Supplementary material

Analytic epidemiology approach

To estimate the association between explanatory variables and the event of interest, the influence of potentially confounding covariates should be taken into account by adjusting statistical models on these covariates. Confounding bias occurs when a third factor distorts the measure of association because that factor is associated with both the exposure and the event of interest. Under correct causal assumptions, statistical adjustment can prevent such bias. Therefore, analytic epidemiological approach aims to establish adjustment sets for causal analysis, with should be both exhaustive, in order to limit confounding bias risk, and parsimonious, to limit the loss of statistical power associated with unnecessary adjustments (1). This careful attention to covariates in modelling is also intended to avoid over-adjustment bias, which can distort associations' estimations, if adjustment is applied improperly on a collider, rather than on a real confounder (2). For older adults population, this concern for correct adjustment is particularly relevant, as clinical and sociodemographic factors are interrelated (3-6).

Thus, our analytic approach first consisted in reviewing literature to identify covariates of interest that may be associated with either explanatory factors or event of interest. This review was extended to all the covariates identified in the literature. Then, directed acyclic graphs (DAG) were built, allowing a visual representation of the causal relationships between variables, and providing a minimal adjustment for association analysis (7). On these graphs, an arrow indicates a causal link between two variables (e.g., Initial unfavourable tumour prognosis → Death). The logical temporal sequence "cause → effect" must be respected for a causal link to exist. The omission of an arrow implies the certainty that there is no causal link between two variables, which may be a strong assumption. Each causal hypothesis were reviewed and confirmed by expert committee, who also intended to identify any variable whose effect may be mediated by others. Variables identified in literature but unavailable from patient's follow-up were excluded. Final DAGs representing variables potential causal links were produced with DAGitty software (7), and used for modelling association between retained explanatory variables and HPC referral.

Assumptions of causation

Comprehensive literature analysis provided exhaustive identification of factors that might influence HPC referral in older adults population, whether they be socio-demographic, tumor-related, or geriatric factors. Among them, malnutrition, multi-morbidity and ethnicity variables were not collected in cohorts follow-up or cancer registries. For multi-morbidity, a polypharmacy proxy variable was used. The potential effect of malnutrition on explanatory variables or outcome was assumed being mediated by this same proxy variable. Ethnic data collection in France and European Union is restricted to specific indications, and was not available. Yet, ethnicity's potential association with HPC referral was assumed being mediated by other sociodemographic variables reflecting precariousness and isolation, such as socio-professional category, household income, or social isolation.
The expert committee retained other effects mediations: socio-professional category over active life mediated household income. The way of living (alone or surrounded) mediated the effect of living in nursing homes.

Covariates choice

Expert committee's evaluation retained the following adjustment hypothesis for modelling HPC referral's determinants (8-56).

Concerning the effect of age at diagnosis on HPC referral, sociodemographic variables (gender, socio-professional category, place of residency and the way of living) were assumed to influence age at diagnosis, as well as geriatric factors (cognitive impairment – MMSE, functional limitations to ADL/IADL, polypharmacy, and depression disorders – CESD). All this variables were retained for adjustment set in modelling.

Sociodemographic variables, geriatric factors, and tumour prognosis were considered as being influenced by gender. Under hypothesis that these variables might be intermediate factors between gender and HPC referral, modelling remained univariate for estimations of HPC referral Hazard Ratios.

Concerning the place of residency during cohort follow-up (rural vs urban), age at diagnosis was not retained for adjustment. Gender, socio-professional category, limitations at IADL/ADL, cognitive impairment, and polypharmacy might influence the place of residency, as well as HPC referral. They were included as adjustment covariates.

For the fact of living alone before cancer diagnosis, gender, place of residency, socio-demographic category, and geriatric factors were retained as adjustment covariates.

Concerning the initial tumour prognosis, age at diagnosis, patient's gender, and all socio-demographic and geriatric variables were considered as covariates for adjustment. Indeed, these factors may influence either the type of cancer, and cause a delayed diagnosis, with more advanced tumours on the loco-regional basis or with metastasis.

For all geriatric factors, gender, socio-professional category, and polypharmacy were retained as adjustment covariates. For depressive disorders, place of residency, living alone, and functional or cognitive impairments were also retained, considering that they might affect both explanatory variable and outcome.

