



# BMJ Open Study protocol of the CREDO randomised controlled trial: evaluation of a structured return home consultation for patients suffering from metastatic cancer

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## ABSTRACT

**Introduction** Patients suffering from cancer are often managed by multiple health professionals. General practitioners with specific skills in oncology could facilitate care coordination between hospital and general practice in the management of these patients. To explore this hypothesis, we run a randomised clinical trial, called ‘Concertation de REtour   Domicile, CREDO’. The main objective is to explore the effectiveness of a ‘return home’ consultation compared with standard care. The number of unscheduled visits to care centres is used to evaluate the effectiveness of the treatment.

**Methods and analysis** CREDO is a multicentre, randomised, open-label, prospective trial. It takes place in two specialised cancer care centres in southern France (Occitania region). Patient inclusion criteria are: be over 18 years old; be treated with a first cycle of metastatic chemotherapy in a specialised cancer care centre; have a metastatic solid cancer and be returning home after treatment. Patients are randomised in two arms: standard-arm (conventional management) or intervention-arm (CREDO management). In the intervention arm, a ‘return home’ consultation is carried out in three steps. First, the investigating GP (GP with specific skills in oncology) from the specialised care centre collects information about the patient and patient’s management choices. Then, the investigating GP conducts an interview with the patient’s referring GP to quickly communicate and discuss information about the patient. Finally, the investigating GP summarises these exchanges and transmits this information to the care centres chosen by the patient. All the patients are followed for 1 year. Statistical and medicoeconomic analysis are planned.

**Ethics and dissemination** This clinical trial is registered under ClinicalTrials.gov identifier and was approved by the ethics committee of South-Western French Committee for the Protection of Persons (number: 2016-A01587-44) and from the French National Drug Safety Agency (ANSM, number: 2016111500034).

An international publication of the final results and conference presentations will be planned.

**Trial registration number** NCT02857400.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The originality of the care coordination system studied between hospital and primary care and the size of the sample.
- ⇒ The medicoeconomic analysis that will make it possible to determine the impact of the implementation of such a return home coordination in all its dimensions.
- ⇒ An over-representation of certain types of cancer according to the specificities of the centres, leading to a selection bias.
- ⇒ A significant number of deaths during the study due to the metastatic stage of the patients included (anticipated by the calculation of the number of subjects required).
- ⇒ Missing data in the 1-year follow-up questionnaires completed by patients or caregivers (anticipated by the clinical research associate’s calls).

## INTRODUCTION

Care coordination is defined as patient-centred, multiparticipant organisation designed to facilitate and adapt care as well as possible.<sup>1</sup>

Patients suffering from cancer are often managed by multiple health professionals. This contributes to fragmented and uncoordinated care.<sup>2</sup> Progression to the metastatic stage of cancer increases the risk of complications and treatment side effects, and, therefore, may lead to potentially greater use of hospital care. When these patients return home between phases of active treatment, they are often referred to their general practitioner (GP), who does not always have access to information on the evolution of the cancer, its complications, treatments and possible side effects.<sup>3</sup>

In a previously published review, we identified four types of coordination tools to improve exchanges between the hospital and the general practice in the management of patient suffering from cancer in the active phase of treatment: transmission of information to GP, dedicated IT tool (Information Technology tool), implementation of a coordination nurse in oncology and multifactor coordination system.<sup>4</sup> Even if this review highlighted the lack of available studies and their low power and level of evidence, the multifactor coordination system identified the need for a leader GP at the centre to humanise care coordination. The role of this leader GP is to promote the link with the referral centre, to transmit information to other health professionals and to assist in the management of the cancer.<sup>5</sup> Creating links and proximity promote better coordination of care providers. Therefore, it seems necessary for GPs to be involved in the design of the various tools to ensure their relevance and promote better ownership and to maximise relational exchanges between health professionals.<sup>5</sup>

