions about the most effective or preferred model/intervention to improve care coordination. Imprecise results that lack generalisability and definitiveness provide limited evidence to base the development of future interventions and policies.

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INTRODUCTION

Cancer is the leading cause of death in Canada¹ and primary care is the first and most frequent point of contact for patients with cancer within the healthcare system.

Although cancer care forms a modest (~10%) workload component for primary care providers,² the intricacy and urgency of patients' care needs are unique and can be complex. These needs include unintended chronic and late-occurring complications of cancer and its treatment, possible oversight of post-treatment surveillance regimens and other multiple concurrent chronic conditions, including those that place patients at higher risk of the adverse effects from cancer treatments.³

The coordination of patient care between primary care and oncology care providers is vital to improve the quality and outcomes of care across the cancer continuum;⁴ however, this coordination of care has been very challenging.^{2 5 6} For example, the poor adherence to recommended cancer-specific surveillance regimens and preventative services may be influenced by the ambiguity regarding providers' roles and diffusion of responsibility, sub-optimal collaboration between care providers and increased volume of patients with cancer.⁷⁻⁹ Initiatives to improve care coordination, and evaluations of shared models of care, have been studied; however, a synthesis of this knowledge is required to understand the tactics that can best optimise this goal. To this end, the purpose of this systematic review is to evaluate models of care and interventions designed to improve coordination of care between primary care and oncology care providers for adult patients with breast and/or colorectal cancer. Choice of patient group was restricted to these two diagnoses because of the high prevalence of these diseases,¹⁰ and to align with the mandate of the Canadian Team to Improve Community-Based Cancer Care along the Continuum (CanIMPACT) programme of research.

For numbered affiliations see end of article.

Correspondence to

Dr Melissa C Brouwers;
mbrouwer@mcmaster.ca

METHODS

Overview

This project is part of a larger research programme called CanIMPACT, which aims to improve coordination of care along the cancer care continuum between primary care provider and cancer specialist communities.¹¹

Protocol and registration

The systematic review has been conducted and reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines.¹² Details of the protocol for this systematic review were registered on PROSPERO.¹³

Search strategy

MEDLINE, EMBASE, CINAHL, Cochrane Library Database of Systematic Reviews and the Centre for Reviews and Dissemination were searched for existing English language studies published between January 2000 and November 2014. The Cochrane Central Register of Controlled Trials was searched for ongoing studies. The full original search strategy can be found in the online supplementary material. Reference lists of relevant systematic reviews were manually searched to identify eligible studies. The search was updated in May 2015 to include articles published between November 2014 and 15 May 2015.

Eligibility criteria

Eligibility criteria were defined a priori and included the following elements:

Interventions

Included studies evaluated a specific model of care or intervention (1) designed to improve care coordination between primary care and oncology care providers, AND (2) for any stage of the cancer continuum, AND (3) for adult breast and/or colorectal cancer patients. A model of care/intervention was conceptualised as a programme or project that is intended to improve some aspect of cancer care coordination, delivery, organisation or patient care. Examples of 'interventions' are the implementation of case management and primary care-led follow-up.

Study designs

Systematic reviews, meta-analyses, randomised controlled trials (RCTs) and non-randomised studies, evaluating the effectiveness of a model of care or intervention on patient, provider or system outcomes, were included. Retrospective and descriptive studies, unpublished data, abstracts and conference proceedings were excluded.

Participants

The model of care or intervention being evaluated had to include both primary care providers (eg, family physicians, nurse practitioners, family practice nurses, community pharmacists and physiotherapists) and oncology

care providers (eg, medical/radiation oncologists, general/family practitioners in oncology, oncology specialists, generalist surgeons and advanced practice or specialist nurses). The participants involved in the evaluation could include members of the healthcare provider group and/or patients who were treated under the model of care being evaluated.

Comparators/controls

For RCTs and non-randomised studies, the comparator group could receive another model of care intervention, standard/usual care or no intervention.

Types of outcome measures

Study eligibility was not dependent on reported outcomes; patient, provider and system outcome measures at all time points were included. Patient outcomes, such as survival, quality of life and chronic adverse effects, were prioritised.

Data extraction

Literature search results were uploaded to, and deduplicated in, EndNote X7 reference management software. Titles and abstracts, followed by full texts of records meeting the initial screening criteria, were retrieved and examined independently by two reviewers (research assistants). Disagreements related to screening were resolved through discussion to reach consensus.

One research assistant extracted data from the included studies using a pilot-tested form, and a second research assistant verified the extracted data through a formal audit process to reduce errors and bias. Disagreements were resolved by consensus. The following data were extracted from each article: (1) study design; (2) setting; (3) risk of bias assessment (more information below); (4) characteristics of participating providers; (5) characteristics of participating patients; (6) model of care or intervention characteristics (including purpose, description and implementation); (7) outcome measures; and (8) results.

Risk of bias assessment

The two reviewers independently assessed the risk of bias for each included study. Disagreements were resolved by consensus. The Assessing Methodological Quality of Systematic Reviews (AMSTAR) Checklist¹⁴ was used to assess systematic reviews and Cochrane Collaboration tools^{15, 16} were used to assess randomised and non-randomised studies.

Data synthesis

The results were summarised in tables according to study design and a systematic narrative synthesis was conducted for each type of study. A meta-analysis was not possible due to heterogeneity in the outcome measures used in the studies.

RESULTS

Results of the search

The original search generated 5064 references. An additional 703 were identified through the search update, resulting in a total of 5767 articles; 130 full-text articles were assessed for eligibility. Twenty-two articles met the eligibility criteria and were included in this review. A PRISMA flow chart outlining the study selection process and reasons for exclusions is found in [figure 1](#).

