

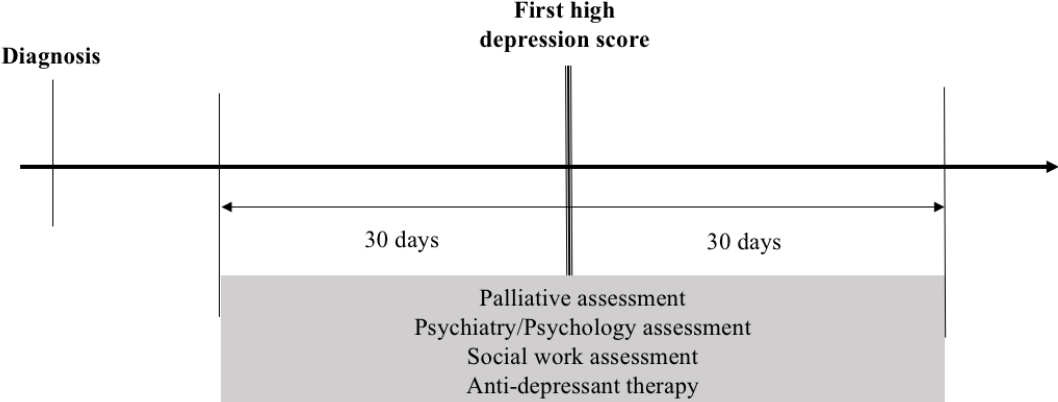
Supplementary Table 1. Main variables definitions using Ontario healthcare databases.

Variable	Data source	Code strategy
Cancer diagnosis	Ontario Cancer Registry (OCR)	ICD-O.3 topography Oropharyngeal: C000-C148, C760 Gastro-intestinal: C150-269, C480-482, C488, C762-763 Respiratory: C300-349, C381-399, C761 Breast: C500-509 Gynecologic: C510-589 Genito-urinary: C600-639, C649, C659, C681, C688, C669-680, C689
Age at diagnosis	OCR	-
Sex	Registered Person database (RPDB)	-
Income quintile	Canadian Census Registered person database (RPDB)	Ecologic measure of income [1]
Rural residence	RPDB	Rural index of Ontario [2]
Year of diagnosis	OCR	-
Comorbidity burden	CIHI-Discharge abstract database (DAD) CIHI – Same day surgery (SDS) OHIP	ICD codes for Johns Hopkins Adjusted Clinical Groups [3,4]
High depression score	Symptoms management database	First ESAS depression score ≥ 2 from date of diagnosis to 6 months following date of diagnosis in the Symptom Management Database
Receipt of chemotherapy	OHIP	≥ 1 cycle of chemotherapy defined as: OHIP codes G381, G281, G339, G345, G359
Palliative care assessment	OHIP	Billing codes: A901 (only if billed with B997 or B998), A902 (only if billed with B997 or B998), A945, C882, C945, C982, G511, G512, K015, K023, K700, W872, W882, W982 [5] Timeframe: 30 days before to 30 days after date of first high depression score
Psychiatry/Psychology assessment	OHIP ALR	Psychiatry: billing codes A195, A895, A190, A795, K630, C895, C190, C395, C196, C795, C695, C193, C194, W895, W190, W795, W395, W196, K620, K623, K624, K629, K198, K199, K197, K190 Psychology: ALR psychology flag Timeframe: 30 days before to 30 days after date of first high depression score
Social work referral	Activity Level Reporting (ALR)	ALR social work flag Timeframe: 30 days before to 30 days after date of first high depression score
Anti-depressant therapy	Ontario Drug Database (ODB)	Patients ≥ 65 years old DIN for fluoxetine, fluvoxamine, sertraline, paroxetine, citalopram, escitalopram, trazodone, amitriptyline, clomipramine, trimipramine, doxepin, nortriptyline, desipramine, venlafaxine, duloxetine, bupropion, mirtazapine, phenelzine, selegiline, tranylcypromine, ritalin. Timeframe: 30 days before to 30 days after date of first high depression score
Death	RPDB	Date of death

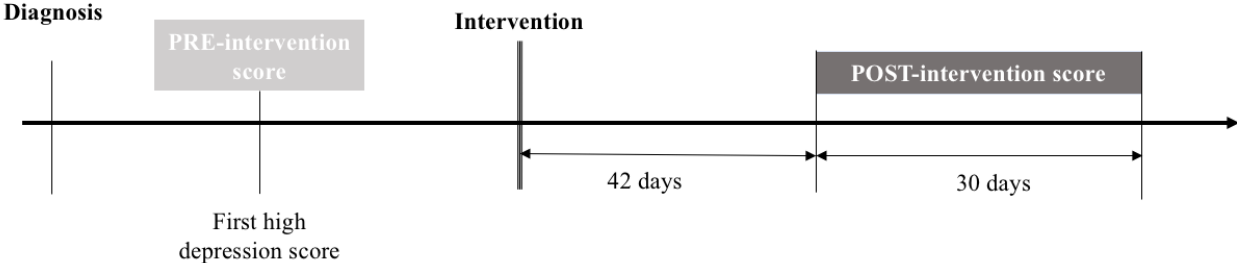
1) Alter DA, Naylor CD, Austin P, *et al.* Effects of socioeconomic status on access to invasive cardiac procedures and on mortality after acute myocardial infarction. *N Engl J Med* 1999;**341**:1359–67. 2) Kralj B. Measuring ‘rurality’ for purposes of health-care planning: an empirical measure for Ontario. *Ont Med Rev* 2000;**67**:33–52. 3) Reid RJ, Roos NP, MacWilliam L, *et al.* Assessing population health care need using a claims-based ACG morbidity measure: a validation analysis in the Province of Manitoba. *Health Serv Res* 2002;**37**:1345–64. 4) Reid RJ, MacWilliam L, Verhulst L, *et al.* Performance of the ACG case-mix system in two Canadian provinces. *Med Care* 2001;**39**:86–99. 5) Merchant SJ, Brogly SB, Goldie C, *et al.* Palliative Care is Associated with Reduced Aggressive End-of-Life Care in Patients with Gastrointestinal Cancer. *Ann Surg Oncol* 2018;**25**:1478–87.

