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## The effect of a geriatric evaluation on treatment decisions and outcome for older cancer patients – A systematic review

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### ABSTRACT

**Aim:** The aim of this systematic review is to summarise all available data on the effect of a geriatric evaluation on the multidisciplinary treatment of older cancer patients, focussing on oncologic treatment decisions, the implementation of non-oncologic interventions and the impact on treatment outcome.

**Methods:** A systematic search in MEDLINE and EMBASE for studies on the effect of a geriatric evaluation on oncologic and non-oncologic treatment decisions and outcome for older cancer patients.

**Results:** 36 publications from 35 studies were included. After a geriatric evaluation, the oncologic treatment plan was altered in a median of 28% of patients (range 8–54%), primarily to a less intensive treatment option. Non-oncologic interventions were recommended in a median of 72% of patients (range 26–100%), most commonly involving social issues (39%), nutritional status (32%) and polypharmacy (31%). Effect on treatment outcome was varying, with a trend towards a positive effect on treatment completion (positive effect in 75% of studies) and treatment-related toxicity/ complications (55% of studies).

**Conclusion:** A geriatric evaluation affects oncologic and non-oncologic treatment and appears to improve treatment tolerance and completion for older cancer patients. Fine-tuning the decision-making process for this growing patient population will require more specific and robust data on the effect of a geriatric evaluation on relevant oncologic and non-oncologic outcomes such as survival and quality of life.

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## 1. Background

As the management of cancer became more complex, with an ever increasing range of therapeutic modalities and regimens, it was considered important that all key professionals were involved in clinical decision making for individual patients [1]. This was the rationale for introducing multidisciplinary teams in cancer care and these have now been implemented all over the world [2]. Despite differences in their working mechanisms and organisation, their role in the treatment of the oncologic patient is undisputed.

The ongoing ageing of Western societies introduces a new level of complexity to oncologic decision making. Existing trials do not provide sufficient evidence for this specific population, as older patients and

those with comorbid conditions are often excluded [3]. Due to the heterogeneity of the elderly population, with its variation in physiological reserves, comorbidity and geriatric conditions, the results of studies in younger or fit patients cannot easily be extrapolated to older patients. Tailoring of care is needed, based on a thorough evaluation of the patient's overall health status in addition to tumour characteristics and patient preferences. Consequently, some form of geriatric evaluation is increasingly being incorporated in oncologic care [4].

In 2014, we published a systematic review on this subject, demonstrating that incorporating a geriatric evaluation in oncologic decision-making alters treatment decisions [5], but at that time very limited data were available regarding the effect of these alterations on treatment outcome. Since then, multiple studies addressing this issue have been published, making an update worthwhile. Thus, the aim of this systematic review is to summarize all currently available data on the effect of a geriatric evaluation on the treatment of older cancer patients, focussing on oncologic treatment decisions, the implementation of non-oncologic interventions and the impact on treatment outcome.

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## 2. Methods

### 2.1. Search Strategy and Article Selection

The following search was performed on December 21st, 2017 in both Medline and Embase: (frailty[tiab] OR frail[tiab] OR geriatrics [MeSH] OR “Geriatric Assessment”[MeSH] OR geriatric\*[tiab] OR elderly care[tiab] OR elderly medicine[tiab]) AND (neoplasm[MeSH] OR cancer [tiab] OR tumor[tiab] OR tumour[tiab] OR tumors[tiab] OR tumours [tiab] OR neoplasm[tiab] OR malignan\*[tiab] OR oncol\*) AND (multidisciplin\*[tiab] OR interdisciplin\*[tiab] OR team\*[tiab] OR tumour board\*[tiab] OR tumor board\*[tiab] OR conference\*[tiab] OR meeting\*[tiab] OR decision\*[tiab] OR decision making[tiab] OR decision-making [tiab] OR treatment choice\*[tiab] OR intervention\*[tiab] OR management[tiab] OR prehabilitation[tiab]). MeSH refers to medical subheading, tiab refers to title and abstract. No limits in age, language or publication date were applied.

For this systematic review, a geriatric evaluation could consist of a geriatric consultation, a multidisciplinary paramedical team evaluation or a geriatric assessment only. We defined a geriatric consultation (C) as a consultation with a geriatrician or specialist in elderly medicine. A multidisciplinary geriatric evaluation (M) was an evaluation of at least three geriatric domains performed by two or more (para)medical health care professionals. An assessment (A) was defined as an evaluation performed by a cancer specialist, health care worker or (research) nurse, focussing on three or more of the following domains, investigated with a validated assessment tool: cognitive function, mood/depression, nutritional status, activities of daily living, instrumental activities of daily living, comorbidity, polypharmacy, mobility/falls, or frailty.