Details of included studies

Five systematic reviews,^{17–21} six RCTs^{22–27} and 11 non-randomised studies^{28–38} comprised the review. The six RCTs and 11 non-randomised studies were not already included in the five systematic reviews. The findings from each type of study are discussed below.

Systematic reviews

The number of studies included in the five systematic reviews^{17–21} ranged from 19 to 51. The types of study designs, the number of studies included, the model(s) of care evaluated and the outcomes measured varied across the systematic reviews, making comparisons

difficult. None of the reviews specifically focused on breast cancer or colorectal cancer, but did include these patient groups. Three of the five systematic reviews were considered to be of moderate quality (ie, AMSTAR score of 5–8/11) and two were considered to be of low quality (ie, AMSTAR score of 0–4/11). [table 1](#) provides AMSTAR results and [table 2](#) provides study details and outcomes.

Overall, the reviews did not support any one model or intervention over another to improve continuity and/or coordination of care. This was due to heterogeneity of outcomes, lack of clinical-centred or person-centred outcomes, and the overall low quality of the studies. The most definitive conclusion that emerged from the existing reviews was from Howell *et al*,¹⁸ who found that primary care and nurse-led models of care are equivalent in post-surgical colorectal cancer populations and following adjuvant treatment for breast cancer. These results are similar to earlier conclusions by Lewis *et al*,²⁰ who demonstrated no statistically significant difference in survivorship, recurrence of cancer or psychological morbidity between physician-led and nurse-led follow-up care. All systematic reviews concluded that better quality investigations are warranted.

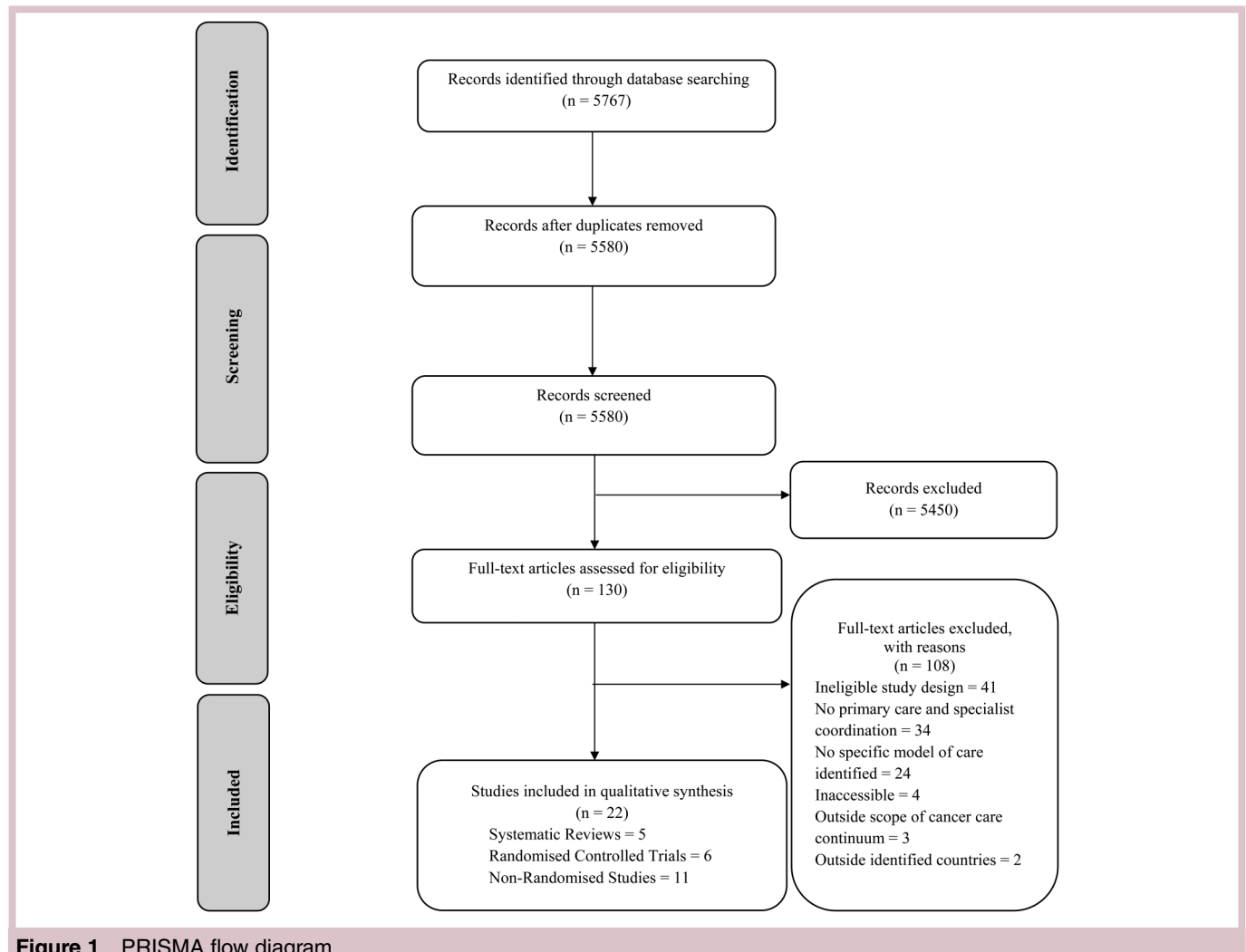


Figure 1 PRISMA flow diagram.

Table 1 AMSTAR results for included systematic reviews.

