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Prevalence of cancer and management in elderly nursing home residents. A descriptive study in 45 French nursing homes

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Abstract

This study aimed to determine cancer prevalence occurring after the age of 75 in 45 French nursing homes (NH), as well as residents' characteristics and parameters associated with cancer-specific management. Descriptive retrospective study including 214 residents (mean age, 89.7 years) with cancer diagnosed after age 75. The studied parameters were sociodemographic, functional, nutritional and cognitive data; comorbidity assessment; date of tumoral diagnosis; cancer type; tumoral stage; treatment plan; multidisciplinary staff decision and oncologic follow-up. Our results showed that cancer prevalence in NH was 8.4 ± 1.1%, diagnosed before admission in 63% of cases. The most common tumoral sites were skin (26%), digestive tract and breast (18% for both); 12% had metastasis. Cognitive impairment was the most common comorbidity (42%), and 44% of the residents were highly dependent. Multivariate analysis showed that therapeutic decisions were associated with age. Older patients had less staging exploration (odd ratios [ORs], 0.90, 95% confidence interval [CI], 0.85–0.97) and underwent less cancer-specific treatment (ORs, 0.92; 95%CI, 0.86–0.99). Oncologic follow-up was more frequent in younger patients (ORs, 0.90; 95%CI, 0.81–0.99) and those with recent diagnosis (ORs, 0.37; 95%CI, 0.23–0.61). This study identified factors associated with substandard neoplastic management in elderly NH residents. It highlights needs for information, education and training in cancer detection to improve cancer consideration and care in NH.

KEYWORDS
aged, diagnosis, education, management, neoplasms, nursing homes

1 | INTRODUCTION

In the first decade of the second millennium, the oldest old population (aged ≥ 85) increased by 30%, reaching 5.5 millions in the United States, representing 1.6% of the total population (Werner, 2011). The projection of demographic variations could lead to a population of 17 millions individuals in 2050, which would equal to 4.5% of the total population (Ortman, Velkoff, & Hogan, 2014). In this growing population, management of cancer is a challenge. As incidence rates are strongly related to age for all cancers combined. In United States, between 2005 and 2009, 7.7% of all cancer diagnoses and 15.5% of cancer deaths occurred in subjects aged 85 and older (Howlader et al.,). In United Kingdom, on average each year more than a third of new cases occur in people aged 75 with highest rates in the 85–89 age group (Ferlay et al, 2013). In the elderly, comorbidities might be barriers to diagnostic and therapeutic management.

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TABLE 1 Characteristics of 214 residents with cancer in 45 French nursing homes

Variables of interest	No. (%)	Cancer diagnosed before admission in nursing home *N* = 133 (%)	Cancer diagnosed after admission in nursing home *N* = 81 (%)	p
Women	135 (63)	85 (64)	50 (62)	0.10
Current age (years)				
75–84	33 (15)	22 (17)	11 (14)	0.73
85–89	66 (31)	39 (29)	27 (33)	
90–94	88 (41)	57 (49)	31 (18)	
≥95	27 (13)	15 (11)	12 (15)	
Reason for admission to nursing home				
Comorbidities	85 (40)	46 (35)	39 (48)	0.03
Cognitive disease	63 (29)	38 (28)	25 (31)	
Cancer	19 (9)	19 (14)	–	
Individual wish	47 (22)	30 (23)	17 (21)	
Length of nursing home stay (at time of chart review)				
<1 year	46 (21)	42 (32)	4 (5)	<0.001
1–2 years	81 (38)	55 (41)	26 (32)	
≥3 years	87 (41)	36 (27)	51 (63)	
Dependence according to the AGGIR classification				
Independence (AGGIR 5–6)	14 (7)	12 (9)	2 (3)	0.14
Moderate (AGGIR 3–4)	107 (50)	67 (50)	40 (49)	
Severe (AGGIR 1–2)	93 (43)	54 (41)	39 (48)	
Comorbidities, according to CIRS-G				
Mean score	5.5 ± 2.3	5.3 ± 2.4	5.7 ± 2.1	0.27
Cognitive impairment	90 (42)	52 (39)	38 (47)	0.26
Loss of weight >10%	23 (11)	13 (10)	10 (12)	0.56
Tumoral sites				
Skin	55 (26)	33 (25)	22 (27)	0.86
Breast	39 (18)	24 (18)	15 (19)	
Digestive	39 (18)	25 (19)	14 (17)	
Haematologic malignancies	23 (11)	12 (9)	11 (14)	
Prostate	22 (10)	14 (10)	8 (10)	
Urinary tract	16 (7)	10 (8)	6 (7)	
Others	20 (9)	15 (11)	5 (6)	
Confirmed metastatic disease	25 (12)	15 (11)	10 (12)	0.81