From theses hypothesis, one DAG was built for each one of the ten explanatory variable. Complete DAGs are not presented here due to their poor legibility, but simplified DAGs for gender and functional limitations to IADL or ADL are proposed as examples (Figures S1 and S2).

Table S1. Assumptions of causation assumed by the expert committee, PACPAL Study

Relations	Assumptions
Age at diagnosis – HPC Referral	Age at diagnosis might affect HPC referral (8-10)
Gender – HPC Referral	Gender might affect HPC referral (8-9,11)
Initial tumour prognosis – HPC Referral	Initial tumour prognosis might affect HPC referral (8-12)
Living alone – HPC Referral	Living alone might affect HPC referral (13-14)
Place or residence – HPC Referral	Place of residence might affect HPC referral (13)
Cognitive impairment – HPC Referral	Cognitive impairment might affect HPC referral (15)
Functional limitations – HPC Referral	Functional limitations (ADL, IADL) might affect HPC referral (16-17)
Depressive disorders – HPC Referral	Depressive disorders might affect HPC referral (17-18)
Polypharmacy (multi-morbidity) – HPC Referral	Polypharmacy (multi-morbidity) might affect HPC referral (5,19)
Age at diagnosis – Gender	Gender might affect age at diagnosis
Age at diagnosis – Socio-professional category	Socio-professional category might affect age at diagnosis (20)
Age at diagnosis – Ethnicity*	Ethnicity* might affect age at diagnosis (20-21)
Age at diagnosis – Living alone	Living alone might affect age at diagnosis (20)
Age at diagnosis – Living in nursing homes	Living in nursing homes might affect age at diagnosis
Age at diagnosis – Household income	Household income might affect age at diagnosis (20)
Age at diagnosis – Place of residency	Place of residency might affect age at diagnosis (20)
Age at diagnosis – Functional limitations	Functional limitations might affect age at diagnosis (22-25)
Age at diagnosis – Depressive disorders	Depressive disorders might affect age at diagnosis (26)
Age at diagnosis – Cognitive impairment	Cognitive impairment might affect age at diagnosis (27)
Age at diagnosis – Polypharmacy (multi-morbidity)	Polypharmacy might affect age at diagnosis (28)
Age at diagnosis – Malnutrition*	Malnutrition* might affect age at diagnosis (29)
Age at diagnosis – Initial tumour prognosis	Age at diagnosis might affect initial tumour prognosis (30)
Gender – Age at diagnosis	No effect
Gender – Socio-professional category	Gender might affect socio-professional category (31)
Gender – Ethnicity*	No effect
Gender – Living alone	Gender might affect the way of living (32)
Gender – Living in nursing homes	Gender might affect the fact of living in nursing homes (33)
Gender – Household income	Gender might affect household income (31)
Gender – Place of residency	No effect
Gender – Functional limitations	Gender might affect the existence of functional limitations (34)
Gender – Depressive disorders	Gender might affect the existence of depressive disorders (35)
Gender – Cognitive impairment	Gender might affect the existence of cognitive impairment (36)
Gender – Polypharmacy (multi-morbidity)	Gender might affect the existence of polypharmacy (37)
Gender – Malnutrition*	Gender might affect the existence of malnutrition* (38)
Gender – Initial tumour prognosis	Gender might affect initial tumour prognosis (30)
Living alone – Age at diagnosis	Living alone might affect age at diagnosis (20)
Living alone – Gender	Gender might affect the way of living alone or surrounded (32)
Living alone – Socio-professional category	Socio-professional category might affect the way of living
Living alone – Ethnicity*	Ethnicity* might affect the way of living alone or not
Living alone – Living in nursing homes	Living alone might affect the fact of living in nursing homes (39)
Living alone – Household income	Living alone might affect household income
Living alone – Place of residency	Place of residency might affect the way of living (40)
Living alone – Functional limitations	Functional limitations might affect the way of living
Living alone – Depressive disorders	Living alone might affect the existence of depressive disorders (41)
Living alone – Cognitive impairment	Existence of cognitive impairment might affect the way of living (42)
Living alone – Polypharmacy (multi-morbidity)	Existence of polypharmacy might affect the way of living
Living alone – Malnutrition*	Existence of malnutrition* might affect the way of living (43)
Living alone – Initial tumour prognosis	Living alone might affect initial tumour prognosis (44)

* = unavailable variables in cohorts follow-up/cancer-registries ; IADL = Instrumental Activities of Daily Living ; ADL = Activities of Daily Living

Table S1. Assumptions of causation assumed by the expert committee, PACPAL Study (cont.)