Author	1. Was an "a priori" design provided?	2. Was there duplicate study selection and data extraction?	3. Was a comprehensive literature search performed?	4. Was the status of publication (i.e., grey literature) used as inclusion criteria?	5. Was a list of studies (included and excluded) provided?	6. Were the characteristics of the included studies provided?	7. Was the scientific quality of the included studies assessed and documented?	8. Was the scientific quality of the included studies used appropriately in formulating conclusions?	9. Were the methods used to combine the findings of studies appropriate?	10. Was the likelihood of publication bias assessed?	11. Was the conflict of interest included?
Aubin <i>et al.</i> , 2012 ¹⁷	No	No	Yes	Can't Answer	No	Yes	Yes	No	N/A	N/A	No
Howell <i>et al.</i> , 2012 ¹⁸	No	Yes	Yes	No	No	Yes	Yes	Yes	Can't Answer	Yes	No
Lamb <i>et al.</i> , 2011 ¹⁹	No	No	Yes	Can't Answer	No	No	No	No	Yes	No	No
Lewis <i>et al.</i> , 2009 ²⁰	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Ouwens <i>et al.</i> , 2009 ²¹	No	Yes	Yes	Yes	No	Yes	No	No	Yes	No	No

Note: The "can't answer" option is chosen when the item is relevant but not described by the authors. The "not applicable" option is selected when the item is not relevant (e.g. when a meta-analysis was not attempted by the authors).

Randomised controlled studies

Six RCTs were included in the review, one each from Canada,²³ Australia,²⁴ the UK²⁵ and the USA,²⁶ and two from Denmark.^{22, 27} Studies were designed for all cancers,²² haematological, breast, ovarian and colorectal cancers,²⁴ breast, colorectal and lung cancers,^{25, 26} breast cancer only²³ and colorectal cancer only.²⁷ Two RCTs examined interventions that targeted transition from diagnosis through to treatment,^{26, 27} one study targeted only treatment,²⁴ two studies targeted transition from treatment through to survivorship^{22, 25} and one study targeted survivorship specifically.²³ The types of model designs or interventions included case management,^{22, 24, 25, 27} nurse navigation²⁶ and the dissemination of survivorship care plans.²³ Outcomes assessed in the studies also varied. All six RCTs examined patient outcomes, including satisfaction with care,^{22, 23, 27} self-advocacy,²⁵ dropout,²⁵ quality of life,^{23, 26} patient experience,^{23, 26} cancer-related distress,²³ anxiety/depression and empowerment²⁴ and adverse effects of treatment.²⁴ Four studies examined provider outcomes, such as satisfaction with care provided,^{22, 24, 27} and system outcomes, such as number of patient visits with a general practitioner and/or oncologist^{23, 27} and costs after diagnosis.²⁶ The key issues regarding study bias were lack of blinding of participants and personnel, and selective reporting of outcomes. [table 3](#) provides a Cochrane risk of bias table and [table 4](#) describes study details and outcomes. Overall, there were no significant changes reported in any of the measured outcomes.

Non-randomised studies

Eleven non-randomised studies examining models of care/interventions to improve care coordination between primary care and oncology care providers were eligible for inclusion in the review.^{28–38} The countries of origin of these studies included three each from the USA^{30, 31, 37} and the UK,^{28, 32, 35} two each from Canada^{27, 36} and Australia,^{29, 38} and one from New Zealand.³⁶ The types of cancer targeted in the studies included breast only (n=4),^{29, 30, 34, 38} colorectal only (n=4),^{28, 33, 35, 36} either breast or colorectal (n=2),^{31, 37} and breast, colorectal and other (n=1).³² The majority of studies piloted interventions for patients in the transition from treatment to survivorship (n=8),^{31–38} with only one intervention focused on diagnosis²⁸ and two focused on the transition from diagnosis through to treatment.^{29, 30} Intervention strategies included the use of nurse navigators (n=3),^{29, 35, 36} treatment or survivorship care plans (n=3),^{30, 31, 37} referral letters/forms (n=1),²⁸ transfer into survivorship assessments (n=1)³⁸ and shared care/creation of multidisciplinary teams (n=1).³² Two studies reported interventions that comprised a number of strategies from those previously listed.^{33, 34} The outcomes assessed in the studies ranged from patient outcomes (eg, perceptions of quality of care,³⁰ satisfaction with care,^{30–33, 35, 37} quality of life,³⁵ psychological morbidity³⁴), to provider outcomes (eg,