(Continues)

TABLE 1 (Continued)

Variables of interest	No. (%)	Cancer diagnosed before admission in nursing home *N* = 133 (%)	Cancer diagnosed after admission in nursing home *N* = 81 (%)	p
Age at cancer diagnosis				
75–84 years	101 (47)	79 (59)	22 (27)	<0.001
85–89	64 (30)	33 (25)	31 (38)	
90–94	41 (19)	20 (15)	21 (26)	
≥95	8 (4)	1 (1)	7 (9)	
Time since cancer diagnosis				
<1 year	47 (22)	14 (11)	33 (41)	<0.001
1–5	105 (49)	61 (46)	44 (54)	
>5	62 (29)	58 (44)	4 (5)	
Available staging information	128 (61)	78 (60)	50 (63)	0.72
Available multidisciplinary staff decision	73 (35)	42 (33)	31 (39)	0.36
Decision of cancer-specific treatment	176 (83)	114 (86)	55 (69)	0.01
Type of antineoplastic management				
Curative management	130 (61)	97 (73)	33 (41)	<0.001
Palliative management	81 (38)	34 (26)	47 (58)	
Missing data	3 (1)	2 (1)	1 (1)	
Treatment				
Surgery	118 (55)	88 (66)	30 (37)	<0.001
Chemotherapy	23 (11)	16 (12)	7 (9)	0.44
Radiation therapy	40 (19)	29 (21)	11 (14)	0.13
Hormonal therapy	45 (21)	25 (19)	20 (25)	0.31
Targeted therapy	0	–	–	–
None	28 (13)	12 (9)	16 (20)	0.02
Patient refusal	8 (4)	2 (2)	6 (7)	0.21
Oncologic follow-up (*n* = 141)	68 (48)	38 (29)	30 (38)	0.21

Note. AGGIR: Autonomie Gérontologique Groupes Iso-Ressources; CIRS-G: cumulative illness rating scale for geriatrics.

Patients' conditions and treatment tolerance may impact on cancer treatment decision-making process or treatment delivery (Puts et al., 2012). For all these reasons, it is well-known that older persons are underdiagnosed or undertreated for cancer (Terret, Castel-Kremer, & Albrand, 2009), all the more as many older individuals with cancer are institutionalised (Castora-Binkley, Meng, & Hyer, 2014).

In nursing homes (NH), the prevalence of cancer is up to 10% (Buchanan, Barkley, Wang, & Kim, 2005; Johnson, Teno, Bourbonniere, & Mor, 2005; Rodin, 2017). In such settings, residents are much more heterogeneous than in the community, with a high level of dependence, a high number of comorbidities and the prevalence of dementia up to 80% (Roick et al., 2018; Selbaek, Engedal, Benth, & Bergh, 2014). To our knowledge, there is no data reporting prevalence and management of cancer in French NH. We propose to describe these characteristics, including geriatric and oncologic data with a focus on staging, therapy and follow-up of residents.

2 | METHODS

2.1 | Study design and population

From January to May 2015, we conducted a descriptive study in 45 NH surrounding our university hospital. All residents with cancer or recurrence of cancer occurring after the age of 75 years could be included regardless of tumoral site and oncologic treatment plan.

2.2 | Ethics

All patients or surrogate decision makers provided informed consent before inclusion. The protocol was approved by the French regulatory authorities on medical research and personal data (*Comité Consultatif sur le Traitement de l'Information en matière de Recherche dans le domaine de la Santé*, France).

2.3 | Study data

The data were collected from the medical records of NH, local hospital and loco-regional online cancer registry (www.oncopoitou-charentes.fr).

Sociodemographic data, such as age, gender, date of and reason for admission, comorbidity assessment with the cumulative illness rating scale for geriatrics (CIRS-G) score, as well as entrance and current weights were recorded (Linn, Linn, & Gurel, 1968; Miller & Towers, 1991). Functional abilities were measured by using the French validated geriatric scale: *Autonomie Gérontologique Groupes Iso-Ressources* (AGGIR). This scale is the official French government scale used to define the amount of the financial allowance to partially pay the assistance related to the patients' dependency. It is easily collectable as systematically performed on admission. The scale assesses the degree of dependence in ten variables reflecting activities of daily livings and cognitive ability (toileting, dressing, dependence at meals, continence, transferring, indoor and outdoor walking, temporal and spatial orientation, coherence and communication) (Vetel, Leroux, & Ducoudray, 1998). The score ranges from 1 (bedridden and demented) to 6 (perfectly independent) and is annually assessed. Three categories of functional status are defined according to the AGGIR groups: AGGIR 1 and 2, severe dependence; AGGIR 3 and 4, moderate dependence; and AGGIR 5 and 6, independence. Cognitive impairment was defined by a Mini-Mental State Examination score below 24/30 and/or cognitive disease reported in the medical record (Folstein, Folstein, & McHugh, 1975).

