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**TITLE**

Adherence to geriatric assessment-based recommendations in older patients with cancer: a multicenter prospective cohort study in Belgium

**RUNNING HEAD**

Adherence to geriatric assessment-based recommendations in older patients with cancer

**AUTHORS**

Cindy Kenis (PhD) 1,\*, Lore Decoster (MD) 2,\*, Johan Flamaing (MD) 3, Philip R. Debruyne (PhD) 4, Inge De Groof (MD) 5, Christian Focan (PhD) 6, Frank Cornelis (MD) 7, Vincent Verschaeve (MD) 8, Christian Bachmann (MD) 9, Dominique Bron (MD) 10, Sylvie Luce (MD) 11, Gwenaëlle Debugne (MD) 12, Heidi Van den Bulck (MD) 13, Jean-Charles Goeminne (MD) 14, Dirk Schrijvers (MD) 15, Katrien Geboers (MD) 16, Benedicte Petit (MD) 17, Christine Langenaeken (MD) 18, Ruud Van Rijswijk (MD) 19, Pol Specenier (PhD) 20, Guy Jerusalem (MD) 21, Jean-Philippe Praet (MD) 22, Katherine Vandenborre (MD) 23, Jean-Pierre Lobelle (MSc) 24, Michelle Lycke (MSc) 4, Koen Milisen (PhD) 25, Hans Wildiers (MD) 26

**AUTHOR’S AFFILIATION**

1 Department of General Medical Oncology and Geriatric Medicine, University Hospitals Leuven, Leuven, Belgium,

2 Department of Medical Oncology, Oncologisch Centrum, Universitair Ziekenhuis Brussel, Vrije Universiteit Brussel, Brussels, Belgium,

3 Department of Geriatric Medicine, University Hospitals Leuven and Department of Chronic Diseases, Metabolism and Ageing – CHROMETA, KU Leuven, Leuven, Belgium,

4 Cancer Centre, General Hospital Groeninge, Kortrijk, Belgium & Positive Ageing Research Institute (PARI), Anglia Ruskin University, Chelmsford, UK

5 Department of Geriatric Medicine, Iridium Cancer Network Antwerp, St. Augustinus, Wilrijk, Belgium,

6 Department of Oncology, Clinique Saint-Joseph, CHC-Liège Hospital Group, B-4000-LIEGE, Belgium,

7 Department of Medical Oncology, Cliniques Universitaires Saint-Luc, UCL, Brussels, Belgium,

8 Department of Medical Oncology, GHDC Grand Hôpital de Charleroi, Charleroi, Belgium,

9 Department of Geriatric Medicine, AZ Sint-Lucas, Gent, Belgium,

10 Department of Hematology, ULB Institut Jules Bordet, Brussels, Belgium,

11 Department Medical Oncology, University Hospital Erasme, Université Libre de Bruxelles (ULB), Brussels, Belgium,

12 Department of Geriatric Medicine, Centre Hospitalier de Mouscron, Mouscron, Belgium,

13 Department of Medical Oncology, Imelda hospital, Bonheiden, Belgium,

14 Department of Medical Oncology, CHU-UCL-Namur, site Sainte-Elisabeth, Namur, Belgium,

15 Department of Medical Oncology, ZNA Middelheim, Antwerp, Belgium,

16 Centre for Oncology and Hematology, AZ Turnhout, Turnhout, Belgium,

17 Department of Medical Oncology, Centre Hospitalier Jolimont, La Louvière, Belgium,

18 Department Medical Oncology, Iridium Cancer Network Antwerp, AZ Klina, Brasschaat, Belgium,

19 Department Medical Oncology, ZNA Stuivenberg, Antwerp, Belgium,

20 Department of Medical Oncology, University Hospital Antwerp, Antwerp, Belgium,

21 Department of Medical Oncology, Centre Hospitalier Universitaire Sart Tilman and Liege University, Liege, Belgium

22 Department of Geriatric Medicine, CHU St-Pierre, Free Universities Brussels, Brussels, Belgium,

23 Department of Medical Oncology, AZ Vesalius, Tongeren, Belgium,

24 Consultant in Statistics, Beernem, Belgium,

25 Department of Geriatric Medicine, University Hospitals Leuven and Department of Public Health and Primary Care, Academic Centre for Nursing and Midwifery, KU Leuven, Leuven, Belgium,

26 Department of General Medical Oncology, University Hospitals Leuven and Department of Oncology, KU Leuven, Leuven, Belgium

\*= equal contribution

**CORRESPONDING AUTHOR**

* Prof. dr. Hans Wildiers
	+ Department of General Medical Oncology, University Hospitals Leuven
	+ Department of Oncology, KU Leuven
	+ Herestraat 49
	+ 3000 Leuven
	+ Belgium
* Tel.: +32 16 34 69 20
* Fax.: +32 16 34 69 01
* E-mail address: hans.wildiers@uzleuven.be

**KEY MESSAGE**

This large scale Belgian study gives insight into the adherence to geriatric recommendations and subsequent actions undertaken in older cancer patients. We identified the domains for which geriatric recommendations are most frequently made and adhered to, and which referrals to other health care workers and facilities are frequently applied in the multidisciplinary approach of older patients with cancer.

**ABSTRACT**

**Background:**

In the general older population, geriatric assessment (GA)-guided treatment plans can improve overall survival, quality of life and functional status (FS). In GA-related research in geriatric oncology, studies mainly focused on geriatric screening and GA but not on geriatric recommendations, interventions and follow-up. The aim of this study was to investigate the adherence to geriatric recommendations and subsequent actions undertaken in older patients with cancer.

**Patient and methods:**

A prospective Belgian multicenter (*N*=22) cohort study included patients ≥70 years with a malignant tumor upon oncologic treatment decision. Patients with an abnormal result on the geriatric screening (G8 ≤14/17) underwent GA. Geriatric recommendations were formulated based on GA results. At follow-up the adherence to geriatric recommendations was documented including a description of actions undertaken.

**Results:**

From 11-2012 till 2-2015, G8 screening was performed in 8451 patients, of which 5838 patients had an abnormal result. Geriatric recommendations data were available for 5631 patients. Geriatric recommendations were made for 4459 patients. Geriatric interventions data were available for 4167 patients. A total of 12384 geriatric recommendations were made. At least one different geriatric recommendation was implemented in 2874 patients. A dietician, social worker and geriatrician intervened most frequently for problems detected on the nutritional, social and functional domain. A total of 7569 actions were undertaken for a total of 5725 geriatric interventions, most frequently nutritional support and supplements, extended home care and psychological support.

**Conclusions:**

This large scale Belgian study focuses on the adherence to geriatric recommendations and subsequent actions undertaken and contributes to the optimal management of older patients with cancer. We identified the domains for which geriatric recommendations are most frequently made and adhered to, and which referrals to other health care workers and facilities are frequently applied in the multidisciplinary approach of older patients with cancer.

**KEY WORDS**

cancer, older persons, geriatric assessment, geriatric recommendations, geriatric interventions, follow-up

**BODY TEXT**

**INTRODUCTION**

In the past years, important steps have been made in the improvement of the multidisciplinary care for older patients with cancer. One of the contributions is the introduction of geriatric assessment (GA) into daily oncology practice [1, 2]. GA is part of a comprehensive geriatric assessment (CGA) which is the cornerstone of modern geriatric medicine and comprises five consecutive steps: 1/ identifying patients who can benefit from CGA by screening tools; 2/ assessing these patients by GA; 3/ developing geriatric recommendations for interventions based on the problems detected by GA; 4/ implementing these recommendations in a care plan; and 5/ providing follow-up and adjusting the care plan with repeated GA [3]. Each part of this process is essential for the delivery of evidence-based CGA [4].