GPs with specific skills in oncology ('GPOs') already exist in some specialised care centres in France. The GPO is a GP trained according to the classical French curriculum and who has completed a year of additional training in oncology services in order to be able to get more specifically involved in the care of patients suffering from cancer. These GPOs are familiar with the specificities and difficulties of primary care and oncology and can, thus, have a global vision of the care pathway of patients with cancer. We hypothesised that these GPOs could facilitate the coordination of care between general practice and the hospital by carrying out a structured 'return to home' consultation with the patient and his or her referring GP from the specialist cancer care centre. This consultation was expected to improve the care pathway of these patients by reducing unscheduled visits (UVs) to specialised care centres. This organisation would allow direct transmission of information between health professionals as well as anticipation of needs and organisation of care around the patients with cancer. The proposed intervention is also hypothesised to reduce caregiver assistance through the improvement of the fluidity of the care pathway of these patients and the anticipation of patient's needs. Indeed, the level of caregiver assistance is directly impacted (through the need to change in their organisation at home or for accompaniment for the consults) in case of inadequacy of the patient follow-up or brutal changes in the patient health status (reflected by UVs and hospitalisation). The patient could, thus, remain in a known area, at home, while benefiting from the same quality of care. To our knowledge, this type of care organisation has never been evaluated. We have, therefore, developed a structured 'return home' consultation carried out by these 'GPOs' from the specialised oncology care centre. To explore the effectiveness and feasibility of this consultation, we are conducting a randomised clinical trial, called CREDO. The objective of this article is to describe the protocol of this trial.

## METHODS AND ANALYSIS

### Objectives

The main objective of this study is to explore the effectiveness of a 'return home' consultation compared with standard care, by evaluating the number of UVs to care centres (hospitalisations and consultations in specialised or non-oncology care centres) in both cases.

The secondary objectives are<sup>1</sup> to study the feasibility of this experimental management system in terms of patient identification (recruitment rate) and patient acceptability (non-inclusion rate)<sup>2</sup>; to study the acceptability of this experimental management system by the patient's referring GP<sup>3</sup>; to identify the consistency of the care pathway in terms of the place of care with that initially planned in the experimental group<sup>4</sup>; to compare the two management modalities in terms of patient satisfaction<sup>5</sup>; to compare the two management modalities in terms of patient quality of life<sup>6</sup>; to quantify the burden on the informal caregiver in both patient groups and<sup>7</sup> to evaluate the medical and economic consequences of the two patient management strategies using a cost-effectiveness analysis.

### Study design

This study protocol follows the international SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) guideline.

CREDO ('Concertation de REtour à DOmicile') is a multicentre, randomised, open-label, prospective trial. It takes place in two specialised cancer care centres, in the Occitania region in southern France (Toulouse and Auch).

This trial started in July 2017 and data collection will end in August 2022.

In addition, an ancillary survey of the referring GPs will be realised to study the acceptability of CREDO concerted care. The primary objective will be to explore the satisfaction of GPs participating to the CREDO trial about exchanges during this experimental system of care coordination, and the secondary objectives will be to gather the opinion of these GPs about the modalities and the practical contribution about CREDO exchanges for their patients with metastatic cancer

### Population

To be eligible, patients must be over 18 years old; be treated with a first cycle of metastatic chemotherapy in a specialised cancer care centre; have a metastatic solid cancer, regardless of the organ; be returning home after treatment administration; be affiliated to the French Social Security system and sign an informed consent before inclusion in the study and before any specific procedures for the study. Patients can come from the whole Occitania region or even from neighbouring regions. Patient exclusion criteria will include pregnancy, breast feeding and being under judicial protection.

Reasons for early exit from the study may be in relation with the patient's decision (at any time, the patient may

withdraw his or her consent and request to leave the trial, for any reason, without losing the right to be followed and treated by his or her referring doctor); the decision of the investigator in the interest of the patient for any reason he or she deems necessary; non-compliance of the patient's referring GP with participation in the CREDO consultation protocol; the study sponsor's decision or the patient's death.