Oncologic data included the date of tumoral diagnosis, the site, the tumoral stage (metastatic or not), the availability of staging information, the cancer treatment plan and the oncologic follow-up. Cancer-specific treatment could include one or a combination of the following modalities: surgery, chemotherapy, hormone therapy and radiotherapy. Ongoing oncologic follow-up was defined when at least one consultation in any oncology service in the latest year was performed. Conclusion from the multidisciplinary meeting was also collected in the medical charts and the online cancer registry. Palliative treatment was retained when a curative treatment plan was not proposed.

2.4 | Statistical analysis

All analyses were conducted using SAS, version 9.3 (SAS Institute, Cary, NC, USA). NH residents and cancer characteristics were expressed as numbers and percentages, respectively, for qualitative variables. Quantitative variables were analysed as the means ± standard deviations. Prevalence rates were calculated with a 95% confidence interval (CI). Univariate and multivariate analyses were performed with a logistic regression test, and results were presented as odd ratios (ORs) with 95% CIs. The threshold for statistical significance was set at an alpha level of 5% in the univariate and multivariate analyses. All collected variables were considered in the univariate analysis. When variables were significantly associated with the outcome of interest, items were integrated in the multivariate analysis, regardless clinical significance and data reported in the literature as predictive factors. In uni- and multivariate analyses, gender, age, length of stay in the NH, levels of dependence, cancer types and stages and time since cancer diagnosis were expressed as categorical variables.

3 | RESULTS

Of 2,552 residents of the 45 French screened NH, 214 were included in this study. The median age at the time of data collection was 90 years (Q1–Q3: 87–93, range: 76–104) (Table 1). The prevalence of cancer diagnosed after the age of 75 was 8.4 ± 1.1%. The population was mostly female (63%) and had a median of two-year length of stay in NH (Q1–Q3: 1–4 years, with range from 0 to 25). Cancer was diagnosed in the previous five years in 71% of residents, mostly after age of 85 years (53%), and after admission to the NH in 37% of residents. The most common tumoral sites were skin (26%), digestive tract and breast (18% for both). Metastatic disease was reported in

12% of cases (n = 25). The residents were moderately dependent in 50% of cases and highly dependent (GIR 1 and 2) in 43%. Majority of the residents (89%) had three or more active comorbidities, according to the CIRS-G score, mainly cognitive impairment (42%).

Staging information and reports of a multidisciplinary discussion were available in, respectively, 61% and 35% of cases. When antineoplastic treatment was decided (n = 176, 83%), surgery was the most frequently performed (55%). Thirty-six patients were still undergoing cancer treatment at time of data collection, and 68 (48%) had still oncologic follow-up. Residents with cancer diagnosed since admission in NH (37%) had statistically the same rate of available staging exploration and multidisciplinary decision, compared to those with a diagnosis before admission in NH, but decision of cancer-specific treatment was significantly lower (69% vs. 86%, p = 0.013) (Table 1). Moreover, when a cancer treatment was organised, residents with cancer diagnosed in NH would rather have undergone palliative management than curative strategy (p < 0.001).

Univariate analysis showed that younger age at diagnosis was associated with more frequent available staging information (ORs, 0.92; 95% CI, 0.86–0.97) and cancer treatment (ORs, 0.91; 95% CI, 0.85–0.97). These associations remained significant in multivariate analysis (Table 2). Oncologic follow-up was more frequently carried out in younger patients (ORs, 0.90; CI 95%, 0.81–0.99) and those with a recent cancer diagnosis (Table 3). A shorter time since cancer diagnosis was significantly associated with a current oncologic follow-up (p < 0.0001). After adjustment, there was no significant association between cancer management and metastatic status.

4 | DISCUSSION

We report characteristics of French NH residents with a history of cancer occurring after the age of 75. Cancer prevalence in this older population was about 8%, with mostly diagnoses of skin, digestive and breast cancers occurring in the five previous years. Data show the lack of staging information, the insufficiency of multidisciplinary conference team reports and less than 50% of residents with oncologic follow-up care. Therapeutic decisions were associated with patients' age, as older age was associated with lower rates of staging information and cancer-specific treatment plans. Comparison between residents with cancer diagnosed before and after the admission in the NH showed a significant difference in the decision of palliative management in residents (26% vs. 58%, p < 0.001) (Table 1).