Table 2 Systematic review details and study outcomes

Author, search years, number of studies	Purpose of systematic review	Models of care examined and participants	Results	Quality of included studies	Authors' conclusions and recommendations
Aubin <i>et al</i> , 2012, Canada ¹⁷ Search from database inception to Feb 2009 51 studies (49 RCTs)	To classify, describe and evaluate the effectiveness of interventions aiming to improve patient, healthcare provider and process outcomes.	Primarily case management, shared care and interdisciplinary teams n=12967 (approximate); Any type of cancer was considered; Only adult patients were considered.	Based on the median effect size estimates, there were no significant differences found between patients assigned to interventions and those assigned to usual care, in regards to patient health-related outcomes.	All studies were of 'very low quality' due to inconsistent results and high heterogeneity among studies.*	Evidence is lacking from the majority of studied outcomes; therefore, no conclusions regarding most effective interventions could be made. Future research should evaluate interventions for which improvement in continuity is the primary objective.
Howell <i>et al</i> , 2012, Canada ¹⁸ Search from 1999 to Dec 2000 19 studies (9 RCTs; 10 practice guidelines)	To determine the optimum organisation and care delivery structure for cancer survivorship services.	Nurse-led and primary care physician-led n=3112; Any type of cancer was considered; Only adult patients were considered.	Nurse-led and primary care physician models of follow-up care were equivalent for detecting recurrence. Consensus also suggested that cancer survivors may benefit from coordinated transition planning that includes the provision of survivorship care plans as a standardised part of care.	The evidence was rated as low quality, due to non-blinding of participants or outcome assessors, poor reporting of randomisation procedures, and lack of power to detect statistically significant differences between treatment groups.†‡	Evidence is limited; however, the realignment of models of care should be identified as a health system priority, in order to meet the supportive care and surveillance needs of the survivor population. Further research is required to evaluate the efficacy of models of care in a broader population of cancer survivors with differing needs and risks.
Lamb <i>et al</i> , 2011, UK ¹⁹ Search from 1999 to May 2009 37 studies (1 RCT)	To examine the evidence on clinical, social and technological factors that affect the quality of MDT clinical decision-making.	MDTs n=not available; Any type of cancer was considered; Patients of any age were considered.	Failure to reach a decision at MDT discussions was found in 27–52% of cases. The majority of team decisions were made by physicians (without the inclusion of nurses) and patient preferences were not discussed. The following factors negatively affected decision-making: time	Overall study quality was low to medium. The median quality score for quantitative papers was 9/18 (range 3–15) and for qualitative papers was 13/24 (range 9–14).§	Team/social factors affect management decisions by cancer MDTs. The following may have a positive impact on team decision-making: allowing adequate time for team members to prepare for MDT meetings; making team and leadership skills training

Continued

Table 2 Continued

Author, search years, number of studies	Purpose of systematic review	Models of care examined and participants	Results	Quality of included studies	Authors' conclusions and recommendations
Lewis <i>et al</i> , 2009, UK ²⁰ Search from database inception to February 2007 21 publications and 10 studies (6 RCTs)	To compare the effectiveness and cost-effectiveness of nurse-led follow-up of cancer patients, with conventional physician-led follow-up.	Nurse-led and primary care physician-led n=927 (for the review's focal four RCTs); Any type of cancer was considered; Patients of any age were considered.	pressure; excessive caseload; low attendance; poor team work; and lack of leadership. Telemedicine is effectively being used in developed countries. There were no statistically significant differences in survival, recurrence or psychological morbidity. Patients with lung cancer were more satisfied with nurse-led telephone follow-up. Patients with breast cancer thought patient-initiated follow-up was convenient. No significant observations regarding cost-effectiveness were made.	Study quality ranged from poor to well-conducted; total quality score for internal validity ranged from 7 (47%) to 13 (87%). The statistical tests used in three studies were poorly-reported.¶	available to team-members; and considering systematic input from nursing personnel. Patients appeared satisfied with nurse-led follow-up. Patient-initiated or telephone follow-up could be practical alternatives to routine hospital follow-up care; however, more evaluations are required and the duration of follow-up needs to be sufficient to allow for comparison of recurrence rates.
Ouwens <i>et al</i> , 2009, Netherlands ²¹ Search from Jan 1996 to Oct 2006 33 studies (31 RCTs/ quasi-RCTs)	To review integrated care interventions and their effects on the quality of cancer care.	Interventions comprising at least one of the three integrated care principles: patient-centeredness; organisation or care; and multidisciplinary care n=not available; Any type of cancer was considered; Only adult patients were considered.	Effective interventions to improve patient-centeredness were: providing patients with an audiotape of the consultation, and with information, and using decision aids. Effective interventions to improve the organisation of care were follow-up and case management, (particularly by nurses and one-stop clinics).	Only studies that met at least three of the five quality criteria described by the Cochrane Collaboration were included in the review.**	In order to improve integrated care for patients with cancer, a multicomponent intervention programme which focuses on patients, professionals and the organisation of care, is required. It is suggested that interventions found in this review should help to structure a future programme which would be evaluated using rigorous methods and explicit outcome measures linked to the intervention.

*The GRADE approach was used to assess the quality of the evidence.

†The AGREE II instrument was used to assess the quality of the practice guidelines.

‡The SIGN guideline development handbook was used to assess the quality of the randomised controlled trials.

§Included studies were assessed against a quality score. Quantitative papers were scored out of a total of 18, and qualitative papers out of 24 (more detail included in online supplementary material of the original review).

¶A modified Downs and Black checklist was used to assess the quality of the evidence.

**Five methodological criteria described by the Cochrane Collaboration (ie, completeness of follow-up, reliability of outcomes, protection against contamination, baseline measurement and concealment of allocation) were used to assess the quality of the evidence.

MDT, multidisciplinary care team; RCTs, randomised controlled trials.

Table 3 Cochrane risk of bias table for included randomised controlled trials.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Bergholdt <i>et al</i> , 2013 ²²	+	-	-	+	?	-	?
Grunfeld <i>et al</i> , 2011 ²³	+	+	+	+	+	+	+
Johnson <i>et al</i> , 2015 ²⁴	+	?	-	?	+	+	+
King <i>et al</i> , 2009 ²⁵	+	+	+	?	-	?	+
Wagner <i>et al</i> , 2014 ²⁶	+	+	-	+	+	-	+
Wulff <i>et al</i> , 2013 ²⁷	+	+	-	+	+	-	+

satisfaction with care^{32 35}) to system outcomes (eg, wait times,²⁹ number of tests requested or appointments,³⁶ patient referrals^{28 38} and cost savings³⁵). Eight studies were judged to be of serious risk of bias and three were judged to be of moderate risk of bias. [table 5](#) provides A Cochrane Risk of Bias Assessment Tool: for Non-Randomized Studies of Interventions (ACROBAT-NRSI) results and [table 6](#) describes the study details and outcomes. All of the non-randomised studies presented inconclusive results.