The effectiveness of geriatric screening and GA by itself is limited unless followed by geriatric recommendations, the implementation of these recommendations (= geriatric interventions) and follow-up [3, 5]. Geriatric recommendations need to be tailored to the detected geriatric problems, which may affect several aspects of the patient’s condition (eg. functional status (FS), nutritional status) as revealed and evaluated by the GA. They are part of the comprehensive management of the older patient and of a personalized care plan to maintain FS, Quality of Life (QoL) and overall survival (OS). Nevertheless, few studies in oncology have focused on the (non)adherence to geriatric recommendations despite their importance for CGA effectiveness [6].

The aim of the present study was to investigate the adherence to geriatric recommendations based on GA results and subsequent actions undertaken in older patients with cancer approximately 3 months after the initial assessment.

**PATIENTS AND METHODS**

**Patient population**

This prospective, multicenter, observational cohort study was performed in 22 hospitals (8 academic; 14 non-academic) in Belgium from November 2012 until February 2015. Patients 70 years and older with a malignant invasive tumor were approached for inclusion by a trained health care worker (THCW) during a hospital visit at diagnosis or at disease progression / relapse, when a cancer treatment decision had to be made. The study was approved by the ethical committee of all participating centers (B322201215495).

**Geriatric screening and assessment**

At baseline, all patients were screened using the G8 screening tool and if the score was abnormal (≤14/17), a GA was performed as previously described [7, 8] (supplementary table S1, available at Annals of Oncology online). Classical oncologic parameters such as Eastern Cooperative Oncology Group - Performance Status (ECOG-PS) [9], tumor characteristics, and treatment details were recorded. Since the aim of this study was to investigate the adherence to geriatric recommendations based on GA results, the results are restricted to the patients in need of a GA (G8 score ≤14).

**Geriatric recommendations based on GA results**

Case-specific geriatric recommendations were formulated based on GA results and were made within each participating centre depending on the available infrastructure and care processes, as previously described [10].

Geriatric recommendations were predefined and structured in different categories (table 1)..

**Adherence to geriatric recommendations**

Approximately three months (+/- two weeks) after the baseline GA and subsequent geriatric recommendations, the adherence to the geriatric recommendations was documented. For each patient, this was documented in two different ways: patient and geriatric domain level.

On patient level, we first described the frequency of the different geriatric recommendations to obtain an overview of the number of different geriatric recommendations for each patient. Secondly the number of times a geriatric recommendation was made and implemented, was recorded.

In order to have an overview of which problems led to a geriatric recommendation, the results are also described on geriatric domain level. We documented problems leading to a recommendation and evaluated the implementation afterwards. For each geriatric domain, three geriatric recommendations were possible.

Lastly, the grade of adherence to geriatric recommendations (ratio between geriatric recommendations made and implemented) was evaluated.

Geriatric recommendations that are implemented, are henceworth called geriatric interventions.

**Geriatric interventions and subsequent actions undertaken**

Concerning geriatric interventions, we also predefined and categorized which actions were undertaken (table 1), and documented this for each individual patient. Actions undertaken were categorized in 34 different actions in various domains (eg. social support) (table 1).

**Statistical analysis**

A descriptive analysis (frequencies, median, and percentages) was performed using SPSS 23.0 software (Chicago, IL). Percentages were associated with a 95% confidence interval calculated in accordance with Wilson’s method where appropriate.

Details on the abovementioned points are further summarized in the supplementary methods, available at Annals of Oncology online.

**RESULTS**

**Patient and clinical characteristics**

A total of 9102 patients were approached for participation in the study. Of these patients, 394 patients refused to participate and 257 did not meet the inclusion criteria. The data of 8451 patients were used for this study (supplementary figure S1, available at Annals of Oncology online). The median age of all patients included was 78 years (range: 70-101) and 53.6% were female. A solid tumor was diagnosed in 91.9% of patients and 8.1% of patients were diagnosed with a hematologic malignancy. 5907 patients (69.9%) presented with an abnormal G8 warranting a GA and GA data were available for 5838 patients. Detailed patient and clinical characteristics, geriatric screening, social and GA data are summarized in table 2 and supplementary table S2 and S3, available at Annals of Oncology online. A detailed description with example of the CGA-process in this study is described in figure 1.

**Frequency of different geriatric recommendations and interventions**

Geriatric recommendations data were available in 5631 of the 5838 (96.5%) patients in whom a GA was performed (figure 1). Patient and clinical characteristics and the results of the social data, geriatric screening and GA for this patient population are separately summarized in table 2and supplementary table S3 (available at Annals of Oncology online) respectively. In supplementary table S4 (available at Annals of Oncology online), the numbers of patients are shown according to the number of different geriatric recommendations per patient. In 4459 of the 5631 patients (79.2%) at least one different recommendation was made with a median of two different geriatric recommendations per patient (range 0-10).

Approximately three months after the baseline assessment, data on geriatric interventions were available in 4167 of the 4459 patients (93.5%). Baseline patient and clinical characteristics and the results of the social data, geriatric screening and GA for this patient population are also separately summarized in table 2, and supplementary table S3 (available at Annals of Oncology online) respectively. At least one different geriatric intervention was present in 2874 patients (69.0%) with a median of one different geriatric intervention per patient (range 0-6) (supplementary table S4, available at Annals of Oncology online).

**Adherence to geriatric recommendations (patient level / geriatric domain level)**

In the group of patients with baseline geriatric recommendations data available (*N* =5631), a total of 13234 geriatric recommendations were made. Most frequently the following recommendations were made: referral to a dietician (3207 times; 57.0% of the patients), social worker (2385 times; 42.4% of the patients), and geriatrician (2058 times; 36.6% of the patients) (table 3).

In the group of patients with geriatric interventions data available (*N* =4167), a total of 12384 geriatric recommendations were made. In this group the most frequent made recommendations were also: referral to a dietician (3043 times; 73.0% of the patients), social worker (2284 times; 54.8% of the patients), and geriatrician (1756 times; 42.1% of the patients) (table 3). A referral to a dietician was recommended for problems detected by GA on the nutritional domain, a social worker for problems detected by GA on the social and FS domain, and a geriatrician for problems detected by GA on all geriatric domains including social status, FS, and nutrition (supplementary table S5, available at Annals of Oncology online).

In total there were 5725 (46.2%) geriatric interventions (table 3). Referral to the dietician (1810 times; 43.3% of the patients), social worker (1087 times; 26.1% of the patients), and geriatrician (944 times; 22.7% of the patients) were the most frequent interventions. Referral to a dietician was adhered to in almost all patients for problems detected by GA on the nutritional domain, to a social worker for problems detected by GA on the social and FS domain, and to a geriatrician for problems detected by GA in all domains (most frequently nutritional, social, and functional domains) (supplementary table S5, available at Annals of Oncology online).

In summary, the highest grade of adherence is noticed for referral to the dietician (59.5%), followed by the geriatrician (53.8%), the social worker (47.6%), the occupational therapist (46.0%), the psychologist (42.2%), and the physiotherapist (41.8%). The grade of adherence was the least for referral to the memory clinic (5.2%), the geriatric day clinic (6.9%), and the fall clinic (10.6%) (table 3).

**Geriatric interventions and subsequent actions undertaken**

A total of 7569 actions were undertaken for a total of 5725 geriatric interventions. These actions were undertaken for geriatric interventions in all geriatric domains (supplementary table S6).

The most frequent actions undertaken were nutritional support (*N* =1860) and supplements (*N* =1174) for recommendations on the nutritional domain, extended home care (*N* = 694) and change in living situation (*N* =250) mainly for recommendations on the social and FS domain, and psychological support (*N* =690) mainly for recommendations on the psychological domain.