Our findings are consistent with the literature data that report cancer development in NH residents between 4.2% and 10.0% (Buchanan et al., 2005; Johnson et al., 2005; Rodin, 2017). Still cancer prevalence among institutionalised persons is much lower than in communities, with prevalence rates in France in men and women over 75 years estimated at 33% and 14% respectively (Colonna, Mitton, Bossard, Belot, & Grosclaude, 2015). Cancer incidence increases with age, reaching a peak at 85, then decreasing in older old population, with an incidence of 2,340 per 100,000 in patients aged 85 and older versus 2,500 per 100,000 in the age group 75–85 (Thakkar, McCarthy, & Villano, 2014). Staging information was missing in 40% of cases and might result from less effective screening or underreporting of cancer diagnosis in NH. Patient, practitioners and caregivers may have decided not to search for metastasis, since residents may not handle an antineoplastic treatment or according to their goals of care. While multidisciplinary discussions in oncology are mandatory in France before decision of therapeutic strategies, our results highlight the difficulty of practitioners to stick to health authorities recommendations, with 35% of available reports. To note, rate of cancer multidisciplinary conference is up to 85% in the overall population (INCa (Institut National du Cancer), 2015) and decreases to 60% in the community-dwelling older population (Caillet et al., 2011).

The most frequently diagnosed tumour sites in this study appeared to be correlated with symptoms, such as skin lesion, breast lump, digestive pain or bleeding. Frequent cancers in older such as prostate and lung cancers may have been underdiagnosed because asymptomatic (Arnold et al., 2015) or because people with known lung cancer may die shortly after admission in NH as such cancer

TABLE 2 Multivariate analysis of associations between geriatric data and cancer management at baseline (available staging information, available multidisciplinary staff decision, cancer treatment) in 214 French nursing home residents

	Available staging information		Available multidisciplinary staff decision		Cancer treatment	
	N (%)	ORs (95% CI)	*N* (%)	ORs (95% CI)	*N* (%)	ORs (95% CI)
Age at cancer diagnosis (years)		0.90 (0.85–0.97)		1.00 (0.95–1.06)		0.92 (0.86–0.99)
75–84 years	68 (54)		29 (30)		87 (87)	
85–89 years	39 (31)		17 (44)		54 (86)	
≥90 years	19 (15)		17 (35)		36 (73)	
Time of cancer diagnosis		0.68 (0.33–1.42)		0.75 (0.40–1.39)		2.06 (0.95–4.49)
Before admission	78 (62)		42 (32)		118 (89)	
After admission	48 (38)		31 (39)		59 (75)	

Note. ORs: odd ratios; CI: confidence interval; CIRS-G: cumulative illness rating scale for geriatrics.

TABLE 3 Univariate and multivariate analyses associations between geriatric parameters and oncologic follow-up in the 141 French nursing home patients who underwent and finished a cancer-specific treatment

	Oncologic follow-up	Univariate analysis	Multivariate analysis
	N (%)	ORs (95% CI)	ORs (95% CI)
Age (years)		0.88 (0.81–0.96)	0.90 (0.81–0.99)
75–84 years	10 (23)		
85–89	17 (40)		
90–95	14 (33)		
>95	2 (4)		
Time since cancer diagnosis			0.37 (0.23–0.61)
<1 years	30 (70)		
1–5 years	4 (9)	0.14 (0.04–0.46)	
>5 years	9 (21)	0.14 (0.05–0.34)	

Note. ORs: odd ratios; CI: confidence interval.

is the first cause of cancer-related mortality after 80 years (Siegel, Miller, & Jemal, 2018). Cancer patients in NH have less access to cancer treatment compared to older cancer outpatients (Bainbridge, Seow, Sussman, & Pond, 2015; Bradley, Clement, & Lin, 2008).

Reasons for under-management appear multiple: lack of diagnosis, fear of cancer, lack of knowledge about therapeutic issues and fatalism in patients with comorbidities such as cognitive impairment, malnutrition and functional loss (INCa (Institut National du Cancer), 2015; NCCN, ;). A Belgian survey of physicians specialised in elder care reported that 33% of patients were not referred because of end-stage dementia, patient's or family's wishes, and limited life expectancy (Hamaker et al., 2012).