DISCUSSION

This review evaluated models or intervention aimed at improving coordination of care between primary care and oncology care providers, for patients with breast and/or colorectal cancer. The 22 included studies varied with respect to type of model (most incorporating nurse navigation^{25-27 29 33 35 36}) or intervention (most incorporating survivorship care plans^{23 31 33 34 37}) evaluated. Many different outcome measures were used and assessed the impact at provider, patient and system levels. The conceptual and methodological limitations with the studies make it challenging to provide specific conclusions about the model or intervention tactic that would lead to changes in patient, provider and system outcomes.

Two conceptual issues with the research until now became evident when conducting the review. First, the majority of the reviewed studies provide little rationale for the selection of the model or intervention being tested, with tactics being chosen by investigator preference rather than by a systematic process of building from previous research.^{39 40} Second, the evaluation of the model or intervention is often a secondary consideration, not the primary objective, of the investigation. As a result, the implementation of the model or intervention was infrequently monitored, making it difficult to decipher whether the results were attributable to the model or intervention. For example, in two studies, the results of patient needs interviews/assessments were provided to primary care providers who were encouraged to participate in patient care, but their involvement was neither enforced nor documented.^{22 25} Consequently, there is a haphazard progression in inquiry such that the field is not advancing in logical sequence as might have been seen more often in clinical investigations (eg, evaluation of new chemotherapy agents). Researchers and practitioners in this field are encouraged to pursue inquiries based on theoretical^{41 42} and evidence-based rationale to build on previously published work.⁴³ Planning for monitoring of implementation would further our knowledge of the effectiveness and feasibility of selected models or interventions in practice.

This synthesis of research also pointed to a number of methodological concerns in this field. With only six RCTs meeting eligibility criteria,²²⁻²⁷ it is evident that non-experimental pilot and feasibility studies are

Table 4 Randomised controlled trial details and study outcomes

Study author	Participants (n), type of cancer, stage of cancer care continuum	Description of study	Results
Bergholdt <i>et al</i> , 2013, Denmark ²²	n=955 patients (baseline); 612 patients (6-month follow-up); 506 patients (14-month follow-up); 776 GPs (14-month follow-up) Any type of cancer was considered; Treatment into survivorship	<i>Intervention:</i> (CM) Assessment of patient needs; results shared with patients' GPs, who were then encouraged to contact patients to facilitate rehabilitation <i>Control:</i> Standard care <i>Data collection methods:</i> Self-administered questionnaires <i>Outcome(s) measured:</i> Patients' satisfaction with their GPs (in general) and with GP support, and GPs' satisfaction with their contribution to their patients' well-being	No statistically significant effects of the intervention were observed. Subgroup analysis of breast cancer patients showed a statistically significant improvement of satisfaction with their GP, in regards to 'information and support' and 'the organisation of care'.
Grunfeld <i>et al</i> , 2011, Canada ²³	n=407 patients (baseline); 332 patients (3-month follow-up); 318 patients (6-month follow-up); 299 (12-month follow-up) Breast; Survivorship	<i>Intervention:</i> (SCPs) Supplement to standard care; all routine follow-up care transferred to patients' PCPs, and SCPs sent to patients and their PCPs <i>Control:</i> Enhanced standard care (ie, all routine follow-up care transferred to patients' PCPs) <i>Data collection methods:</i> Self-administered questionnaires and collection of health services records <i>Outcome(s) measured:</i> Patients' level of cancer-related distress, quality of life, patient satisfaction, continuity of care, and health services outcomes (ie, patient transfer to PCP, oncologist visits, and awareness of which care provider is primarily responsible for follow-up care).	No statistically significant effects of the intervention were observed on any outcome measure, at any time point. Nine intervention and five control patients were not transferred to the PCP for follow-up due to recurrence/other reasons. After transfer to PCP, 16 control patients and 15 intervention patients visited an oncologist. Overall, over 89% of patients correctly identified their PCP as being the primary provider of follow-up care; at 12 months, significantly more intervention group patients were able to do so.
Johnson <i>et al</i> , 2015, Australia ²⁴	n=88 patients; 55 PCPs; 5 cancer specialists Haematological, breast, ovarian and colorectal cancers; Treatment	<i>Intervention:</i> (CM) Shared care model, incorporating the use of patient-held records and dissemination of PCP educational resources packages <i>Control:</i> Standard care <i>Data collection methods:</i> Self-administered questionnaires and symptom diary completion <i>Outcome(s) measured:</i> Patients' level of anxiety, depression, empowerment, adverse effects of treatment and patients', PCPs' and cancer specialists' perceptions of the shared care model	No statistically significant differences in patients' levels of anxiety, depression, empowerment or adverse effects of treatment were observed. No differences were detected in perceptions of care between PCPs and patients in the intervention and control groups. The majority (88%) of PCPs found the patient health records to be useful and the majority of their comments were positive. One of five cancer specialists thought the patient health record was useful and all five had concerns about the shared care model.