**DISCUSSION**

A crucial aspect to improve the quality of care for older patients with cancer is the integration of CGA in daily oncology practice. In order to optimize the impact of GA, it is acknowledged that integration of geriatric recommendations in care plans, interventions based on these recommendations and follow-up are needed. A few studies in geriatric oncology report geriatric interventions in their results but data related to the grade of (non)adherence are often not reported [6, 11-13].

As shown in our results, not all problems detected by GA lead to geriatric recommendations. The detected problems could already be addressed, optimized or not reversible. Secondly, not all geriatric recommendations are adhered to. In patients with a G8 score below threshold (≤14), geriatric recommendations are made in approximately 80% of the assessed patients and adhered to in approximately 70% of the patients. When taking the total number of geriatric recommendations into account, 46% of the geriatric recommendations are adhered to. In our previous smaller feasibility study, there was a similar result regarding the percentage of geriatric recommendations (76%) but a lower adherence rate in only 52% of the patients [6]. This may be explained by a learning curve [14]. All hospitals participating in the study of Baitar et al were also participating in this study, and the increasing experience with CGA may have led to a higher number of geriatric interventions. Secondly, there were more geriatric recommendations documented for problems detected by GA in this study. The adherence to geriatric recommendations is far from 100% but it can be questioned if this is the ideal goal to reach. The decision to intervene on short term in older patients with cancer, can also be influenced by its importance and anticipated benefit as judged by the treating physician as well as by the patient. For instance, slight memory problems in a patient with metastatic pancreatic cancer or a brain tumor, are not the highest priority in the initial stage of treatment, where prognosis and QoL is largely determined by cancer diagnosis. It is important that treating physician/team and patient are aware of the problems detected by GA at diagnosis, but the amount and timing of geriatric interventions need to be determined within the global clinical context of the individual older patient. Depending on the response to treatment, and clinical evolution, some problems detected by GA may be handled at a later timepoint.

The highest grades of adherence were noticed for referrals to the dietician, followed by the geriatrician, the social worker, the occupational therapist, the psychologist and the physiotherapist. With the exception of the geriatrician’s involvement, these results are in line with the results of previous research by Baitar et al [6]. Oncology teams may interpret these referrals as most important for immediate implementation, but it could also be that these health care workers are most easily accessible. In Belgium, additional finances by the Cancer Plan for integration of psychologists and dieticians in the care for patients with cancer in general are available, but this may be different in other countries. These health care workers should be available in all cancer centers, but even then, their numbers may be insufficient to cover all patients in need. The lowest grade of adherence was observed for referrals to the memory clinic, the geriatric day clinic and the fall clinic. This can possibly be caused by logistic problems or long waiting lists for those facilities, which may be less an issue for referral to other health care workers. Furthermore, geriatric interventions mostly aimed to address problems detected by GA in the domain of social status, FS and nutritional status. In general, oncology teams don’t have the geriatric expertise to tackle the different problems detected by GA. Therefore, the geriatric recommendations allow directed referrals to specific other health care workers and facilities.

To our knowledge, this study is the first study to examine in detail which geriatric interventions and subsequent actions are undertaken for problems detected by GA. The most frequent actions undertaken were nutritional support and supplements, extended home care, and psychological support. The description of these actions undertaken is important for the further development of multidisciplinary care plans for older patients with cancer.

In general, the geriatric recommendations, interventions and subsequent actions undertaken show in detail which referrals to other health care professionals and facilities are important and frequently addressed in this population. This might be an efficient way to structure care for older patients with cancer.

This study has some limitations. GA was only performed when the G8 screening tool demonstrated a geriatric risk profile. Some patients with a normal result on the G8 could still have some underlying problems, while some patients with an abnormal result on the G8 don’t have problems in subsequent GA. Despite this, several studies have shown the capability of G8 to identify a group of older patients with cancer with a geriatric risk profile and have demonstrated its prognostic capability for outcomes like OS and functional decline [7, 15]. The use of a geriatric screening tool has been proposed as an efficient way to identify patients in need of GA and multidisciplinary approach [15]. Secondly, differences between the participating hospitals may exist regarding geriatric recommendations, interventions and subsequent actions undertaken. We were not able to capture for each individual patient, the reason for (non)adherence to specific geriatric recommendations. Each hospital has its own processes and care plans. Although there may be good reasons in specific patients not to adhere to geriatric recommendations (on short and long term), it remains difficult to describe why. Thirdly, we were not able to collect information on the last step of the CGA process, ie. the long term compliance to actions undertaken (figure 1). This would require a further huge effort and long-term follow-up of the included patients, and financial means were not available for this purpose. The compliance to actions undertaken remains therefore an important point of interest for future research. Fourth, this study describes the implementation of CGA in Belgium; the situation may be different in other countries and health care settings. But anyhow, the Belgian model can be one example on how to improve care for the older patient with cancer.

This study has also several strengths. It has a prospective design, a large and representative sample with almost 8500 patients included in 22 Belgian cancer centers in less then 2.5 years, and a low drop-out rate. Further research is still necessary to optimize CGA-effectiveness. Little is known about the impact of geriatric interventions on patient-related outcomes in the older population with cancer, like OS, health-related QoL and FS [16, 17]. Additional confounding factors like patient preference and patient compliance to the actions undertaken, should also to be taken into account in the future.

In summary, this large scale Belgian study gives important insight into the adherence to geriatric recommendations and subsequent actions undertaken in older patients with cancer and contributes to the optimal management of older patients with cancer. We identified the domains for which geriatric recommendations are most frequently made and adhered to, and which referrals to other health care workers and facilities are frequently applied in the multidisciplinary approach of older patients with cancer.

**Table 1: overview of geriatric domains, geriatric recommendations and actions undertaken**

|  |  |  |
| --- | --- | --- |
| **Geriatric domains included in the GA** | **Geriatric recommendations** | **Actions undertaken** |
| Social status | Geriatrician | 1. Change living situation: institution |
| FS (ADL + IADL) | GCT | 2. Change living situation: Assisted Living Community Apartment |
| Fall | Social worker | 3. Change living situation: palliative unit or other |
| Pain (VAS) | Occupational therapist | 4. Extended home care : home care nurse |
| Fatigue (VAS) | Physiotherapist | 5. Extended home care : home help |
| Cognition (MMSE) | Fall clinic | 6. Extended home care: meals at home |
| Depression (GDS-15) | Geronto-psychiatrist | 7. Extended home care: cleaning help |
| Nutrition (MNA-SF) | Psychologist | 8. Extended home care: homesitter |
| Other | Memory clinic | 9. Extended home care : other |
|  | Geriatric day clinic | 10. Rehabilitation unit |
|  | Dietician | 11. Adjustment living environnement |
|  | Other physician | 12. Technical support |
|  | Other health support | 13. Physiotherapy |
|  |  | 14. Occupational therapy / check-up |
|  |   | 15. Recommendations for (in)continence |
|  |  | 16. Recommendations for falls / falls check-up |
|  |  | 17. Orthostatism prevention |
|  |  | 18. Adjustment medication |
|  |  | 19. Psychological / emotional support |
|  |  | 20. Cognitive check-up |
|  |  | 21. Recommendations delirium prevention / ROT |
|  |  | 22. Nutritional check-up / Recommendations for nutritional support |
|  |  | 23. Nutritional supplements |
|  |  | 24. Recommendations for sleep |
|  |  | 25. Recommendations for wound care / pressure ulcers |
|  |  | 26. Nursing wound care |
|  |  | 27. Visual / Hearing check-up |
|  |  | 28. Parenteral nutrition |
|  |  | 29. Social assessment |
|  |  | 30. Palliative care |
|  |  | 31. Information, application and transport |
|  |  | 32. Follow-up of non-cancer related health problems |
|  |  | 33. Additional treatment |
|  |  | 34. Undefined |