Loss of follow-up reached high rates in our population, with 48% of residents who had oncologic follow-up care with cancer services, whereas scientific societies, such as the American Society of Clinical Oncology and the National Comprehensive Cancer Network, recommend follow-up every 3 months in the first two years, then every six months during three years (Choi, Craft, & Geraci, 2011). Range of adherence to recommended office visits was from 60% to 92% within the first 12 to 18 months after cancer diagnosis in younger patients (Carpentier, Vernon, Bartholomew, Murphy, & Bluethmann, 2013; Katz et al, 2009) and may decrease to 67% at five years in younger population (Rolnick et al, 2005). Older age, poor performance status and comorbid conditions are frequently reported as associated with a lower adherence to surveillance in cancer survivors in community dwelling (Kukar, Watroba, Miller, Kumar, & Edge, 2014; Marcus, Raji, & Chen, 2014; Misu, Preethi, & Aleyamma, 2010; Salloum et al, 2012; Tan, Moldovan-Johnson, Gray, Hornik, & Armstrong, 2013). Among them, patients aged 80 and older are less likely to undergo surveillance, with lower rate of oncologic follow-up (relative risk: 0.32; 95% CI 0.22–0.45, $p < 0.05$) (Rulyak, Mandelson, Brentnall, Rutter, & Wagner, 2004). Still, it is reported that quality of oncologic follow-up could also be assessed by general practitioners (Augestad et al, 2013; Jacobs & Shulman, 2017), with outcomes in breast cancer survivors followed by general practitioner equivalent to those in patients followed by an oncologist (Grunfeld et al, 2006; Lewis et al, 2009).

Our results also highlighted that oncologic follow-up was more frequently carried out in patients with recent cancer diagnosis, which is consistent with the literature as the percentage of patients undergoing recommended surveillance decreases steadily over time (Giuliani et al, 2016).

Using chronologic age alone to make treatment decisions is no longer an acceptable approach in cancer care. Multidisciplinary management involving geriatricians would make sense in this situation, since other specialists may underestimate and misdiagnose impaired geriatric domains. In patients with diagnosed neoplasms, adoption of multidisciplinary symptom management guidelines and procedures for appropriate referral to hospital might improve the quality of care and enhance the quality of life in this population, notably in cancer-related symptoms (Dobalian, 2004; Drageset, Eide, Harrington, & Ranhoff, 2015). Needs of prospective resident ethics meetings have been reported (Bollig, Schmidt, Rosland, & Heller, 2015). Collaboration between nursing staff and relatives is known to be a central prerequisite for good care in these settings (Jakobsen, Sellevold, & Egede-Nissen, 2017). Decisions about ethical challenges in nursing homes, regarding end-of-life care, decision-making, do-not-resuscitate orders, or decision to hospitalise or not, would then be discussed with staff members, representatives of the resident or the resident him/herself. These meetings could lead to consent on acceptable shared decisions for both staff and relatives, including ideally the patient in the decision-making process (Hughes & Goldie, 2009). Involvement in resident's decision-making has to be improved, as 40% of US nursing homes residents reported being told nothing about their medical conditions (Wetle, Levkoff, Cwikel, & Rosen, 1988). This claiming of information and decision-making has been established in older patients in community dwelling (Herrmann et al., 2018; Paillaud et al, 2017). Moreover, NH staff wishes to improve their skills about cancer diagnosis and management (Lubeek, van Gelder, & van der Geer, 2016). As 37% of the residents were diagnosed with cancer post-admission in our study, it paves the way for further studies to screen residents who are most likely to benefit from personalised cancer management. Recent guidelines should help physicians to choose among therapeutic options based

on patient impairments ranging from optimal cancer treatment to abstention (NCCN,).

This study has several limitations because it was retrospective in nature. We did not specifically review each patient's treatment data to assess whether the treatment was or was not optimal. We lacked information about whether or not the NH resident had expressed advanced directives and family preferences, which might have influenced the therapeutic decisions. The oncology-specific skills of the professional caregivers were not reported. Another limitation was the inclusion of all cancer types and stages, particularly skin cancers, leading to heterogeneous groups.

Despite limitations, to our knowledge, this is the first French cohort including numerous NH residents with cancer and reporting factors associated with cancer care plans and oncologic follow-up. The results indicate that the prevalence of cancer diagnosis in the most vulnerable patients is much lower than in communities. This study highlights the need to better recognise residents in which diagnosis of cancer could be beneficial, to have conversations with patients and families, and to encourage referral to oncology centre if consistent with goals of care. Implementation of a comprehensive geriatric assessment in geriatric oncology clinics would also help improving cancer management in this population.

5 | CONCLUSION

Literature rarely provides data about older old patients with cancer living in nursing homes. This study is one of the first which reports the geriatric and oncologic characteristics in this very specific group, with a lack of staging information, an insufficiency of multidisciplinary conference team reports and low rate of effective oncologic follow-up care, notably in the oldest ones. Regarding our findings, more attention should be drawn to improve management of cancer in this frail population, including oncologists and geriatricians, but also when possible residents themselves, relatives and nursing staff.

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CONFLICT OF INTEREST

The authors indicated no conflict of interest.