Relations	Assumptions
Place of residency – Age at diagnosis	Place of residency might affect age at diagnosis (20)
Place of residency – Gender	No effect
Place of residency – Socio-professional category	Socio-professional category might affect the place of residency (40)
Place of residency – Ethnicity*	Ethnicity* might affect the place of residency
Place of residency – Living in nursing homes	Place of residency might affect the fact of living in nursing homes (40)
Place of residency – Living alone	Place of residency might affect the way of living (39)
Place of residency – Household income	Household income might affect the place of residency
Place of residency – Functional limitations	No effect
Place of residency – Depressive disorders	Place of residency might affect existence of depressive disorders (35)
Place of residency – Cognitive impairment	No effect
Place of residency – Polypharmacy (multi-morbidity)	No effect
Place of residency – Malnutrition*	No effect
Place of residency – Initial tumour prognosis	Place of residency might affect initial tumour prognosis (44)
Initial tumour prognosis – Age at diagnosis	Age at diagnosis might affect initial tumour prognosis (30)
Initial tumour prognosis – Gender	Gender might affect initial tumour prognosis (30-45)
Initial tumour prognosis – Socio-professional category	Socio-professional category might initial tumour prognosis (42)
Initial tumour prognosis – Ethnicity*	Ethnicity* might affect initial tumour prognosis (46)
Initial tumour prognosis – Living in nursing homes	Living in nursing homes might affect initial tumour prognosis (47)
Initial tumour prognosis – Living alone	Living alone might affect initial tumour prognosis (47)
Initial tumour prognosis – Place of residency	Place of residency might affect initial tumour prognosis (44)
Initial tumour prognosis – Household income	Household income might affect initial tumour prognosis (46)
Initial tumour prognosis – Functional limitations	Functional limitations might affect initial tumour prognosis (48)
Initial tumour prognosis – Depressive disorders	Depressive disorders might affect initial tumour prognosis (26)
Initial tumour prognosis – Cognitive impairment	Cognitive impairment might affect initial tumour prognosis (27)
Initial tumour prognosis – Polypharmacy (multi-morbidity)	Polypharmacy might affect initial tumour prognosis (28)
Initial tumour prognosis – Malnutrition*	Malnutrition* might affect initial tumour prognosis (28)
Functional limitations – Age at diagnosis	Functional limitations might affect age at diagnosis (22-25)
Functional limitations – Gender	Gender might affect existence of functional limitations (34)
Functional limitations – Socio-professional category	Socio-professional category might affect functional limitations (49)
Functional limitations – Ethnicity*	Ethnicity* might affect functional limitations (50)
Functional limitations – Living in nursing homes	Functional limitations might affect living in nursing homes (51)
Functional limitations – Living alone	Functional limitations might affect the way of living
Functional limitations – Place of residency	No effect
Functional limitations – Household income	Functional limitations might affect household income (52)
Functional limitations – Depressive disorders	Depressive disorders might affect functional limitations (35)
Functional limitations – Cognitive impairment	Cognitive impairment might affect functional limitations (34,49)
Functional limitations – Polypharmacy (multi-morbidity)	Polypharmacy might affect functional limitations (53)
Functional limitations – Malnutrition*	Malnutrition* might affect functional limitations (38)
Functional limitations – Initial tumour prognosis	Functional limitations might affect initial tumour prognosis (48)

* = unavailable variables in cohorts follow-up/cancer-registries ; IADL = Instrumental Activities of Daily Living ; ADL = Activities of Daily Living

Table S1. Assumptions of causation assumed by the expert committee, PACPAL Study (cont.)