**Legend:** ADL = Activities of Daily Living; IADL = Instrumental Activities of Daily Living; VAS = Visual Analogue Scale; MMSE = Mini Mental State Examination; GDS = Geriatric Depression Scale; MNA-SF = Mini Nutritional Assessment – Short Form; GCT = geriatric consultation team; ROT = reality orientation training

**Figure 1: Description of the CGA-process**



**Legend**: CGA = comprehensive geriatric assessment; MNA-SF = Mini Nutritional Assessment – Short Form

**Table 2: Baseline patient and clinical characteristics, social data and geriatric screening data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Total of patients included*****N* = 8451** | **Patients with geriatric recommendations data available*****N* = 5631** | **Patients with geriatric interventions data available*****N* = 4167** |
| **Baseline patient and clinical characteristics** | **Operationalization** | ***N* (%)** | ***N* (%)** | ***N* (%)** |
| **Age (years)** | 70-7475-7980-84≥85MedianMeanRange | 2361 (27.9)2539 (30.0)2095 (24.8)1456 (17.2)7878.770-101 | 1173 (20.8)1533 (27.2)1622 (28.8)1303 (23.1)8079.970-101 | 914 (21.9)1161 (27.9)1189 (28.5)903 (21.7)8079.770-101 |
| **Gender** | MaleFemale  | 3925 (46.4)4526 (53.6) | 2553 (45.3)3078 (54.7) | 1836 (44.1)2331 (55.9) |
| **Diagnosis general** | Solid tumorHematologic malignancy | 7763 (91.9)688 (8.1) | 5107 (90.7)524 (9.3) | 3797 (91.1)370 (8.9) |
| **Diagnosis specific** | New diagnosisRelapseDisease progression | 6674 (79.0)619 (7.3)1158 (13.7) | 4416 (78.4)792 (14.1)423 (7.5) | 3261 (78.3)597 (14.3)309 (7.4) |
| **CCI (0-37)** | Score 0Score ≥1Missing | 2605 (30.8)5766 (68.2)80 (1.0) | 1440 (25.6)4148 (73.7)43 (0.8) | 1078 (25.9)3062 (73.5)27 (0.6) |
| **Polypharmacy** | Number 0-4Number ≥5Missing | 3798 (44.9)4463 (52.8)190 (2.3) | 2012 (35.7)3513 (62.4)106 (1.9) | 1521 (36.5)2593 (62.2)53 (1.3) |
| **ECOG-PS** | Score 0Score 1Score 2Score 3 Score 4Missing | 2658 (31.5)2655 (31.4)1301 (15.4)1233 (14.6)593 (7.0)11 (0.1) | 967 (17.2)1891 (33.6)1137 (20.2)1106 (19.6)530 (9.4)0 | 644 (15.5)1417 (34.0)896 (21.5)834 (20.0)376 (9.0)0 |
| **Geriatric screening** | **Operationalization** | ***N* (%)** | ***N* (%)** | ***N* (%)** |
| G8 (0-17) | Absence of a geriatric risk profile (score >14)Presence of a geriatric risk profile (score ≤14) | 2544 (30.1)5907 (69.9) | 0 (0)5631 (100) | 0 (0)4167 (100) |
| **Social data** | **Operationalization** | ***N* (%)** | ***N* (%)** | ***N* (%)** |
| Living situation | At home: aloneAt home with family memberAt home with partnerInstitution (eg. nursing home)Assisted Living Community ApartmentOtherMissing | 2781 (32.9)503 (6.0)4573 (54.2)347 (4.1)164 (1.9)72 (0.9)11 (0.1) | 2015 (35.8)383 (6.8)2722 (48.3)309 (5.5)143 (2.5)58 (1.0)1 (0.0) | 1518 (36.4)264 (6.3)2028 (48.7)207 (5.0)103 (2.5)46 (1.1)1 (0.0) |
| Marital status | SingleMarriedDivorcedLegally cohabitingWidow/erOtherMissing | 426 (5.0)4544 (53.8)448 (5.3)116 (1.4)2848 (33.8)53 (0.6)16 (0.2) | 303 (5.4)2738 (48.6)288 (5.1)76 (1.4)2180 (38.7)42 (0.7)4 (0.1) | 214 (5.1)2047 (49.1)219 (5.3)56 (1.3)1596 (38.3)32 (0.8)3 (0.1) |
| Professional home care | NoYes-Home nursing-Home help-Meals at home-Cleaning help-OtherMissing | 4353 (51.5)4076 (48.2)1340 (32.9)597 (14.7)441 (10.8)3191 (78.3)493 (12.1)22 (0.3) | 2637 (46.8)2985 (53.0)1152 (38.6)515 (17.3)394 (7.0)2278 (76.3)349 (11.7)9 (0.2) | 1924 (46.2)2240 (53.8)870 (38.8)383 (17.1)301 (13.4)1693 (75.6)275 (12.3)3 (0.1) |

**Legend**: CCI = Charlson Comorbidity Index; ECOG-PS: Eastern Cooperative Oncology Group – Performance Status

**Table 3. Overview of geriatric recommendations and geriatric interventions on patient level**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Baseline** | **Follow-up at 3 months (+/- 2 weeks)** |  |
| **Geriatric recommendations** | **Geriatric recommendations (*N*=5631)** | **Geriatric recommendations (*N* =4167)** | **Geriatric interventions (*N* =4167)** |  |
|  | **N° of times geriatric recommendation is made\*** | **%** | **95% CI** | **N° of times geriatric recommendation is made\*\*** | **%** | **95% CI** | **N° of times geriatric recommendation is implemented\*\*** | **%** | **95%CI** | **Grade of adherence (%)\*\*** |
| **Geriatrician**  | 2058 | 36.6 | 35.3-37.8 | 1756 | 42.1 | 40.6-43.6 | 944 | 22.7 | 21.4-23.9 | 53.8 |
| **GCT** | 660 | 11.7 | 10.9-12.6 | 608 | 14.6 | 13.5-15.7 | 152 | 3.7 | 3.1-4.2 | 25.0 |
| **Social worker** | 2385 | 42.4 | 41.1-43.6 | 2284 | 54.8 | 53.3-56.3 | 1087 | 26.1 | 24.8-27.4 | 47.6 |
| **Occupational therapist** | 400 | 7.1 | 6.4-7.8 | 374 | 9.0 | 8.1-9.8 | 172 | 4.1 | 3.5-4.7 | 46.0 |
| **Physiotherapist** | 634 | 11.3 | 10.4-12.1 | 596 | 14.3 | 13.2-15.4 | 249 | 6.0 | 5.3-6.7 | 41.8 |
| **Fall clinic** | 129 | 2.3 | 1.9-2.7 | 123 | 3.0 | 2.4-3.5 | 13 | 0.3 | 0.1-0.5 | 10.6 |
| **Geronto-psychiatrist** | 38 | 0.7 | 0.5-0.9 | 28 | 0.7 | 0.4-0.9 | 7 | 0.2 | 0.0-0.3 | 25.0 |
| **Psychologist** | 1390 | 24.7 | 23.6-25.8 | 1310 | 31.4 | 30.0-32.8 | 553 | 13.3 | 12.2-14.3 | 42.2 |
| **Memory clinic** | 336 | 6.0 | 5.3-6.6 | 326 | 7.8 | 7.0-8.6 | 17 | 0.4 | 0.2-0.6 | 5.2 |
| **Geriatric day clinic** | 275 | 4.9 | 4.3-5.4 | 261 | 6.2 | 5.5-7.0 | 18 | 0.4 | 0.2-0.6 | 6.9 |
| **Dietician** | 3207 | 57.0 | 55.7-58.2 | 3043 | 73.0 | 71.7-74.4 | 1810 | 43.4 | 41.9-44.9 | 59.5 |
| **Other\*\*\*** | 1722 | 30.6 | 29.4-31.8 | 1675 | 40.2 | 38.7-41.7 | 703 | 16.9 | 15.7-18.0 | 42.0 |
| **Total** | **13234** |  |  | **12384** |  |  | **5725** |  |  |  |