Studies were included if they fulfilled the inclusion criteria for one or more of three outcome measures. The first outcome measure was any alteration in oncologic treatment plan after the geriatric evaluation. For this outcome measure, studies were included if a treatment plan was determined both prior to and after the geriatric evaluation or if a comparison was made between treatment choice in patients with and without a geriatric evaluation. The second outcome measure was the number and type of non-oncologic interventions directly resulting from the findings of the geriatric evaluation. The third outcome measure was the effect of the geriatric evaluation on the outcome of treatment, i.e. toxicity or treatment-related complications, treatment completion, quality of life or physical functioning, mortality, and health care utilisation (such as hospitalisation, readmissions, length of stay). For this outcome measure, studies were included only if a control group was included which did not undergo the geriatric evaluation.

The titles and abstracts of all studies retrieved by the search were assessed by one reviewer (MH) to determine which warranted further examination. All potentially relevant articles were subsequently screened as full text by two authors (MH and MtM). If only an abstract was available, an effort was made to find the final report of the study by searching Embase and Medline using the names of the first, second and/or final author as well as key words from the title. If multiple publications were available from one study, only the primary publication or most recent update was included, except when prior manuscripts contained relevant outcomes that were not included in the primary/most recent publication.

Finally, references of included publications were cross-referenced to retrieve any additional relevant citations.

### 2.2. Data Extraction

For each eligible study, the following data were independently extracted by two investigators (MH, MtM): type of study, study setting, study population (age, sex, cancer type), method of patient selection, the type of control group if present, type of geriatric evaluation, the change in treatment after the geriatric evaluation, the number and type of (recommended) non-oncologic interventions, and the change

in treatment outcome, i.e. toxicity or treatment-related complications, treatment completion, quality of life or physical functioning, mortality, and health care utilisation (hospitalisation, readmissions, length of stay).

### 2.3. Quality Assessment

The methodological quality of each of the studies was independently assessed by two reviewers (MH, MtM), using the Newcastle–Ottawa Scale adapted to this subject (Appendix A.1) [6]. Disagreement among the reviewers was discussed during a consensus meeting and in case of persisting disagreement, the assistance of a third reviewer (LH) was sought.

### 2.4. Data Synthesis and Analysis

We summarised the study results to describe our main outcomes of interest. Due to the expected heterogeneity in the study populations, a formal meta-analysis was not considered feasible beforehand.

## 3. Results

### 3.1. Study Characteristics

The literature search identified 5481 citations (2156 from Medline and 3325 from Embase), of which 1270 were duplicates. Details on the search and reasons for exclusion can be found in Fig. 1. After exclusion of 4175 publications, 36 publications from 35 studies were included in this review [7–42], of which fifteen were conference abstracts [8,10–12,18,19,23,25,30–32,34,35,41,42]. Cross-referencing yielded no additional results.

The characteristics of these 35 studies are summarized in Table 1 [7–42]. The first publication is from 2004 [17], but the majority of studies (66%) were published over the past five years. Median sample size was 84 patients (range 15–494 patients). Mean or median age of the patient populations ranged from 74 to 83 years. Study populations were heterogeneous, with fourteen focusing on patients with a specific type of cancer [7,10,16,17,23,24,30–34,40,41], while the remainder included patients with various cancer types. Eight studies focussed specifically on patients at risk for frailty [10,11,19,21,22,28,33,37,41], two included only patients for whom treatment decisions were considered complex [14,25], and three included only those patients considered fit enough for (a specific type of) treatment [16,17,23]. Twelve studies used a geriatric consultation (C) [11,13,14,21,22,24,27,33,34,38–41]; in ten the geriatric evaluation was done by a multidisciplinary (para)medical team (M) [8,15,17,18,23,25,30,32,35,37] and thirteen used an assessment performed by a cancer specialist, health care worker or (research) nurse (A) [7,9,10,12,16,19,20,26,28,29,31,36,42]. Eleven studies addressed the comparison between the oncologic treatment plan before and after geriatric evaluation [7,11–14,20,24,25,31,38,40], while four studies described differences in oncologic treatment between cohorts with and without a geriatric evaluation [16,18,27,35]. Nineteen reported on the number and type of recommended non-oncologic interventions [8–10,13–15,17,19,24,26–29,31,33,34,39,40,42]. Thirteen studies addressed the effect on treatment outcome [16,18,21–23,27,29,30,32,33,35–37,41], of which eight were randomised controlled trials [16,21–23,29,32,33,36,37].

### 3.2. Quality Assessment

The results of the quality assessment can be found in Fig. 2; detailed results per study are listed in Appendix A.2. The overall quality of the studies was good, but in six studies – all of which were conference abstracts – the description of the method of geriatric evaluation was insufficient to judge potential risk of bias [18,23,30–32,41]. Studies addressing change in treatment outcome using a historic cohort were

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