The caregiver is any non-professional person who provides regular assistance to the patient in the acts of daily life and/or in his medical care. He/she is directly designated by the patient him/herself.

### Patient and public involvement

No patients were involved in the design or conduct of this study.

### Selection

The selection of patients for the study will be done through the referring oncologist during the patient's hospitalisation for the administration of their first cycle of metastatic chemotherapy. The identified patients will be referred to the GPO of the care facility (investigating physician). The investigating GPO will check the patient's eligibility criteria on the basis of his or her medical file and the information provided by the oncologist. If the patient meets the inclusion and non-inclusion criteria, then he will be informed of the trial by the investigator who will provide him with detailed information on the study procedure and its modalities and will give him the information note and the informed consent (online supplemental appendix 1).

If the patient agrees to participate in the trial, he must give written consent by personally dating and signing the two copies of the consent form, which will also be dated and signed by the investigator (one original copy will be given to the patient, the other copy will be filed by the investigator). The caregiver is chosen and designated by the patient, and his/her consent is not required in our protocol.

### Randomisation

A dedicated website has been set up by the study sponsor.

Patients are randomly assigned to one of two arms:

- ▶ A-Arm (standard): conventional management. A standard link form is sent to the patient's referring GP on the day of patient discharge.
- ▶ B-Arm (experimental): CREDO management. A 'return home' consultation is carried out between the patient, the investigating GP and the patient's referring GP. Then, a CREDO link form is sent to the GP on the day of the patient's discharge.

At the end of this step, the sponsor receives via an automatic email, the information on the patient's inclusion (number composed of four digits, allocated to the patient and randomisation arm).

### Intervention and conduct of the study

#### Standard process

The standard link form contains the following information: patient's health status (WHO score, weight and

height...); patient's oncological situation (nature of the initial cancer, date of diagnosis, location of metastatic sites, list and dates of treatments, etc); concomitant pathologies and treatments; the patient's future treatments (chemotherapy, radiotherapy...); dates of planned examinations, consultations and hospitalisations and expected complications and side effects and what to do if they occur.

This record is sent to the patient's referring GP on the day of patient discharge by fax, mail or secure e-mail.

### Intervention

The patient's care based on a return home consultation takes place in three stages.

#### 1) First step: consultation between the investigating GP and patient

The first step is an oral consultation between the investigating GP and the patient, carried out at the patient's bedside, in the specialised care centre, before the patient's return home.

The aim of this consultation is to gather information from the patient about his or her lifestyle, social protection, family and professional situation as well as that of his or her caregiver and partner, if applicable. The investigating GP informs the patient about the possible complications of his or her disease and the treatments' side effects. In addition, the investigating GP informs the patient of the appointments' scheduled for his/her next consultations and/or hospitalisations.

Finally, the investigating GP defines with the patient, the desired place of care (hospital, clinic, home) in case of complications (UVs).

At the end of the consultation, the investigating GP gives the patient a summary document concerning complications, possible adverse effects and the list of scheduled visits and the place of care defined in case of complications and a follow-up logbook to be filled in by the patient to record consultations and/or hospitalisations during the coming year.

#### 2) Second step: consultation between the investigating GP and the patient's referring GP

The second step is a telephone conversation between the investigating GP and the patient's referring GP. The investigating GP contacts the patient's referring GP by telephone and informs him/her of the patient's health status (WHO score, weight and height...); the patient's oncological situation (nature of the initial cancer, date of diagnosis, location of metastatic sites, list and dates of treatments, etc.); concomitant pathologies and treatments; the patient's future treatments (chemotherapy, radiotherapy...); dates of planned examinations, consultations and hospitalisations; and expected complications and side effects and what to do if they occur.

The investigating GP informs the patient's referring GP of the patient's wishes regarding the place of care in the event of complications. This information is then

forwarded to the patient's referring GP by fax, mail or secure e-mail.