Relations	Assumptions
Depressive disorders – Age at diagnosis	Depressive disorders might affect age at diagnosis (26)
Depressive disorders – Gender	Gender might affect existence of depressive disorders (35)
Depressive disorders – Socio-professional category	Socio-professional category might affect depressive disorders (26)
Depressive disorders – Ethnicity*	Ethnicity* might affect depressive disorders (41)
Depressive disorders – Living in nursing homes	Living in nursing homes might affect depressive disorders (41)
Depressive disorders – Living alone	Way of living might affect depressive disorders (41)
Depressive disorders – Place of residency	Place of residency might affect depressive disorders (35)
Depressive disorders – Household income	Household income might affect depressive disorders (26)
Depressive disorders – Functional limitations	Depressive disorders might affect functional limitations (35)
Depressive disorders – Cognitive impairment	Cognitive impairment might affect depressive disorders (41)
Depressive disorders – Polypharmacy (multi-morbidity)	Polypharmacy might affect depressive disorders (53)
Depressive disorders – Malnutrition*	Depressive disorders might affect malnutrition* (53)
Depressive disorders – Initial tumour prognosis	Depressive disorders might affect initial tumour prognosis (26)
Cognitive impairment – Age at diagnosis	Cognitive impairment might affect age at diagnosis (34,49)
Cognitive impairment – Gender	Gender might affect the existence of cognitive impairment (36)
Cognitive impairment – Socio-professional category	Socio-professional category may affect cognitive impairment (42)
Cognitive impairment – Ethnicity*	Ethnicity* might affect cognitive impairment (42)
Cognitive impairment – Living in nursing homes	Cognitive impairment might affect living in nursing homes (42)
Cognitive impairment – Living alone	Functional limitations might affect the way of living (42)
Cognitive impairment – Place of residency	No effect
Cognitive impairment – Household income	Cognitive impairment might affect household income (54)
Cognitive impairment – Depressive disorders	Cognitive impairment might affect depressive disorders (55)
Cognitive impairment – Functional limitations	Cognitive impairment might affect functional limitations (34,49)
Cognitive impairment – Polypharmacy (multi-morbidity)	Cognitive impairment might affect polypharmacy (56)
Cognitive impairment – Malnutrition*	Cognitive impairment might affect malnutrition* (29)
Cognitive impairment – Initial tumour prognosis	Cognitive impairment might affect initial tumour prognosis (38)
Polypharmacy (multi-morbidity) – Age at diagnosis	Polypharmacy might affect age at diagnosis (28)
Polypharmacy (multi-morbidity) – Gender	Gender might affect existence of polypharmacy (37)
Polypharmacy (multi-morbidity) – Socio-professional category	Socio-professional category might affect polypharmacy (56)
Polypharmacy (multi-morbidity) – Ethnicity*	Ethnicity* might affect polypharmacy (56)
Polypharmacy (multi-morbidity) – Living in nursing homes	Polypharmacy might affect living in nursing homes (56)
Polypharmacy (multi-morbidity) – Living alone	Polypharmacy might affect the way of living
Polypharmacy (multi-morbidity) – Place of residency	No effect
Polypharmacy (multi-morbidity) – Household income	Polypharmacy might affect household income
Polypharmacy (multi-morbidity) – Depressive disorders	Polypharmacy might affect depressive disorders (41)
Polypharmacy (multi-morbidity) – Cognitive impairment	Cognitive impairment might affect polypharmacy (56)
Polypharmacy (multi-morbidity) – Functional limitations	Polypharmacy might affect functional limitations (53)
Polypharmacy (multi-morbidity) – Malnutrition*	Polypharmacy might affect malnutrition (38)
Polypharmacy (multi-morbidity) – Initial tumour prognosis	Polypharmacy might affect initial tumour prognosis (29)

* = unavailable variables in cohorts follow-up/cancer-registries ; IADL = Instrumental Activities of Daily Living ; ADL = Activities of Daily Living

Table S2. Minimally sufficient adjustment sets retained (shaded cells) after relationships analysis for HPC referral determinants, PACPAL study

Explanatory Variable	Covariates									
	Age [a]	Gender [a]	Urban/rural place of residence [a]	Living alone or surrounded [a]	Tumour prognosis [a]	IADL, ADL [b]	MMSE [b]	CESD [b]	Polypharmacy, proxy for multi-morbidity [b]	SCP during life
Age [a]	NA									
Gender [a]		NA								
Urban/rural place of residency [a]			NA							
Living alone or surrounded [a]				NA						
Tumour prognosis [a]					NA					
IADL, ADL [b]						NA				
MMSE [b]							NA			
CESD [b]								NA		
Polypharmacy, proxy for multi-morbidity [b]									NA	