**Legend**: GCT=geriatric consultation team

\* Data calculated from the total N° pts with geriatric recommendations data available (*N* =5631 pts)

\*\*Data calculated from the total N° pts with geriatric interventions data available (*N* =4167 pts)

\*\*\*Other = other physician + other health support

**Supplementary methods**

**Patient population**

This prospective, multicenter, observational cohort study was performed in 22 hospitals (8 academic; 14 non-academic) in Belgium from November 2012 until February 2015. Patients 70 years and older with a malignant invasive tumor (solid tumors and hematologic malignancies) were approached for inclusion by a trained health care worker (THCW) - usually a nurse - during a hospital visit at diagnosis or at disease progression / relapse, when a cancer treatment decision had to be made. Disease progression / relapse is defined as progression under treatment or relapse after a treatment-free interval. The study focused mainly on newly diagnosed patients who were candidates for cancer treatment with significant toxicity and morbidity (eg. surgery, chemotherapy, radiotherapy) since these treatments are expected to have potential impact on global health and FS of patients. Patients with disease progression / relapse were included when a significant change in therapeutic strategy was considered and where the GA could have impact on the cancer treatment decision. The study was approved by the ethical committee of all participating centers (B322201215495).

**Geriatric screening and assessment**

At baseline, all patients were screened using the G8 screening tool and if the score was abnormal (≤14/17), a GA was performed as previously described [7, 8] (supplementary table S1).

Classical oncologic parameters such as Eastern Cooperative Oncology Group - Performance Status (ECOG-PS) [9], tumor characteristics (type and stage), and treatment details (surgery / chemotherapy / radiotherapy / hormonal therapy / other therapy) were recorded.

Since the aim of this study was to investigate the adherence to geriatric recommendations based on GA results, the results are restricted to the patients in need of a GA (G8 score ≤14).

**Geriatric recommendations based on GA results**

Case-specific geriatric recommendations were formulated based on GA results and were made within each participating centre depending on the available infrastructure and care processes, as was previously described in a survey on this topic [10]. Several health care workers were involved in the establishment of geriatric recommendations, and various scenarios were used, in most cases based on case review by one or more health care workers: THCW and geriatrician, geriatrician only, THCW and internal geriatric consultation team, THCW and treating physician (eg. oncologist). Other possibilities are recommendations based on standard protocols approved by the geriatric team or by referral and case review on the geriatric day clinic.

Geriatric recommendations were predefined and structured in different categories (see supplementary table 2table 1). They consisted of referrals to the geriatrician, geriatric consultation team (GCT), social worker, occupational therapist, physiotherapist, fall clinic, geronto-psychiatrist, psychologist, memory clinic, geriatric day clinic, dietician, and other (either other physician or other health care support). Results of the geriatric screening and GA and the geriatric recommendations were communicated to the treating physician and the oncology team was responsible for the adherence to the recommendations. The THCW in this study mainly had an advisory role with no direct or limited control over patient care.

**Adherence to geriatric recommendations**

Approximately three months (+/- two weeks) after the baseline GA and subsequent geriatric recommendations, the adherence to the geriatric recommendations was documented. For each patient, this was documented in two different ways: on patient level and on geriatric domain level.

On patient level, we first described the frequency of the different geriatric recommendations to obtain an overview of the number of different geriatric recommendations for each patient. Secondly the number of times a geriatric recommendation was made and implemented, was recorded.

In order to have an overview of which problems led to a geriatric recommendation, the results are also described on geriatric domain level. We documented problems leading to a recommendation and evaluated the implementation afterwards. For each geriatric domain, three geriatric recommendations were possible.

To evaluate the grade of adherence to geriatric recommendations (ratio between geriatric recommendations made and implemented), the following methods were used: verification of the patient chart (eg. electronic file), contact with the treating physician, patient, other health care professionals (employed in the hospital) or general practitioner.

Geriatric recommendations that are implemented, are henceworth called geriatric interventions.

**Geriatric interventions and subsequent actions undertaken**

Concerning geriatric interventions, we also predefined and categorized which actions were undertaken (see supplementary table 2table 1), and documented this for each individual patient. Actions undertaken were categorized in 34 different actions in various domains (eg. social support) (see supplementary table 2table 1).

**Statistical analysis**

A descriptive analysis (frequencies, median, and percentages) was performed using SPSS 23.0 software (Chicago, IL). Percentages were associated with a 95% confidence interval calculated in accordance with Wilson’s method where appropriate.

**Supplementary table S1: Content of the geriatric assessment**

|  |  |  |
| --- | --- | --- |
| Demographic data | * Age
* Gender
* Living situation
* Marital status
* Presence of professional home care
 |  |
| Functional status | * Katz’s Activties of Daily Living (ADL)\*1
* Lawton’s Instrumental Activities of Daily Living (IADL)\*\*2
 | * Bathing
* Dressing
* Toileting
* Transferring
* Continence
* Feeding
* ability to use the telephone
* shopping
* cooking
* housekeeping
* doing laundry
* responsibility of own medication
* mode of transportation
* ability to handle finances
 |
| Falls3 | * Number of falls and
* Fall-related injuries in the past 12 months
 |  |
| Self-perceived fatigue | Visual Analogue Scale4 |  |
| Pain | Visual Analogue Scale |  |
| Cognition | Mini Mental State Examination (MMSE)5 |  |
| Depression | Geriatric Depression Scale (GDS)6 |  |
| Nutritional status | Mini Nutritional Assessment – Short Form (MNA-SF)7 |  |
| Comorbidities | Charlson Comorbidity Index (CCI)8 |  |
| Polypharmacy9 | Number of different drugs taken in the week before inclusion |  |

\* The Katz ADL scale includes six items (bathing, dressing, toileting, transferring, continence, and feeding).

\*\* The Lawton IADL scale includes eight items (ability to use the telephone, shopping, cooking, housekeeping, doing laundry, responsibility of own medication, mode of transportation, and ability to handle finances). Because some of these items (cooking, housekeeping, and doing laundry) are mostly only applicable in women, these three items were not assessed in males in the original form.