All of the information delivered and collected during these two steps are collected by the investigating GP on a CREDO link form. This record is then sent to the patient's referring GP by fax, mail or secure e-mail and kept in the investigator centre as a source document.

### 3) Third step: transmission of information to the local care centre

A 'patient reporting form', a summary of the patient's file, is sent to the local care centre defined with the patient and the referring GP. This transmission is carried out by fax, mail or secure e-mail. This form includes information on the patient's health and oncological status, concomitant pathologies, treatments administered, possible adverse effects of treatments and indications for the management of complications.

#### Follow-up

In the two randomisation arms (A-Arm 'standard' and B-Arm 'experimental'), patients are followed every 3 months for 1 year. They benefit from follow-up telephone appointments to complete questionnaires. These four telephone interviews are conducted in each investigator centre by clinical research associates. The answers are collected by interviewing the patient and the informal caregiver (if applicable).

These questionnaires are of two types. Patient questionnaires will comprise Quality of Life Assessment Questionnaire: QLQ-C30,<sup>6</sup> CREDO satisfaction questionnaire (online supplemental appendix 2) and Activities of Daily Living Assessment Questionnaires (ADL and IADL).<sup>7,8</sup> Questionnaires for the informal caregiver (if applicable) will include Burden Assessment Questionnaire (Zarit Burden interview),<sup>9</sup> and a questionnaire concerning the time spent by the informal caregiver, over the past week, to assist in the performance of the activities of daily living described in the ADL and IADL questionnaires (online supplemental appendix 3).

The intervention and patient follow-up are presented in [table 1](#).

#### Outcomes

The main outcome is the number of UVs of the patient to the care centres, after the first cycle of metastatic chemotherapy: consultations and hospitalisations in specialised or non-specialised cancer care centres. The secondary outcomes are: (1) the conformity of the care pathway will be measured by comparing the consistency between the care centres chosen during the consultation with the investigating GP and the care centres where patients have attended, (2) the patient's satisfaction measured using the CREDO questionnaire, (3) the patient's quality of life assessed using the EORTC QLQ-C30 questionnaire and (4) the informal caregiver's burden quantified using the Zarit Burden Interview.

#### Sample size calculation

With an expected case frequency of 30% and a reduction in the number of UVs of up to 20% (with  $\alpha=0.05$  and  $1-\beta=0.90$ ), the total number of subjects should be 812 or 406 patients in each arm of the study to highlight a difference in univariate analysis. Under the same conditions, in the case of multivariate analysis, the number of patients required would be 824 if the explained variance is 20% and 694 if it is 5%.<sup>10</sup> 824 patients will therefore be included. Even if a high mortality and/or drop-out could be expected, we considered that patients dying during the follow-up have not systematically a lower probability of seeking care (UVs) because they are observed for a shorter period. The calculated sample size was then not corrected to take account for mortality and/or drop-out during the follow-up.

#### Collection of medicoeconomic data

The consumption of care related to patient care will be collected over a period of 12 months from the regional directorate of the medical service of the Health Insurance of the Occitania region. These data will be collected retrospectively and using a bottom-up approach. Patients will be identified by last name, first names, gender, date of birth and full residential address. In addition, data on hospital stays in specialised centres will be collected from each participating centre. The collection of data relating to the help provided by the informal caregivers will be carried out by measuring the time spent by informal caregivers helping the patient with the basic and instrumental activities of daily life (ADL/IADL).

[Table 2](#) presents the economic data that will be collected during the study. The medical and economic evaluation will be conducted by establishing a differential cost-effectiveness ratio at 1 year for the management of patients with metastatic solid tumours in a 'return home' consultation versus 'standard' so-called reference management.

#### Statistical analysis

The main analysis will compare the results in both arms of the study (experimental or standard) on the main and secondary outcomes. A first univariate description will be used. Then, to take into account potential confounding factors, a multivariate analysis will be used (logistic regression for the main criterion; linear regression for the criteria measured by a score). Two cost-effectiveness analyses will also be carried out.