Continued

Table 4 Continued

Study author	Participants (n), type of cancer, stage of cancer care continuum	Description of study	Results
King <i>et al</i> , 2009, UK ²⁵	n=93 patients (baseline); 61 patients (6-month follow-up) Breast, colorectal and lung; Treatment into survivorship	<i>Intervention:</i> (CM) (a) Patients completed continuity assessment; (b) Patients completed aforementioned assessment; results shared with clinical nurse specialists, who were encouraged to address patients' needs <i>Control:</i> Standard care <i>Data collection methods:</i> Self-administered questionnaires <i>Outcome(s) measured:</i> Patients' experienced continuity of care	No statistically significant differences in patients' experienced continuity of care; some trends were observed. For example, participants in the intervention trial arms expressed less unmet needs for care than participants allocated to the control group.
Wagner <i>et al</i> , 2014, USA ²⁶	n=251 patients (baseline); 242 patients (4-month follow-up); 229 patients (12-month follow-up) Breast, colorectal and lung; Diagnosis into treatment	<i>Intervention:</i> (Nurse navigation) Four months of nurse navigation support <i>Control:</i> Enhanced standard care (ie, receipt of more tailored patient education) <i>Data collection methods:</i> Telephone-administered questionnaires and automated administrative data <i>Outcome(s) measured:</i> Quality of life, patient experience with care, healthcare costs	There were no statistically significant differences between intervention and control groups in quality of life scores. Nurse navigator patients reported a significantly higher extent to which care actively involves patients, and reported significantly fewer problems with care (especially regarding psychosocial care, care coordination, and information). Furthermore, there were no statistically significant differences (by cancer type and intervention group) in the median cumulative costs of care, calculated from 3 months before the date of diagnosis through to 1 year postdiagnosis.
Wulff <i>et al</i> , 2013, Denmark ²⁷	n=280 GPs (baseline); 228 GPs (30 weeks) Colorectal; Primarily diagnosis into treatment	<i>Intervention:</i> (Hospital-based CM) Supplement to standard care, involving assessment of patient needs, patient outreach and informing GPs of patients' overall health status <i>Control:</i> Standard care <i>Data collection methods:</i> Self-administered questionnaires and Danish National Health Service Register <i>Outcome(s) measured:</i> GPs' evaluation of the intervention, and amount of contact between patients and GPs during daytime hours and out-of-hours services	The use of CM was associated with a significant tendency towards more positive evaluations (particularly relating to psychological effects of the cancer, social effects of the cancer and information given to the patient by the specialists). Additionally, significantly fewer CM GPs than non-CM GPs reported having contacted the hospital regarding their patients' care. CM did not affect the number of patient contacts with their GPs during daytime hours, but CM patients showed a tendency towards more contacts to out-of-hours GP services than non-CM patients.

The recorded number of participants in the second column of the table represents the number that completed the study at each time point. CM, case management; GP, general practitioner; PCP, primary care provider; RCT, randomised controlled trial; SCP, survivorship care plan.

Table 5 ACROBAT-NRSI results for included non-randomised studies.

Author	Overall risk of bias	Confounding	Selection of participants	Measurement of interventions	Departures from intended interventions	Missing data	Measurement of outcomes	Selection of the reported result
Aljarabah <i>et al</i> , 2009 ²⁸	Serious	Serious	Serious	Serious	Low	Low	Low	Low
Baliski <i>et al</i> , 2014 ²⁹	Moderate	Moderate	Low	Low	Low	Low	Low	Low
Blinder <i>et al</i> , 2013 ³⁰	Serious	Serious	Serious	Moderate	Low	Serious	Moderate	Moderate
Dulko <i>et al</i> , 2013 ³¹	Serious	Serious	Moderate	Moderate	Low	NI	Moderate	Low
Hall <i>et al</i> , 2011 ³²	Serious	Serious	Serious	Low	Low	Moderate	Low	Low
Jefford <i>et al</i> , 2011 ³³	Serious	Serious	Moderate	Low	Low	Low	Moderate	Moderate
Jiwa <i>et al</i> , 2013 ³⁴	Serious	Serious	Serious	Moderate	Low	Low	Low	Low
Knowles <i>et al</i> , 2007 ³⁵	Serious	Serious	Moderate	Low	Low	Low	Low	Low
McFarlane <i>et al</i> , 2011 ³⁶	Moderate	Low	Moderate	Low	Low	Low	Moderate	Low
Sprague <i>et al</i> , 2013 ³⁷	Serious	Serious	Serious	Moderate	Low	Moderate	Serious	Low
Vanhuysse <i>et al</i> , 2007 ³⁸	Moderate	Moderate	Moderate	Low	Moderate	Low	Low	Low