NA = Not applicable, this variable being the variable of interest in this model

IADL = Instrumental activities of daily living

ADL = Activities of daily living

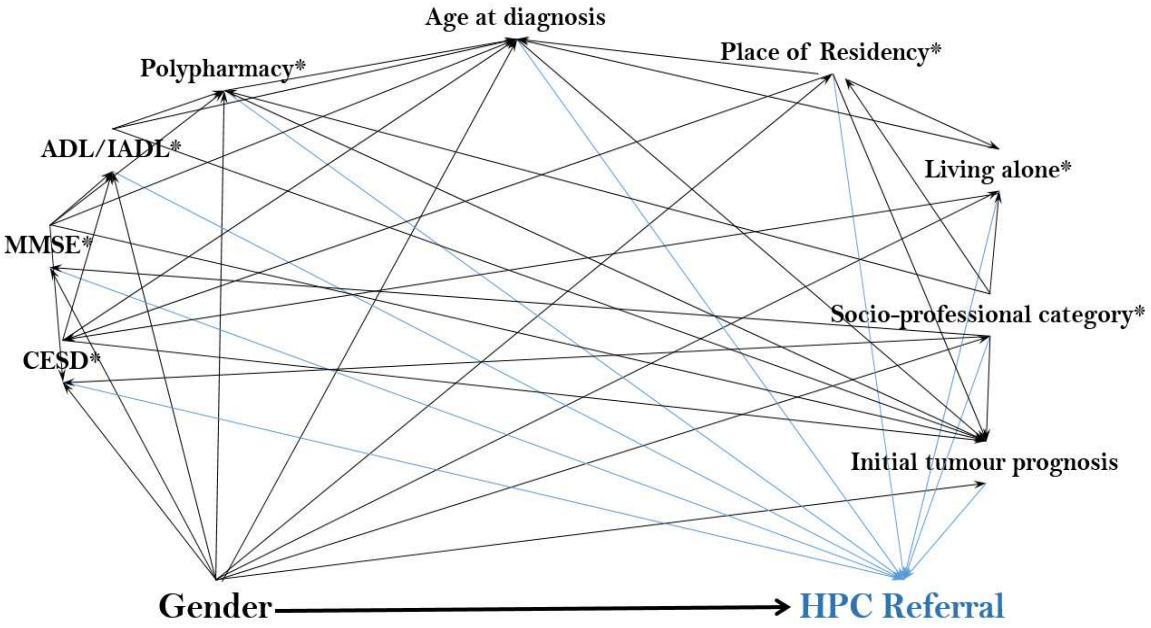
MMSE = Mental-state score examination

CESD = Centre for epidemiologic studies depression scale

SCP = Socio-professional category

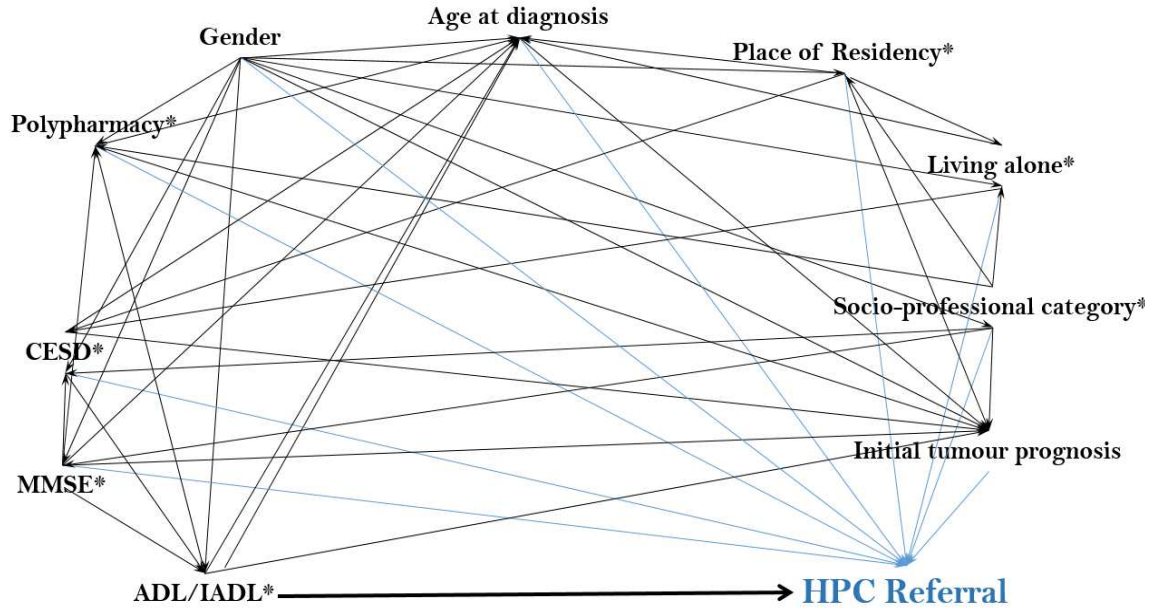
[a] Variables measured at cancer diagnosis

[b] Variables measured before cancer diagnosis, during cohort follow-up



* = Variables collected during cohort follow-up, before cancer diagnosis

Figure S1. Relationship analysis for the effect of nutritional state on survival. Directed Acyclic Graph.