**References**

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**Supplementary figure S1: Flow-chart of patient selection**



**Supplementary table S2: Diagnosis and treatment characteristics (*N*=8451)**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Operationalization** | ***N* (%)** |
| Medical data SOLID TUMOR(*N* = 7763) | * Breast
* Central nervous system (brain and spinal cord);
* Digestive sites;
	+ Esophagus;
	+ Stomach;
	+ Colon and rectum;
	+ Neuroendocrine tumors;
	+ Liver;
	+ Bile(duct);
	+ Pancreas;
	+ Digestive: other
* Genitourinary sites;
	+ Prostate;
	+ Kidney;
	+ Urinary bladder;
	+ Adrenal;
	+ Genitourinary: other
* Gynecologic sites;
	+ Cervix uteri;
	+ Corpus uteri;
	+ Ovary and primary peritoneal carcinoma;
	+ Gynecologic: other
* Head and neck;
	+ Squamous carcinoma head and neck;
	+ Thyroid;
	+ Head and neck: other
* Musculoskeletal sites;
	+ Bone;
	+ Soft tissue sarcoma
* Ophthalmic sites;
* Skin;
	+ Cutaneous squamous cell carcinoma and other cutaneous carcinoma;
	+ Merkel cell carcinoma;
	+ Melanoma of the skin
* Thorax;
	+ Lung;
	+ Pleural mesothelioma
* CUP
 | 1738 (22.39)68 (0.88)2556 (32.93)191 (7.47)174 (6.80)1594 (62.36)33 (1.29)99 (3.87)77 (3.01)319 (12.48)69 (2.70)1361 (17.53)668 (49.08)221 (16.24)445 (32.70)3 (0.22)24 (1.76)574 (7.39)56 (9.76)259 (45.12)208 (36.24)51 (8.89)328 (4.23)239 (72.87)26 (7.93)63 (19.21)67 (0.86)5 (7.46)62 (92.54)3 (0.0004)186 (2.40)55 (29.57)8 (4.30)123 (66.13)796 (10.25)770 (96.73)26 (3.27)86 (1.11) |
| Staging SOLID TUMOR(*N* = 7763) | * Stage I
* Stage II
* Stage III
* Stage IV
* Missing
 | 1100 (14.17)1609 (20.73)1719 (22.14)2701 (34.79)634 (8.17) |
| Medical dataHEMATOLOGIC MALIGNANCY(*N* = 688) | * NHL
* HL
* AML
* CML
* ALL
* CLL
* MM
* Other
 | 302 (43.90)16 (2.33)64 (9.30)24 (3.49)8 (1.16)61 (8.87)96 (13.95)117 (17.01) |
| Surgery (*N* = 8451) | * No
* Yes
	+ Curative
	+ Palliative
 | 4418 (52.28)4033 (47.72)3521(87.30)512 (12.70) |
| Chemotherapy(*N* = 8451) | * No
* Yes
	+ Curative
	+ Palliative
	+ Adjuvant
	+ Neoadjuvant
 | 4950 (58.57)3501 (41.43)596 (17.02)1911 (54.58)620 (17.71)374 (10.68) |
| Radiotherapy(*N* = 8451) | * No
* Yes
	+ Curative
	+ Palliative
	+ Adjuvant
	+ Neoadjuvant
 | 6072 (71.85)2379 (28.15)573 (24.09)680 (28.58)897 (37.70)229 (9.63) |
| Hormonal therapy(*N* = 8451) | * No
* Yes
	+ Palliative
	+ Adjuvant
	+ Neoadjuvant
 | 7109 (84.12)1342 (15.88)382 (28.46)885 (65.95)75 (5.59) |
| Other (*N* = 8451) | * No
* Yes
	+ Curative
	+ Palliative
	+ Adjuvant
	+ Neoadjuvant
	+ Not reported
 | 7465 (88.33)986 (11.67)187 (18.97)693 (70.28)32 (3.24)2 (0.20)72 (7.30) |

**Legend**: CUP= cancer of unknown primary origin; NHL= non-Hodgkin Lymfoma; HL= Hodgkin Lymfoma; AML= acute myeloid leukemia; CML= chronic myelogenous leukemia; ALL= acute lymphoblastic leukemia; CLL= chronic lymphocytic leukemia; MM= multiple myeloma

**Supplementary table S3: Results of the baseline geriatric assessment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Patients with GA data available when G8 score ≤14*****N* = 5838** | **Patients with geriatric recommendations data available*****N* = 5631** | **Patients with geriatric interventions data available*****N* = 4167** |
| **Geriatric domain** | **Operationalization** | ***N* (%)** | ***N* (%)** | ***N* (%)** |
| FS: ADL (6-24) | Independent: score 6Dependent: score ≥ 7 | 2339 (40.1)3499 (59.9) | 2270 (40.3)3361 (59.7) | 1592 (38.2)2575 (61.8) |
| FS: IADL (0-5 (male)/8(female)) | Independent: score 8 (female) or 5 (male)Dependent: score < 8 or 5Missing | 1822 (31.2)3951 (67.7)65 (1.1) | 1774 (31.5)3821 (67.9)36 (0.6) | 1212 (29.1)2940 (70.6)15 (0.4) |
| Falls | No fallsPresence of fallsMissing | 3618 (62.0)2141 (36.7)79 (1.3) | 3515 (62.4)2064 (36.7)52 (0.9) | 2572 (61.7)1573 (37.8)22 (0.5) |
| Pain (VAS) (0-10) | No pain (score 0)Mild pain (score 0.5-3)Pain to treat (score 3.5-10)Missing | 2741 (47.0)1090 (18.7)1842 (31.5)165 (2.8) | 2675 (47.5)1045 (18.6)1777 (31.6)134 (2.4) | 1946 (46.7)743 (17.8)1394 (33.5)84 (2.0) |
| Fatigue (VAS) (0-10) | No fatigue (score 0)Presence of fatigue (score 0.5-10)Missing | 1268 (21.7)4319 (74.0)251 (4.3) | 1245 (22.1)4183 (74.3)203 (3.6) | 879 (21.1)3164 (75.9)124 (3.0) |
| Cognition (MMSE) (0-30) | Score ≥ 24 = normal cognitionScore 18-23 = mild cognitive declineScore ≤ 17 = severe cognitive declineMissing | 3949 (67.6)842 (14.4)363 (6.2)684 (11.7) | 3865 (68.6)807 (14.3)344 (6.1)615 (10.9) | 2866 (68.8)636 (15.3)265 (6.4)400 (9.6) |
| Depression (GDS) (0-15) | Score 0-4 = not at risk for depressionScore 5-15 = at risk for depressionMissing | 3310 (56.7)1961 (33.6)567 (9.7) | 3234 (57.4)1911 (33.9)486 (8.6) | 2303 (55.3)1571 (37.7)293 (7.0) |
| Nutrition (MNA-SF) (0-14) | Normal nutritional status: score 12-14Risk of malnutrition: score 8-11Malnutrition: score 0-7Missing | 1031 (17.7)3006 (51.5)1781 (30.5)20 (0.3) | 992 (17.6)2923 (51.9)1697 (30.1)19 (0.3) | 567 (13.6)2252 (54.0)1340 (32.2)8 (0.2) |

**Legend**: FS = functional status; ADL = Activities of Daily Living; IADL = Instrumental Activities of Daily Living; VAS = Visual Analogue Scale; MMSE = Mini Mental State Examination: GDS = Geriatric Depression Scale; MNA-SF = Mini Nutritional Assessment – Short Form; QoL = Quality of Life; EORTC QlQ-C30 = European Organisation for Research and Treatment of Cancer – Quality of Life Questionnaire – C30; GHS = global health scale

**Supplementary table S4. Frequency of different geriatric recommendations and interventions in patients with abnormal result on the G8 screening tool**