Table 6 Non-randomised study details and study outcomes

Study author (type of study)	Participants (n), type of cancer, stage of cancer care continuum	Description of study	Results
Aljarabah <i>et al</i> , 2009, UK ²⁸ (Prospective)	n=3 clinical consultants (receiving GPs' referral letters for 217 patients) Colorectal; Diagnosis	<i>Intervention:</i> (Referral letters) Clinical consultants' assessment of the reliability of GPs' referral letters for allowing patients to proceed 'straight-to-test' <i>Control:</i> None <i>Data collection methods:</i> Prospective collection of clinical consultants' recommendations for diagnostic test referrals based on both GP letter and postpatient consultation <i>Outcome(s) measured:</i> Consultants' diagnostic test referrals	The diagnostic tests that were recommended by clinical consultants having only read GPs' referral letters differed from those that they would have recommended having performed an in-person clinical consultation for 31% of patients. Therefore, suspected patients with colorectal cancer should be seen in a clinic by an expert before proceeding to testing.
Baliski <i>et al</i> , 2014, Canada ²⁹ (Cohort)	n=97 current patients (and 100 patients from previous years) Breast; Diagnosis into treatment	<i>Intervention:</i> (Nurse navigation) Implementation of a nurse navigation programme <i>Control:</i> None <i>Data collection methods:</i> Prospective records database, and wait time records from BC Cancer Agency Sindi Ahluwalia Hawkins Centre for the Southern Interior and Kelowna General Hospital (from previous years) <i>Primary outcome(s):</i> Surgical wait times	Wait times for surgery decreased with the introduction of the programme (median of 59 vs 48 days); however, this decrease was not statistically significant. The need for MRI was found to significantly influence wait times by delaying surgery.
Blinder <i>et al</i> , 2013, USA ³⁰ (Prospective)	n=174 patients (completed at least one survey) Breast; Diagnosis into treatment	<i>Intervention:</i> (TPSs) Seven oncology practices from the ASCO membership were instructed to offer all patients TPSs and to discuss them with the patients. Patients receiving chemotherapy received the plan and summary documents separately (at the beginning and end of treatment, respectively). All other patients received a single integrated TPS. <i>Control:</i> None <i>Data collection methods:</i> Telephone surveys <i>Outcome(s) measured:</i> Quality of care, coordination of care and patient satisfaction	Of all patients who recalled receiving TPSs, 94% believed that the documents improved patient–physician communication (quality of care) and 82% believed that they improved communication between physicians (coordination of care). Participants expressed high satisfaction with TPSs. Of patients who still had their documents, 97% said they were useful (patient satisfaction).
Dulko <i>et al</i> , 2013, USA ³¹ (Descriptive)	n=17 APPs, 39 PCPs and 58 patients participated Breast and colorectal; Survivorship	<i>Intervention:</i> (SCPs) Evaluating the process of SCP completion and assessing the barriers to SCP creation and implementation <i>Control:</i> None <i>Data collection methods:</i> Self-administered questionnaires and telephone interviews <i>Outcome(s) measured:</i> Usefulness and barriers to SCP development, challenges to development and implementation of SCPs, and patient perceptions of the SCP visit	Fifty-eight per cent of PCPs identified inadequate knowledge of cancer survivor issues as a barrier to SCP implementation and 64% identified limited access to patients as a barrier to providing follow-up care. The primary barrier to SCP completion, identified by APPs, was the time required to prepare a SCP (the average time needed was 53.9 min). More than half of the patients surveyed did not know what to expect from their SPC visit; 64% of patients seen within 6 months of diagnosis (and 55% of patients seen at 7–12 months after diagnosis) agreed that the SCP was given to them at an appropriate time.
Hall <i>et al</i> , 2011, UK ³² (Cross-sectional)	n=23 patients and 5 GPs participated Breast, colorectal, gastrointestinal, prostate and melanoma; Survivorship	<i>Intervention:</i> (Shared follow-up care) Assessment of opinions regarding shared-care and conducting a shared-care modelling exercise <i>Control:</i> none <i>Data collection methods:</i> Telephone or in-person interviews and shared follow-up modelling exercise <i>Outcome(s) measured:</i> Opinions regarding shared follow-up care	Most patients and GPs had a positive outlook on shared follow-up care. Patients perceived the benefits of shared follow-up care to be improved access, convenience, travel time and continuity of care; they agreed that GPs who provide shared care should be specially trained and that shared-care must be supported by secondary care. GPs emphasised the importance of maintaining their clinical skills and receiving strong administrative support.

Continued

Table 6 Continued

Study author (type of study)	Participants (n), type of cancer, stage of cancer care continuum	Description of study	Results
Jefford <i>et al</i> , 2011, Australia ³³ (Prospective)	n=10 patients (baseline); 8 patients* Colorectal; Survivorship	<i>Intervention:</i> (Nurse-led care) Implementation of nurse-led post-treatment intervention <i>Control:</i> None <i>Data collection methods:</i> Self-administered questionnaires, and in-person and telephone interviews <i>Outcome(s) measured:</i> Patient satisfaction	Overall, patients considered the nurse-led intervention to be appropriate, relevant, and useful. All participants agreed that nurse-led treatment sessions addressed their concerns and clarified information, and that the phone calls were informative, reassuring and allowed for continued contact with the hospital (which was deemed important).
Jiwa <i>et al</i> , 2013, Australia ³⁴ (Prospective)	n=21 patients (baseline); 19 patients* Breast; Survivorship	<i>Intervention:</i> (Cancer care coordination) Evaluation of the benefits of therapeutic action delivered to patients by GPs (therapeutic action was based on the recommendations of a primary care-led multidisciplinary team, who had received the patient's needs assessment) <i>Control:</i> None <i>Data collection methods:</i> Self-administered questionnaires and telephone conversations <i>Outcome(s) measured:</i> Physical and psychological patient outcomes	Questionnaire responses showed no statistically significant difference in physical or psychological patient outcomes. However, the majority of participants (11/17 women who had visited their GPs) reported that their condition had improved as a result of the primary care-led intervention.
Knowles <i>et al</i> , 2007, UK ³⁵ (Prospective)	n=80 patients (baseline); 60 patients* Colorectal; Survivorship	<i>Intervention:</i> (Nurse-led follow-up care) Assessment of the feasibility of a nurse-led follow-up programme over the course of 1 year <i>Control:</i> None <i>Data collection methods:</i> Access database, patients' case notes, self-administered questionnaires <i>Outcome(s) measured:</i> Adherence to follow-up protocol; detection of recurrence; quality of life; patient and clinician satisfaction; cost savings analysis	Over the course of 1 year, nurse adherence to protocol was strict and resulted in recurrence being detected in 10 patients. Furthermore, patients' quality of life significantly improved throughout the study period. The programme was acceptable to both patients and care providers, and the presence of nurses provided an added benefit of streamlining services and reducing the burden on outpatient resources. The assumed cost savings over a 3-year follow-up period (supposing a steady rate of 220 new patients annually) was estimated to be £28 030.
McFarlane <i>et al</i> , 2012, New Zealand ³⁶ (Prospective)	n=950 patients, tracked for 7 years Colorectal; Survivorship	<i>Intervention:</i> (Nurse-led follow-up care) Documentation of the results of a nurse-led follow-up clinic over the course of 7 years <i>Control:</i> None <i>Data collection methods:</i> Patient details recorded prospectively in a database <i>Outcome(s) measured:</i> Patient health outcomes and process outcomes	Over the course of 7 years, 368 patients were discharged, 474 remained actively involved in the programme and 108 died. Of those who were discharged, 73% returned to the care of their GP, free of disease. Twenty patients were identified as having disease recurrence and 93 as having distant metastatic disease; of these, 65 were referred to palliative care and 28 had surgery. Overall, the clinic's detection rates of recurrent or metastatic disease were comparable to surgical consultant follow-up.
Sprague <i>et al</i> , 2013, USA ³⁷ (Cross-sectional)	n=78 patients (baseline); 58 patients* Breast and colorectal; Survivorship	<i>Intervention:</i> (SCPs) Evaluation of patient satisfaction with SCPs <i>Control:</i> None <i>Data collection methods:</i> Telephone interviews <i>Outcome(s) measured:</i> Patient satisfaction	Ninety-one per cent of patients agreed that the SCP they received was useful, easy to understand, and that the length was appropriate. Nineteen per cent stated that they would need help in using the plan. The majority agreed that the SCP was very or critically important to understanding survivorship issues; however, only about half of all patients felt that the SCP helped them to understand the individual roles of, and the collaborative relationship between, PCPs and oncologists.