* = Variables collected during cohort follow-up, before cancer diagnosis

Figure S2. Relationship analysis for the effect of neurologic state on survival. Directed Acyclic Graph.

Supplementary references

(s1) Schisterman EF, Cole SR, Platt RW. Overadjustment bias and unnecessary adjustment in epidemiologic studies. Epidemiology. 2009;20(4):488-95.

(s2) Lu H, Cole SR, Platt RW, Schisterman EF. Revisiting Overadjustment Bias. Epidemiology. 2021;32(5):e22.

(s3) Penninx BW, Leveille S, Ferrucci L, van Eijk JT, Guralnik JM. Exploring the effect of depression on physical disability: longitudinal evidence from the established populations for epidemiologic studies of the elderly. Am J Public Health. 1999;89(9):1346-52.

(s4) Manton KG. Epidemiological, Demographic, and Social Correlates of Disability among the Elderly. The Milbank Quarterly. 1989;67:13-58.

(s5) Newschaffer CJ, Bush TL, Penberthy LE, Bellantoni M, Helzlsour K, Diener-West M. Does Comorbid Disease Interact With Cancer? An Epidemiologic Analysis of Mortality in a Cohort of Elderly Breast Cancer Patients. The Journals of Gerontology: Series A. 1998;53A(5):M372-8.

(s6) Kales HC, Valenstein M. Complexity in Late-Life Depression: Impact of Confounding Factors on Diagnosis, Treatment, and Outcomes. J Geriatr Psychiatry Neurol. 2002;15(3):147-55.

(s7) Textor J, Hardt J, Knuppel S. DAGitty: a graphical tool for analyzing causal diagrams. Epidemiology. 2011;22(5):745.

(s8) Frasca M, Orazio S, Amadeo B, Sabathe C, Berteaud E, Galvin A, et al. Palliative care referral in cancer patients with regard to initial cancer prognosis: a population-based study. Public Health. 2021;195:24-31.

(s9) Frasca M, Galvin A, Raherison C, Soubeyran P, Burucoa B, Bellera C, et al. Palliative versus hospice care in patients with cancer: a systematic review. BMJ Supportive and Palliative Care. 2021;11(2):188-99.

(s10) Ahmed N, Bestall JE, Ahmedzai SH, Payne SA, Clark D, Noble B. Systematic review of the problems and issues of accessing specialist palliative care by patients, carers and health and social care professionals. Palliative Medicine. 2004;18(6):525-42.

(s11) Luppa M, Luck T, Weyerer S, König H-H, Riedel-Heller SG. Gender differences in predictors of nursing home placement in the elderly: a systematic review. International Psychogeriatrics. 2009;21(6):1015-25.

(s12) Hui D, Kilgore K, Park M, Liu D, Kim YJ, Park JC, et al. Pattern and Predictors of Outpatient Palliative Care Referral Among Thoracic Medical Oncologists. Oncologist. 2018;23(10):1230-5.

(s13) Parajuli J, Tark A, Jao YL, Hupcey J. Barriers to palliative and hospice care utilization in older adults with cancer: A systematic review. Journal of Geriatric Oncology. 2020;11(1):8-16.

(s14) Kozlov E, Cai A, Sirey JA, Ghesquiere A, Reid MC. Identifying Palliative Care Needs Among Older Adults in Nonclinical Settings. American Journal of Hospice and Palliative Care. 2018;35(12):1477-82.

(s15) Mo L, Urbauer DL, Bruera E, Hui D. Recommendations for Palliative and Hospice Care in NCCN Guidelines for Treatment of Cancer. The Oncologist. 2021;26(1):77-83.

(s16) Tuca A, Gómez-Martínez M, Prat A. Predictive model of complexity in early palliative care: a cohort of advanced cancer patients (PALCOM study). Supportive Care in Cancer. 2018;26(1):241-9.