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REFERENCES

Arnold, M., Karim-Kos, H. E., Coebergh, J. W., Byrnes, G., Antilla, A., Ferlay, J., … Soerjomataram, I. (2015). Recent trends in incidence of five common cancers in 26 European countries since 1988: Analysis of the European Cancer Observatory. *European Journal of Cancer*, *51*, 1164–1187. https://doi.org/10.1016/j.ejca.2013.09.002

Augestad, K. M., Norum, J., Dehof, S., Aspevik, R., Ringberg, U., Nestvold, T., … Lindsetmo, R.-O. (2013). Cost-effectiveness and quality of life in surgeon versus general practitioner-organised colon cancer surveillance: A randomised controlled trial. *British Medical Journal Open*, *4*, 4. pii: e002391. https://doi.org/10.1136/bmjopen-2012-002391

Bainbridge, D., Seow, H., Sussman, J., & Pond, G. (2015). Factors associated with acute care use among nursing home residents dying of cancer: A population-based study. *International Journal of Palliative Nursing*, *21*, 349–356. https://doi.org/10.12968/ijpn.2015.21.7.349

Bollig, G., Schmidt, G., Rosland, J. H., & Heller, A. (2015). Ethical challenges in nursing homes – staff's systematic ethics meetings with participation of residents' relatives. *Scandinavian Journal of Caring Sciences*, *29*, 810–823.

Bradley, C. L., Clement, J. P., & Lin, C. (2008). Absence of cancer diagnosis and treatment in elderly Medicaid-insured nursing home residents. *Journal of the National Cancer Institute*, *100*, 21–31. https://doi.org/10.1093/jnci/djm271

Buchanan, R. J., Barkley, J., Wang, S., & Kim, M. (2005). Analyses of nursing home residents with cancer at admission. *Cancer Nursing*, *28*, 406–414. https://doi.org/10.1097/00002820-200509000-00012

Caillet, P., Canoui-Poitrine, F., Vouriot, J., Berle, M., Reinald, N., Krypciak, S., … Paillaud, E.. (2011). Comprehensive geriatric assessment in the decision-making process in elderly patients with cancer: ELCAPA study. *Journal of Clinical Oncology*, *29*, 3636–3642. https://doi.org/10.1200/JCO.2010.31.0664

Carpentier, M. Y., Vernon, S. W., Bartholomew, L. K., Murphy, C. C., & Bluethmann, S. M. (2013). Receipt of recommended surveillance among colorectal cancer survivors: A systematic review. *Journal of Cancer Survivorship*, *7*, 464–483. https://doi.org/10.1007/s11764-013-0290-x

Castora-Binkley, M., Meng, H., & Hyer, K. (2014). Predictors of long-term nursing home placement under competing risk: evidence from the Health and Retirement Study. *Journal of American Geriatric Society*, *62*, 913–918.

Choi, M., Craft, B., & Geraci, S. A. (2011). Surveillance and monitoring of adults cancer survivors. *American Journal of Medicine*, *124*, 598–601.

Colonna, M., Mitton, N., Bossard, N., Belot, A., & Grosclaude, P. (2015). Total and partial cancer prevalence in the adult French population in 2008. *BMC Cancer*, *15*, 153. https://doi.org/10.1186/s12885-015-1168-2

Dobalian, A. (2004). Nursing facility compliance with do-not-hospitalize orders. *Gerontologist*, *44*, 159–165. https://doi.org/10.1093/geront/44.2.159

Drageset, J., Eide, G. E., Harrington, C., & Ranhoff, A. H. (2015). Acute hospital admission for nursing home residents without cognitive impairment with a diagnosis of cancer. *European Journal of Cancer Care*, *24*, 147–154. https://doi.org/10.1111/ecc.12205

Ferlay, J., Soerjomataram, I., Ervik, M., Dikshit, R., Eser, S., Mathers, C., … Bray, F. (2013). *GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]*. Lyon, France: International Agency for Research on Cancer. Retrieved from https://globocan.iarc.fr (accessed on 07/05/2018)

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state", a practical method for gradng the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, *12*, 189–198. https://doi.org/10.1016/0022-3956(75)90026-6

Giuliani, O., Mancini, S., Puliti, D., Caranci, N., Ravaioli, A., Vattiato, R., … Falcini, F. (2016). Patterns and determinants of receipt of follow-up mammography and/or clinical examination in a cohort of Italian

breast cancer survivors. *Breast Cancer Research and Treatment*, *159*, 543–551. https://doi.org/10.1007/s10549-016-3895-8

Grunfeld, E., Levine, M. N., Julian, J. A., Coyle, D., Szechtman, B., Mirsky, D., … Whelan, T. (2006). Randomized trial of long-term follow-up for early-stage breast cancer: A comparison of family physician versus specialist care. *Journal of Clinical Oncology*, *24*, 848–855. https://doi.org/10.1200/JCO.2005.03.2235