Continued

Table 6 Continued

Study author (type of study)	Participants (n), type of cancer, stage of cancer care continuum	Description of study	Results
Vanhuyse <i>et al.</i> , 2007, Canada ³⁸ (Cross-sectional)	n=193 patients, tracked over the course of 4 months Breast; Survivorship	<i>Intervention:</i> (Transfer of follow-up care) Prospective programme of planned patient transfer to a PCP for follow-up <i>Control:</i> None <i>Data collection methods:</i> Patient details recorded prospectively in a database <i>Outcome(s) measured:</i> Number of patients for whom transfer back to a PCP for follow-up care was feasible	Transfer was deemed suitable for 43% of all patients assessed for transfer. This strategy of safely assessing follow-up patients for transfer to primary care may help in allowing oncologists to focus on primarily caring for newly diagnosed and advanced-stage patients.

*Number of patients who completed the study.

APP, advanced practice professional; ASCO, American Society of Clinical Oncology; BC, British Columbia; GP, general practitioner; PCP, primary care provider; SCP, survivorship care plan; TPS, treatment plan and summary.

dominating the field. However, the included studies are of low to moderate quality; common methodological flaws include small sample sizes and inadequate statistical power,^{24 25} a lack of baseline data collected to examine changes over time,^{22 25 26} and a lack of clarity about the statistical significance of the results and their importance from a clinical and health system perspective.²⁵ Moreover, very few studies investigated any one model or intervention type, making it challenging for a body of knowledge to be accumulated. Compounding this issue is when studies do investigate the same model design or intervention type, yet study authors use different nomenclature. For example, the concept of 'nurse navigation' in Wagner *et al.*²⁶ is referred to as 'case management' in two other RCTs,^{25 27} although the model appears to be essentially identical. Even when several studies investigate similar intervention types, an array of provider, patient and system outcomes are assessed, and the quality of the measurement of these varied outcomes is often questionable. By way of illustration, patients' needs/satisfaction with care is best defined by how it is experienced by patients;²³⁻²⁵ however, studies often examine practitioners' evaluation of care and extrapolate the outcome as patient satisfaction.²⁷ Similar methodological flaws and the heterogeneity in outcome measures were noted in the included systematic reviews.¹⁷⁻²¹

The primary potential limitation of this systematic review was that all relevant literature may not have been captured and/or reported. For example, a number of terms (eg, 'care coordination', 'continuity of care' and 'care integration') exist for similar concepts in this field, and are often interchangeable. To mitigate this limitation, we used a rigorous, systematic methodology¹² and our search strategy included a number of search terms encompassing the variety in nomenclature (see online supplementary material).

CONCLUSION

Overall, researchers, clinicians and administrators are left with imprecise results that lack both generalisability as well as definitiveness, providing limited data to build better interventions. Therefore, the development of provincial or national policies based on a strong evidence base remains unlikely. The most robust conclusion that can be made from this systematic review is that there has been little progress in this field. The ageing population, combined with an overall greater life expectancy for those living with cancer, will lead to an increased burden on the healthcare system. The Canadian healthcare system can neither afford nor has the human resource capacity to continue with business as usual. Ongoing demands will be placed on primary care and oncology care providers, without adequate evidence to direct the most suitable model designs (for the most appropriate patients and contexts), and without enough support to optimise the collaboration between these healthcare providers. High quality and adequately

powered prospective experimental designs in this field are required to optimise patient experience, provider satisfaction and system performance.

Author affiliations

¹School of Kinesiology and Health Studies, Queen's University, Kingston, Ontario, Canada

²Department of Oncology, McMaster University & the Escarpment Cancer Research Institute, Hamilton, Ontario, Canada

³Department of Family and Community Medicine, University of Toronto, Toronto, Ontario, Canada

⁴Department of Surgery, Dalhousie University, Halifax, Nova Scotia, Canada

⁵Division of Cancer Care and Epidemiology, Cancer Research Institute, Queen's University, Kingston, Ontario, Canada

⁶Bloomberg Faculty of Nursing, University of Toronto, Toronto, Ontario, Canada

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