#### Demographic data

Demographic and clinical data will be described using standard descriptive statistics. The categorical variables will be presented as follows: number of missing data, number and percentage for each modality of the variable. The quantitative data will be presented as follows: number of missing data, mean, variance, SD, minimum, maximum, median, quartiles.

**Table 1** Summary schedule of the evaluation carried out during the study

Consultations/phone calls		Inclusion consultation	Standard care management	Credo care management	Follow-up telephone calls (Collection of information on interrogation of the patient in the two groups)				
					A-arm	B-arm	M3	M6	M9
<b>Types of evaluation</b>									
Inclusion and exclusion criteria	Hospitalisation for a first course of metastatic chemotherapy	X							
Signing of informed consent		X							
Randomisation		X							
Patient's administrative data, family and professional situation, main caregiver, existence of a local care network			X	X					
Medical history, concomitant pathologies, past and current treatments			X	X					
Demographic data, reason for hospitalisation, type of chemotherapy, discharge treatment			X	X					
List of hospitalisations and scheduled consultations			X	X					
<b>CREDO care management</b>									
Consultation investigating GP/patient				X					
Consultation investigating GP/patient's referring GP				X					
Transmission of the patient file to the local care structure (report form)				X					
Delivery of the patient follow-up logbook			X	X					
Retrieving the patient's follow-up logbook					X	X	X	X	
Time spent by the investigating GP				X					
<b>Questions for the patient</b>									
Quality of Life Questionnaire (QLQ-C30)					X	X	X	X	
CREDO Satisfaction Questionnaire					X	X	X	X	
Activity of Daily Living Assessment Questionnaire (ADL/IADL)					X	X	X	X	
<b>Questions for the informal caregiver</b>									
Burden Assessment Questionnaire (Zarit Burden interview)					X	X	X	X	
Questionnaire to collect the time spent by the caregiver in support of ADL/IADL activities					X	X	X	X	

## Outcomes

The main outcome is the rate of patients who have had at least one UV. It will be presented as a number, percentage and 95% CI (binomial exact). The endpoint analysis will be performed at 12 months. As the probability of UVs depends not only on the length of observation but also on the deterioration of the patients' health status, especially if they die, the analysis will be adjusted on the length of observation and on the fact of having died before the end of the study.

For the secondary outcomes, univariate analyses will be carried out to study the correlations between the different variables and UV. The categorical variables will be presented by group (UV Yes/No) as follows: number of missing data, number and percentage for each modality of the variable. The quantitative data will be presented by group as follows: number of missing data, mean, variance, SD, minimum, maximum, median, quartiles.

Comparisons between groups will be made using the  $\chi^2$  or Fisher exact test for categorical variables and the

**Table 2** Costs included in the economic evaluation

Direct medical costs	Direct non-medical costs	Informal costs
Hospitalisation: traditional, rehabilitation care, palliative care. Outpatient care: consultation, medical and paramedical procedures, additional examinations. Drugs and medical equipment	Cost of medical transport used to transport the patient to a care centre and back.	Cost relative to the time (number of hours) spent by informal caregivers helping the patient with the activities of daily living described in the ADL and IADL questionnaires.
Activity of Daily Living Assessment Questionnaire, ADL/IADL.		

Student's t test or Mann-Whitney test for quantitative variables. Multivariate analyses to assess the influence of different factors on UV can be performed using a logistic regression model. The OR estimators corresponding to the variables studied will be given with their 95% CIs. The factors considered in the multivariate analysis are those significant in univariate analysis ( $p < 0.05$ ).

The different scores will be established according to the algorithms recommended by the authors of the scales used. The scores will be described at each of the measurement times (SD mean, median, min–max). The completion rate of the questionnaires will be established.