Hamaker, M. E., Hamelinck, V. C., van Munster, B. C., Bastiaannet, E., Smorenburg, C. H., Achterberg, W. P., … de Rooij, S. E. (2012). Nonreferral of nursing home patients with suspected breast cancer. *Journal of the American Medical Directors Association*, *13*, 464–469. https://doi.org/10.1016/j.jamda.2012.01.002

Herrmann, A., Hall, A., Sanson-Fisher, R., … H. (2018). Not asking cancer patients about their preferences does make a difference. A cross-sectional study examining cancer patients' preferred and perceived role in decision-making regarding their last important cancer treatment. *European Journal of Cancer Care*, *27*, e12871. https://doi.org/10.1111/ecc.12871

Howlader, N., Noone, A. M., Krapcho, M., Miller, D., Bishop, K., Kosary, C. L., …Cronin, K. A. (eds). *SEER Cancer Statistics Review*, *1975–2014*.

Hughes, C. M., & Goldie, R. (2009). "I just take what I am given": Adherence and resident involvement in decision making on medicines in nursing homes for older people: A qualitative survey. *Drugs and Aging*, *26*, 505–517. https://doi.org/10.2165/00002512-200926060-00007

INCa (Institut National du Cancer). (2015). Les cancers en France. Retrieved from www.e-cancer.fr/content/ download/148692/.../Les-cancers-en-France-edition-2015.pdf/ (Assessed 17 09 11).

Jacobs, L. A., & Shulman, L. N. (2017). Follow-up care of cancer survivors: Challenges and solutions. *Lancet Oncology*, *18*, e19–e29. https://doi.org/10.1016/S1470-2045(16)30386-2

Jakobsen, R., Sellevold, G. S., & Egede-Nissen, V. (2017). Ethics and quality care in nursing homes: Relatives' experiences. *Nursing Ethics*, *1*, 969733017727151. https://doi.org/10.1177/0969733017727151

Johnson, V. M., Teno, J. M., Bourbonniere, M., & Mor, V. (2005). Palliative care needs of cancer patients in U.S. nursing homes. *Journal of Palliative Medicine*, *8*, 273–279. https://doi.org/10.1089/jpm.2005.8.273

Katz, M. L., Donohue, K. A., Alfano, C. M., Day, J. M., Herndon, J. E. 2nd, & Paskett, E. D. (2009). Cancer surveillance behaviors and psychosocial factors among long-term survivors of breast cancer. *Cancer*, *115*, 480–488. https://doi.org/10.1002/cncr.24063

Kukar, M., Watroba, N., Miller, A., Kumar, S., & Edge, S. B. (2014). Fostering coordinated survivorship care in breast cancer: Who is lost to follow-up? *Journal of Cancer Survivorship*, *8*, 199–204. https://doi.org/10.1007/s11764-013-0323-5

Lewis, R. A., Neal, R. D., Williams, N. H., France, B., Hendry, M., Russell, D., … Wilkinson, C. (2009). Follow-up of cancer in primary care versus secondary care: Systematic review. *British Journal of General Practice*, *59*, e234–e247. https://doi.org/10.3399/bjgp09X453567

Linn, B. S., Linn, M. W., & Gurel, L. (1968). Cumulative illness rating scale. *Journal of the American Geriatrics Society*, *16*, 622–626. https://doi.org/10.1111/j.1532-5415.1968.tb02103.x

Lubeek, S. F., van Gelder, M. M., van der Geer, E. R., van de Kerkhof, P. C. M., & Gerritsen, M. J. P. (2016). Skin cancer care in institutionalized elderly in the Netherlands: A nationwide study on the role of nursing home physicians. *Journal of the European Academy of Dermatology and Venereology*, *30*, e236–e237. https://doi.org/10.1111/jdv.13573

Marcus, M. W., Raji, O. Y., Chen, Y., Duffy, S. W., & Field, J. K. (2014). Factors associated with dropout in a lung cancer high-risk cohort – the Liverpool Lung Project. *International Journal of Oncology*, *44*, 2146–2152. https://doi.org/10.3892/ijo.2014.2371

Miller, M. D., & Towers, A. (1991). *A manual of guidelines for scoring the cumulative illness rating scales for geriatrics (CIRS-G)*. Pittsburg, CA: University of Pittsburg.

Misu, P., Preethi, S. G., & Aleyamma, M. (2010). Patient and disease related factors associated with lost-to-follow-up/drop-out of cervical cancer patients: A study at a major cancer hospital in South India. *Asian Pacific Journal of Cancer Prevention*, *11*, 1529–1534.