|  |  |
| --- | --- |
| **Baseline** | **Follow-up at 3 months (+/- 2 weeks)** |
| **Different geriatric recommen-dations/pt** | ***N* pts** | **%a** | ***N* pts with geriatric interventions data available**  | ***N* pts with at least one different geriatric intervention** | **%** | **Different geriatric interventions /pt** | ***N* pts** | **%b** |
| **0** | 1172 | 20.8 |  |
| **1** | 1342 | 23.8 | 1234 | 677 | 54.9 | **1** | 677 | 54.9 |
|  |  |  |  |  |  | **0** | 557 | 45.1 |
| **2** | 1321 | 23.5 | 1218 | 828 | 68.0 | **2** | 420 | 34.5 |
|  |  |  |  |  |  | **1** | 408 | 33.5 |
|  |  |  |  |  |  | **0** | 390 | 32.0 |
| **3** | 1007 | 17.9 | 964 | 750 | 77.8 | **3** | 221 | 22.9 |
|  |   |   |   |   |  | **2** | 270 | 28.0 |
|  |  |  |   |  |  | **1** | 259 | 26.9 |
|  |   |   |   |   |   | **0** | 214 | 22.2 |
| **4** | 522 | 9.3 | 499 | 412 | 82.6 | **4** | 69 | 13.8 |
|  |   |   |   |   |  | **3** | 111 | 22.2 |
|  |  |  |   |  |  | **2** | 115 | 23.1 |
|  |  |  |   |  |  | **1** | 117 | 23.5 |
|  |   |   |   |   |   | **0** | 87 | 17.4 |
| **5** | 162 | 2.9 | 156 | 125 | 80.1 | **5** | 15 | 9.6 |
|  |   |   |   |   |  | **4** | 19 | 12.2 |
|  |  |  |   |  |  | **3** | 28 | 18.0 |
|  |  |  |   |  |  | **2** | 36 | 23.1 |
|  |  |  |   |  |  | **1** | 27 | 17.3 |
|  |   |   |   |   |   | **0** | 31 | 19.9 |
| **6** | 77 | 1.4 | 69 | 58 | 84.1 | **6** | 2 | 2.9 |
|  |  |  |   |  |  | **5** | 5 | 7.3 |
|  |  |  |   |  |  | **4** | 10 | 14.5 |
|  |  |  |   |  |  | **3** | 18 | 26.1 |
|  |  |  |   |  |  | **2** | 17 | 24.6 |
|  |  |  |   |  |  | **1** | 6 | 8.7 |
|  |   |   |   |   |   | **0** | 11 | 15.9 |
| **7-10** | 28 | 0.5 | 27 | 24 | 88.9 | **5-10** | 0 | 0.0 |
|  |  |  |   |  |  | **4** | 5 | 18.5 |
|  |  |  |   |  |  | **3** | 8 | 29.6 |
|  |  |  |   |  |  | **2** | 7 | 25.9 |
|  |  |  |   |  |  | **1** | 4 | 14.8 |
|  |  |  |   |  |  | **0** | 3 | 11.1 |
| **Total** | **5631** |  | **4167** | **2874** |   |   |   |   |

a calculated from total N° pts with geriatric recommendations data available (***N*** =5631)

b calculated from the N° pts with geriatric interventions data available (***N*** =4167)

**Supplementary table S5: Overview of geriatric recommendations and geriatric interventions on geriatric domain level\*.**

|  |  |  |
| --- | --- | --- |
|  |  | **Geriatric domains** |
|  |  | **Social status** | **FS** | **Falls** | **Pain** | **Fatigue** | **Cognition** | **Depression** | **Nutrition** | **Other\*\*\*\*** | **Total** |
| **Geriatric recommendation**  |  | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **N** | **%** | **n** | **%** | **n** | **%** |
| **Geriatrician** | **Made** | 200 | 4.80 | 229 | 5.50 | 134 | 3.22 | 129 | 3.10 | 70 | 1.68 | 125 | 3.00 | 198 | 4.75 | 428 | 10.27 | 243 | 5.83 | 1756 | 42.14 |
| **Implemented** | 122 | 2.93 | 102 | 2.45 | 54 | 1.30 | 55 | 1.32 | 16 | 0.38 | 37 | 0.89 | 113 | 2.71 | 279 | 6.70 | 166 | 3.98 | 944 | 22.65 |
| **GCT** | **Made** | 40 | 0.96 | 124 | 2.98 | 35 | 0.84 | 138 | 3.31 | 165 | 3.96 | 44 | 1.06 | 15 | 0.36 | 37 | 0.89 | 10 | 0.24 | 608 | 14.59 |
| **Implemented** | 8 | 0.19 | 28 | 0.67 | 8 | 0.19 | 59 | 1.42 | 16 | 0.38 | 11 | 0.26 | 3 | 0.07 | 14 | 0.34 | 5 | 0.12 | 152 | 3.65 |
| **Social worker** | **Made** | 1206 | 28.94 | 1015 | 24.36 | 28 | 0.67 | 1 | 0.02 | 10 | 0.24 | 11 | 0.26 | 6 | 0.14 | 6 | 0.14 | 1 | 0.02 | 2284 | 54.81 |
| **Implemented** | 685 | 16.44 | 373 | 8.95 | 14 | 0.34 | 0 | 0.00 | 4 | 0.10 | 5 | 0.12 | 2 | 0.05 | 3 | 0.07 | 1 | 0.02 | 1087 | 26.09 |
| **Occupational therapist** | **Made** | 7 | 0.17 | 163 | 3.91 | 174 | 4.18 | 0 | 0.00 | 2 | 0.05 | 22 | 0.53 | 3 | 0.07 | 0 | 0.00 | 3 | 0.07 | 374 | 8.98 |
| **Implemented** | 2 | 0.05 | 57 | 1.37 | 108 | 2.59 | 0 | 0.00 | 1 | 0.02 | 3 | 0.07 | 1 | 0.02 | 0 | 0.00 | 0 | 0.00 | 172 | 4.13 |
| **Physiotherapist** | **Made** | 0 | 0.00 | 238 | 5.71 | 317 | 7.61 | 8 | 0.19 | 10 | 0.24 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 23 | 0.55 | 596 | 14.30 |
| **Implemented** | 0 | 0.00 | 114 | 2.74 | 121 | 2.90 | 3 | 0.07 | 4 | 0.10 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 7 | 0.17 | 249 | 5.98 |
| **Fall clinic** | **Made** | 0 | 0.00 | 1 | 0.02 | 120 | 2.88 | 1 | 0.02 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 0.02 | 0 | 0.00 | 123 | 2.95 |
| **Implemented** | 0 | 0.00 | 1 | 0.02 | 12 | 0.29 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 13 | 0.31 |
| **Geronto-psychiatrist** | **Made** | 0 | 0.00 | 3 | 0.07 | 1 | 0.02 | 0 | 0.00 | 0 | 0.00 | 10 | 0.24 | 13 | 0.31 | 1 | 0.02 | 0 | 0.00 | 28 | 0.67 |
| **Implemented** | 0 | 0.00 | 0 | 0.00 | 1 | 0.02 | 0 | 0.00 | 0 | 0.00 | 1 | 0.02 | 4 | 0.10 | 1 | 0.02 | 0 | 0.00 | 7 | 0.17 |
| **Psychologist** | **Made** | 3 | 0.07 | 2 | 0.05 | 0 | 0.00 | 1 | 0.02 | 8 | 0.19 | 50 | 1.20 | 1227 | 29.45 | 2 | 0.05 | 17 | 0.41 | 1310 | 31.44 |
| **Implemented** | 2 | 0.05 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.05 | 15 | 0.36 | 527 | 12.65 | 0 | 0.00 | 7 | 0.17 | 553 | 13.27 |
| **Memory clinic** | **Made** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 324 | 7.78 | 2 | 0.05 | 0 | 0.00 | 0 | 0.00 | 326 | 7.82 |
| **Implemented** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 17 | 0.41 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 17 | 0.41 |
| **Geriatric day clinic** | **Made** | 18 | 0.43 | 54 | 1.30 | 47 | 1.13 | 5 | 0.12 | 6 | 0.14 | 113 | 2.71 | 10 | 0.24 | 8 | 0.19 | 0 | 0.00 | 261 | 6.26 |
| **Implemented** | 2 | 0.05 | 2 | 0.05 | 7 | 0.17 | 0 | 0.00 | 0 | 0.00 | 7 | 0.17 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 18 | 0.43 |
| **Dietician** | **Made** | 0 | 0.00 | 1 | 0.02 | 0 | 0.00 | 0 | 0.00 | 10 | 0.24 | 0 | 0.00 | 2 | 0.05 | 3028 | 72.67 | 2 | 0.05 | 3043 | 73.03 |
| **Implemented** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.05 | 0 | 0.00 | 0 | 0.00 | 1808 | 43.39 | 0 | 0.00 | 1810 | 43.44 |
| **Other physician\*\*** | **Made** | 8 | 0.19 | 30 | 0.72 | 44 | 1.06 | 267 | 6.41 | 203 | 4.87 | 47 | 1.13 | 20 | 0.48 | 48 | 1.15 | 179 | 4.30 | 846 | 20.30 |
| **Implemented** | 3 | 0.07 | 17 | 0.41 | 16 | 0.38 | 199 | 4.78 | 161 | 3.86 | 12 | 0.29 | 7 | 0.17 | 23 | 0.55 | 75 | 1.80 | 513 | 12.31 |
| **Other health support\*\*\*** | **Made** | 19 | 0.46 | 98 | 2.35 | 63 | 1.51 | 91 | 2.18 | 72 | 1.73 | 94 | 2.26 | 83 | 1.99 | 124 | 2.98 | 185 | 4.44 | 829 | 19.89 |
| **Implemented** | 6 | 0.14 | 15 | 0.36 | 7 | 0.17 | 28 | 0.67 | 2 | 0.05 | 19 | 0.46 | 23 | 0.55 | 28 | 0.67 | 62 | 1.49 | 190 | 4.56 |
| **Total** | **Made** | 1501 | 36.02 | 1958 | 46.99 | 963 | 23.11 | 641 | 15.38 | 556 | 13.34 | 840 | 20.16 | 1579 | 37.89 | 3683 | 88.38 | 663 | 15.91 | **12384** |   |
| **Implemented** | 830 | 19.92 | 709 | 17.01 | 348 | 8.35 | 344 | 8.26 | 208 | 4.99 | 127 | 3.05 | 680 | 16.32 | 2156 | 51.74 | 323 | 7.75 | **5725** |   |
|  | **Grade of adherence %** |   | 55.30 |   | 36.21 |   | 36.14 |   | 53.67 |   | 37.41 |   | 15.12 |   | 43.07 |   | 58.54 |   | 48.72 |   |   |