### Cost-effectiveness analyses

The first analysis will allow us to calculate the differential cost-effectiveness ratio of the 'return home consultation' strategy compared with the reference strategy, from a health insurance perspective. It will make it possible to compare the medical consequences, measured in terms of UV to the specialised care centre in 1 year and the economic consequences in terms of care and medical goods reimbursed by the health insurance.<sup>11</sup>

In addition, a cost-effectiveness analysis from the point of view of society will be carried out. The numerator of the incremental cost-effectiveness ratio (ICER) will be the same as for the cost-effectiveness analysis from the payer's perspective (ie, number of UVs), and the denominator of the ratio will be the healthcare and medical goods expenses reimbursed by health insurance plus informal costs. Informal costs are costs relative to the time (number of hours) spent by informal caregivers helping the patient with the activities of daily living described in the ADL and IADL questionnaires. They reflect the value of unpaid care time provided by the patient's informal caregivers and will be valued using the replacement cost approach. This approach values the time spent on informal care at the employment market price for a paid caregiver (ie, professional household help, professional home help). This method allows for a valuation of the time spent by the informal caregiver on each specific task.

The overall cost of patient care will be described in both arms.

For these descriptive analyses, the quantitative variables will be described by means, SD, minimum, maximum, quartiles and median. A comparison of the costs of care between the two arms will be carried out. It will be based on the use of independent statistical series tests (Student's t test or Mann-Whitney test).

Deterministic and probabilistic sensitivity analyses will be performed. As part of the deterministic sensitivity analysis, we will study the robustness of the results by measuring the impact on the final result of the variation of different cost and efficiency parameters.<sup>12</sup>

The probabilistic sensitivity analysis, which will be performed using the non-parametric bootstrap method, will allow us to identify the uncertainty around the ICER by estimating its CI.<sup>13</sup> No updating of cost data will be carried out. Taking into account changing individuals'

preferences is not justified because of the limited follow-up period of 12 months.<sup>11 12</sup>

### Data management

Patients' data (clinical data, patient questionnaires, informal caregiver questionnaires and some data from the patient consultation form, the GP consultation form and the patient report form) will be collected by the investigator or his representatives via the electronic case report form made available by the investigator centre's Data Management unit. Access is controlled by a system of identifiers and passwords assigned to all personnel according to their respective roles.

Since safety is not the objective of the study, no adverse events will be collected during this study.

### Ethics and dissemination

#### Ethics

The sponsor of this trial is the Toulouse University Cancer Institute (IUCT).

It complies with the various applicable French and international laws and clinical research recommendations. It has been approved by the South-Western French Committee for the Protection of Persons (Bordeaux University Hospital, France) and is registered under the number 2016-A01587-44. Any significant protocol modifications must be approved by this committee. This trial has also been approved by the French National Drug Safety Agency (ANSM) and is registered under the number 2016111500034.

This study is conducted in accordance with:

- ▶ The ethical principles of the latest version of the Declaration of Helsinki.
- ▶ Good Clinical Practices (ICH V.E6, 17 July 1996 and decision of 24 November 2006).
- ▶ The European Directive (2001/20/EC) on the conduct of clinical trials.
- ▶ The Huriet law (n°88-1138) of 20 December 1988 relating to the Protection of Persons Lending themselves to Biomedical Research and modified by the Public Health law (n°2004-806) of 9 August 2004.
- ▶ The French Data Protection Act n°78-17 of 6 January 1978 modified by the law n°2004-801 of 6 August 2004 relating to the protection of individuals with regards to the processing of personal data.
- ▶ The French bioethics law n°2004-800 of 6 August 2004.

This clinical trial is registered under ClinicalTrials.gov identifier.

#### Availability of data and material

The data supporting the conclusions of this study will be available from the Clinical Trials Unit of the Institut Universitaire du Cancer de Toulouse (IUCT), but there are restrictions on the availability of these data, which will, therefore, not be publicly available. The data will be, however, available from the corresponding author on reasonable request and with the permission of the IUCT.

## Dissemination

An international publication of the final results and conference presentations will be planned.

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