National Cancer Institute. Bethesda, MD. Retrieved from https://seer.cancer.gov/csr/1975_2014/. based on November 2016 SEER data submission, posted to the SEER web site, April 2017.

Ortman, J. M., Velkoff, V. A., & Hogan, H. (2014). *An aging nation: The older population in the United States*, *current population reports*, *P25–1140*. Washington, DC: U.S. Census Bureau.

Paillaud, E., Canoui-Poitrine, F., Varnier, G., Anfasi-Ebadi, N., Guery, E., Saint-Jean, O., … Caillet, P. (2017). Preferences about information and decision-making among older patients with and without cancer. *Age and Ageing*, *46*, 665–671. https://doi.org/10.1093/ageing/afw256

Puts, M. T., Hardt, J., Monette, J., Girre, V., Springall, E., & Alibhai, S. M. H. (2012). Use of geriatric assessment for older adults in the oncology setting: A systematic review. *Journal of the National Cancer Institute*, *104*, 1133–1163. https://doi.org/10.1093/jnci/djs285

Rodin, M. B. (2017). Should you screen nursing home residents for cancer? *Journal of Geriatric Oncology*, *8*, 154–159. https://doi.org/10.1016/j.jgo.2016.10.005

Roick, J., Danker, H., Kersting, A., Briest, S., Dietrich, A., Dietz, A., … Singer, S. (2018). Factors associated with non-participation and drop-out among cancer patients in a cluster-randomised controlled trial. *European Journal of Cancer Care*, *27*, e12645. https://doi.org/10.1111/ecc.12645

Rolnick, S., Hensley Alford, S., Kucera, G. P., Fortman, K., Ulcickas Yood, M., Jankowski, M., & Johnson, C. C. (2005). Racial and age differences in colon examination surveillance following a diagnosis of colorectal cancer. *Journal of the National Cancer Institute Monograms*, *35*, 96–101. https://doi.org/10.1093/jncimonographs/lgi045

Rulyak, S. J., Mandelson, M. T., Brentnall, T. A., Rutter, C. M., & Wagner, E. H. (2004). Clinical and sociodemographic factors associated with colon surveillance among patients with a history of colorectal cancer. *Gastrointestinal Endoscopy*, *59*, 239–247. https://doi.org/10.1016/S0016-5107(03)02531-8

Salloum, R. G., Hornbrook, M. C., Fishman, P. A., Ritzwoller, D. P., O'Keeffe Rossetti, M. C., & Elston Lafata, J. (2012). Adherence to surveillance care guidelines after breast and colorectal cancer treatment with curative intent. *Cancer*, *118*, 5644–5651. https://doi.org/10.1002/cncr.27544

Selbaek, G., Engedal, K., Benth, J. S., & Bergh, S. (2014). The course of neuropsychiatric symptoms in nursing-home patient with dementia over a 53-month follow-up period. *International Psychogeriatrics*, *26*, 81–91.

Siegel, R. L., Miller, K. D., & Jemal, A. (2018). Cancer statistics, 2018. *CA: A Cancer Journal for Clinicians*, *68*, 7–30. https://doi.org/10.3322/caac.21442

Tan, A. S., Moldovan-Johnson, M., Gray, S. W., Hornik, R. C., & Armstrong, K. (2013). An Analysis of the association between cancer-related information seeking and adherence to breast cancer surveillance procedures. *Cancer Epidemiology, Biomarkers & Prevention*, *22*, 167–174. https://doi.org/10.1158/1055-9965.EPI-12-0781

Terret, C., Castel-Kremer, E., Albrand, G., & Droz, J. P. (2009). Effects of comorbidity on screening and early diagnosis of cancer in elderly people. *Lancet Oncology*, *10*, 80–87. https://doi.org/10.1016/S1470-2045(08)70336-X

Thakkar, J. P., McCarthy, B. J., & Villano, J. L. (2014). Age-specific cancer incidence rates increase through the oldest age groups. *American Journal of the Medical Sciences*, *348*, 65–70. https://doi.org/10.1097/MAJ.0000000000000281

Vetel, J. M., Leroux, R., & Ducoudray, J. M. (1998). AGGIR, practical use, geriatric autonomy group resources needs. *Soins Gerontologie*, *13*, 23–27.

Werner, C. A. (2011). *The older population: 2010 (2010 census briefs)*. Suitland, Suitland-Silver Hill, Maryland: U.S. Department of Commerce Economics and Statistics Administration.

Wetle, T., Levkoff, S., Cwikel, J., & Rosen, A. (1988). Nursing home residents participation in medical decisions: Perceptions and preferences. *Gerontologist*, *22*, 32–38.

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