**Legend**: GCT=geriatric consultation team; FS = functional status

\*Data calculated from the total N° pts with geriatric interventions data available (*N*=4167 pts)

\*\* Other physician: Anesthesiologist; Cardiologist; Dentist; Dermatologist; Endocrinologist; Gastroenterologist; General practitioner; Hematologist; Neurologist; Neurosurgeon; Oncologist; Ophthalmologist; Head and neck specialist; Orthopedist / traumatologist; Pain specialist; Pneumologist; Psychiatrist; Radiologist; Radiotherapist; Rehabilitation specialist; Reumatologist; Stomatologist; Surgeon; Urologist

\*\*\* Other health support: Abusus support; Audiologist; Geriatric revalidation; Geriatric support; Logopedist; Nursing support; Pain Support; Palliative support; Psychological support; Religious support; Social support; Revalidation program; Treatment and drug advice

\*\*\*\* Other: General condition; Non-cancer related health problems; Psychological issues; Treatment and drug advice

**Supplementary table S6: Overview of geriatric interventions and subsequent actions undertaken.**

|  |  |
| --- | --- |
|  | **Geriatric domains** |
|  | **Social status** | **FS** | **Falls**  | **Pain**  | **Fatigue**  | **Cognition**  | **Depression**  | **Nutrition**  | **Other**  | **TOTAL** |
| **Total geriatric interventions** | **830** | **709** | **348** | **344** | **208** | **127** | **680** | **2156** | **323** | **5725** |
| **Total actions undertaken** | **1105** | **906** | **383** | **404** | **213** | **140** | **746** | **3293** | **379** | **7569** |
|  |
| 1. Change living situation: institution | 135 | 33 | 3 | 1 | 0 | 2 | 1 | 3 | 4 | **182** |
| 2. Change living situation: Assisted Living Community Apartment | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **12** |
| 3. Change living situation: palliative unit or other | 31 | 7 | 1 | 3 | 3 | 1 | 1 | 2 | 7 | **56** |
| 4. Extended home care : home care nurse | 143 | 123 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | **275** |
| 5. Extended home care : home help | 84 | 53 | 1 | 0 | 4 | 1 | 1 | 8 | 1 | **153** |
| 6. Extended home care: meals at home | 30 | 31 | 1 | 0 | 1 | 0 | 0 | 20 | 0 | **83** |
| 7. Extended home care: cleaning help | 69 | 25 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | **97** |
| 8. Extended home care: homesitter | 5 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | **9** |
| 9. Extended home care : other | 58 | 13 | 2 | 1 | 0 | 2 | 0 | 0 | 1 | **77** |
| 10. Rehabilitation unit | 89 | 60 | 12 | 0 | 2 | 3 | 3 | 4 | 3 | **176** |
| 11. Adjustment living environnement | 18 | 18 | 5 | 0 | 1 | 0 | 0 | 1 | 1 | **44** |
| 12. Technical support | 65 | 45 | 19 | 5 | 0 | 0 | 0 | 3 | 1 | **138** |
| 13. Physiotherapy | 9 | 174 | 152 | 4 | 5 | 1 | 1 | 1 | 6 | **353** |
| 14. Occupational therapy / check-up | 2 | 54 | 33 | 0 | 1 | 3 | 1 | 0 | 1 | **95** |
| 15. Recommendations for (in)continence | 2 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 7 | **17** |
| 16. Recommendations for falls / falls check-up | 0 | 3 | 117 | 0 | 0 | 1 | 2 | 0 | 0 | **123** |
| 17. Orthostatism prevention | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| 18. Adjustment medication | 0 | 3 | 6 | 146 | 18 | 14 | 78 | 8 | 164 | **437** |
| 19. Psychological / emotional support | 29 | 28 | 1 | 1 | 2 | 4 | 592 | 1 | 32 | **690** |
| 20. Cognitive check-up | 0 | 8 | 0 | 0 | 0 | 61 | 3 | 0 | 0 | **72** |
| 21. Recommendations delirium prevention / ROT | 0 | 2 | 0 | 0 | 0 | 11 | 0 | 1 | 4 | **18** |
| 22. Nutritional check-up / Recommendations for nutritional support | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1860 | 0 | **1860** |
| 23. Nutritional supplements | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 1170 | 0 | **1174** |
| 24. Recommendations for sleep | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 1 | 0 | **9** |
| 25. Recommendations for wound care / pressure ulcers | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 9 | **14** |
| 26. Nursing wound care | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | **3** |
| 27. Visual / Hearing check-up | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | **3** |
| 28. Parenteral nutrition | 0 | 1 | 0 | 0 | 0 |  | 2 | 37 | 2 | **42** |
| 29. Social assessment | 183 | 95 | 5 | 3 | 3 | 8 | 15 | 38 | 3 | **353** |
| 30. Palliative care | 19 | 11 | 1 | 6 | 1 | 1 | 3 | 4 | 21 | **67** |
| 31. Information, application and transport | 71 | 38 | 2 | 1 | 0 | 2 | 3 | 1 | 7 | **125** |
| 32. Follow-up of non-cancer related health problems | 0 | 6 | 0 | 169 | 154 | 6 | 2 | 32 | 12 | **381** |
| 33. Additional treatment | 2 | 7 | 2 | 12 | 0 | 8 | 3 | 27 | 68 | **129** |
| 34. Undefined | 52 | 53 | 10 | 50 | 6 | 9 | 32 | 68 | 18 | **298** |

**Legend**: FS = functional status; ROT = reality orientation training

\*Other = sum of other physician + other health support

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**DISCLOSURE**

The authors have declared no conflicts of interest.

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