(s17) Philip J, Collins A, Smallwood N, Chang YK, Mo L, Yang IA, et al. Referral criteria to palliative care for patients with respiratory disease: a systematic review. European Respiratory Journal. 2021;58(4):307.

(s18) Morita T, Fujimoto K, Namba M, Sasaki N, Ito T, Yamada C, et al. Palliative care needs of cancer outpatients receiving chemotherapy: an audit of a clinical screening project. Supportive Care in Cancer. 2008;16(1):101-7.

(s19) Corbett T, Bridges J. Multimorbidity in older adults living with and beyond cancer. Current Opinion in Supportive and Palliative Care. 2019;13(3):220-4.

(s20) Mandelblatt J, Andrews H, Kao R, Wallace R, Kerner J. The late-stage diagnosis of colorectal cancer: demographic and socioeconomic factors. American Journal of Public Health. 1996;86(12):1794-7.

(s21) Flores YN, Davidson PL, Nakazono TT, Carreon DC, Mojica CM, Bastani R. Neighborhood socio-economic disadvantage and race/ethnicity as predictors of breast cancer stage at diagnosis. BMC Public Health. 2013;13:1061-72.

(s22) Kane RL, Shamliyan T, Talley K, Pacala J. The association between geriatric syndromes and survival. Journal of the Am Geriatrics Society. 2012;60(5):896-904.

(s23) Barberger-Gateau P, Rainville C, Letenneur L, Dartigues J-F. A hierarchical model of domains of disablement in the elderly: a longitudinal approach. Disability and Rehabilitation. 2000;22(7):308-17.

(s24) Evers MM, Meier DE, Morrison RS. Assessing Differences in Care Needs and Service Utilization in Geriatric Palliative Care Patients. Journal of Pain and Symptom Management. 2002;23(5):424-32.

(s25) Frasca M, Soubeyran P, Bellera C, Rainfray M, Leffondre K, Mathoulin-Pelissier S, et al. Alterations in comprehensive geriatric assessment decrease survival of elderly patients with cancer. European Journal of Cancer. 2018;90:10.

(s26) Desai MM, Bruce ML, Kasl SV. The Effects of Major Depression and Phobia on Stage at Diagnosis of Breast Cancer. International Journal of Psychiatry in Medicine. 1999;29(1):29-45.

(s27) McWilliams L, Farrell C, Grande G, Keady J, Swarbrick C, Yorke J. A systematic review of the prevalence of comorbid cancer and dementia and its implications for cancer-related care. Aging & Mental Health. 2018;22(10):1254-71.

(s28) Mazza D, Mitchell G. Cancer, ageing, multimorbidity and primary care. European Journal of Cancer Care. 2017;26(3):e12717.

(s29) Kaikani W, Bachmann P. Consequences of a comorbidity often neglected in oncology: malnutrition. Bulletin du Cancer. 2009;96(6):659-64.

(s30) Pilleron S, Soto-Perez-de-Celis E, Vignat J, Ferlay J, Soerjomataram I, Bray F, et al. Estimated global cancer incidence in the oldest adults in 2018 and projections to 2050. International Journal of Cancer. 2021;148(3):601-8.

(s31) Blau FD, Kahn LM. The Gender Wage Gap: Extent, Trends, and Explanations. Journal of Economic Literature. 2017;55(3):789-865.

(s32) Cornwell EY, Waite LJ. Measuring Social Isolation Among Older Adults Using Multiple Indicators From the NSHAP Study. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences. 2009;64(1):38-46.

(s33) Runte R. Predictors of institutionalization in people with dementia: a survey linked with administrative data. Aging Clinical and Experimental Research. 2018;30(1):35-43.

(s34) Roedl KJ, Wilson LS, Fine J. A systematic review and comparison of functional assessments of community-dwelling elderly patients. Journal of the American Association of Nurse Practitioners. 2016;28(3):160-9

(s35) Maier A, Riedel-Heller SG, Pabst A, Luppa M. Risk factors and protective factors of depression in older people 65+. A systematic review. PLoS One. 2021;16(5):e0251326.

(s36) Considering sex and gender in Alzheimer disease and other dementias. Dialogues in Clinical Neuroscience. 2016;18(4):437-46.

(s37) Wikström K, Lindström J, Harald K, Peltonen M, Laatikainen T. Clinical and lifestyle-related risk factors for incident multimorbidity: 10-year follow-up of Finnish population-based cohorts 1982–2012. European Journal of Internal Medicine. 2015;26(3):211-6.

(s38) Corish CA, Bardon LA. Malnutrition in older adults: screening and determinants. Proceedings of the Nutrition Society. 2019;78(3):372-9.

(s39) Hajek A, Brettschneider C, Lange C, Posselt T, Wiese B, Steinmann S, et al. Longitudinal Predictors of Institutionalization in Old Age. PLoS One. 2015;10(12):e0144203.

(s40) Bontron JC. Access to medical care for the aged in rural areas: issues and experiences. Gérontologie et société. 2013;36146(3):153-71.

(s41) Vink D, Aartsen MJ, Schoevers RA. Risk factors for anxiety and depression in the elderly: A review. Journal of Affective Disorders. 2008;106(1):29-44.

(s42) Kivimäki M, Batty GD, Pentti J, Shipley MJ, Sipilä PN, Nyberg ST, et al. Association between socioeconomic status and the development of mental and physical health conditions in adulthood: a multi-cohort study. The Lancet Public Health. 2020;5(3):e140-9.

(s43) Besora-Moreno M, Llauradó E, Tarro L, Solà R. Social and Economic Factors and Malnutrition or the Risk of Malnutrition in the Elderly: A Systematic Review and Meta-Analysis of Observational Studies. Nutrients. 2020;12(3):737-53.

(s44) Afshar N, English DR, Milne RL. Rural-urban residence and cancer survival in high-income countries: A systematic review. Cancer. 2019;125(13):2172-84.

(s45) Huang X, Shu C, Chen L, Yao B. Impact of sex, body mass index and initial pathologic diagnosis age on the incidence and prognosis of different types of cancer. Oncology Reports. 2018;40(3):1359-69.

(s46) Ellis L, Canchola AJ, Spiegel D, Ladabaum U, Haile R, Gomez SL. Racial and Ethnic Disparities in Cancer Survival: The Contribution of Tumor, Sociodemographic, Institutional, and Neighborhood Characteristics. Journal of Clinical Oncology. 2018;36(1):25-33.

(s47) Dalton SO, Schüz J, Engholm G, Johansen C, Kjær SK, Steding-Jessen M, et al. Social inequality in incidence of and survival from cancer in a population-based study in Denmark, 1994–2003: Summary of findings. European Journal of Cancer. 2008;44(14):2074-85.

(s48) Kurtz ME, Kurtz JC, Stommel M, Given CW, Given B. Loss of physical functioning among geriatric cancer patients: relationships to cancer site, treatment, comorbidity and age. European Journal of Cancer. 1997;33(14):2352-8.

(s49) Galvin A, Helmer C, Coureau G, Amadeo B, Rainfray M, Soubeyran P, et al. Determinants of functional decline in older adults experiencing cancer (the INCAPAC study). Journal of Geriatric Oncology. 2019;10(6):913-20.

(s50) Menkin JA, Guan SSA, Araiza D, Reyes CE, Trejo L, Choi SE, et al. Racial/Ethnic Differences in Expectations Regarding Aging Among Older Adults. Gerontologist. 2017;57(2):138-48.

(s51) Fortinsky RH, Covinsky KE, Palmer RM, Landefeld CS. Effects of Functional Status Changes Before and During Hospitalization on Nursing Home Admission of Older Adults. The Journals of Gerontology: Series A. 1999;54(10):521-6.

(s52) Broese van Groenou MI, Deeg DJH, Penninx BWJH. Income differentials in functional disability in old age: relative risks of onset, recovery, decline, attrition and mortality. Aging Clinical and Experimental Research. 2003;15(2):174-83.

(s53) Béland F, Zunzunegui MV. Predictors of functional status in older people living at home. Age and Ageing. 1999;28(2):153-9.

(s54) Galvin JE, Howard DH, Denny SS, Dickinson S, Tatton N. The social and economic burden of frontotemporal degeneration. Neurology. 2017;89(20):2049-56.

(s55) Joling KJ, Janssen O, Francke AL, Verheij RA, Lissenberg-Witte BI, Visser P-J, et al. Time from diagnosis to institutionalization and death in people with dementia. Alzheimer's & Dementia. 2020;16(4):662-71.

(s56) Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, et al. Aging with multimorbidity: A systematic review of the literature. Ageing Research Reviews. 2011;10(4):430-9.