Supplementary Figure 1. Time windows for capture of intervention around the time of positive depression symptom screening (A) and measure of change in ESAS depression-item score (B).

A



B



Supplementary Table 2. Results of sensitivity analysis using ESAS depression score ≥ 4 to define depression symptom, showing patient characteristics (A),

2A. Characteristics of patients stratified by patient-reported depression score (ESAS depression ≥ 4).

Variable		Patient-reported depression (n=38,486)	No patient-reported depression (n=103,784)	p-value
Age (years old)	≤ 60	18,302 (31.6%)	39,677 (68.4%)	<0.001
	61-70	11,048 (25.3%)	32,686 (74.7%)	
	71-80	6,571 (22.4%)	22,738 (77.6%)	
	≥ 81	2,565 (22.8%)	8,683 (77.2%)	
Sex	Female	23,946 (28.8%)	59,138 (71.2%)	<0.001
	Male	14,540 (24.6%)	44,646 (75.4%)	
Rural residence	Yes	3,448 (23.1%)	11,494 (76.9%)	<0.001
	No	35,038 (27.5%)	92,290 (72.5%)	
High comorbidity burden (ACG ≥ 10)	Yes	9,316 (33.2%)	18,712 (66.8%)	<0.001
	No	29,170 (25.5%)	85,072 (74.5%)	
Income quintile	1 st (lowest)	7,345 (30.5%)	16,758 (69.5%)	<0.001
	2 nd	7,641 (28.0%)	19,609 (72.0%)	
	3 rd	7,642 (27.0%)	20,683 (73.0%)	
	4 th	8,142 (26.2%)	22,921 (73.8%)	
	5 th (highest)	7,716 (24.5%)	23,813 (75.5%)	
Cancer diagnosis type	Breast	10,472 (25.5%)	30,616 (74.5%)	<0.001
	Gastro-intestinal	9,450 (27.9%)	24,422 (72.1%)	
	Genito-urinary	3,791 (16.1%)	19,733 (83.9%)	
	Gynecologic	4,455 (28.3%)	11,307 (71.7%)	
	Oropharyngeal	2,640 (37.5%)	4,394 (62.5%)	
	Respiratory	7,678 (36.6%)	13,312 (63.4%)	
Time period of diagnosis	2010-2014	24,945 (26.9%)	67,681 (73.1%)	0.162
	2015-2017	13,541 (27.3%)	36,103 (72.7%)	
Subsequent second cancer diagnosis	Yes	1,295 (27.1%)	3,477 (72.9%)	0.892
	No	37,191 (27.0%)	100,307 (73.0%)	
Receipt of systemic therapy	Yes	23,648 (33.9%)	46,076 (66.1%)	<0.001
	No	14,838 (20.5%)	57,708 (79.5%)	

2B. Receipt of psycho-social intervention in patients with patient-reported depression (ESAS depression ≥ 4).

Psycho-social intervention	All patients with patient-reported depression (n=38,486)	Patients ≥ 65 years old with patient-reported depression (n=14,584)
Chemotherapy	23,648 (61.5)	-
Palliative assessment	7,675 (19.9)	
Psychiatry/psychology assessment	886 (2.3)	
Social work referral	3,707 (9.6)	
Anti-depressant therapy	-	829 (5.6)

Values are n (%) showing column percentages.

2C. Change in ESAS depression score following psycho-social intervention with patient-reported depression (ESAS depression ≥ 4).

Psycho-social intervention	Reduction (≥ 1 point on ESAS score)	Stability (no change)	Increase (≥ 1 point on ESAS score)
Palliative care assessment (n=4,460)	76.6%	10.5%	12.9%
Psychiatry/psychology assessment (n=422)	69.9%	14.0%	16.1%
Social work referral for depression (n=2,448)	75.1%	12.0%	12.9%
Anti-depressant therapy* (n=425)	77.4%	10.1%	12.5%

*In patients ≥ 65 years old.

Supplementary Table 3. Results of sensitivity analysis using time window from 30 days prior to 90 days following ESAS depression score to measure psycho-social interventions.

3A. Receipt of psycho-social intervention in patients with patient-reported depression.

Psycho-social intervention	All patients with patient-reported depression (n=65,424)	Patients >65 years old with patient-reported depression (n=26,125)
Palliative assessment	15,027 (23.0)	-
Psychiatry/psychology assessment	1,983 (3.0)	
Social work referral	6,959 (10.6)	
Anti-depressant therapy	-	2,455 (9.4)

Values are n (%) showing column percentages.

3B. Change in ESAS depression score following psycho-social intervention with patient-reported depression.

Psycho-social intervention	Reduction (≥1 point on ESAS score)	Stability (no change)	Increase (≥1 point on ESAS score)
Palliative care assessment (n=7,969)	67.2%	13.3%	19.6%
Psychiatry assessment or psychology referral (n=813)	63.4%	14.3%	22.4%
Social work referral for depression (n=4,378)	66.6%	14.1%	19.3%
Anti-depressant assessment for depression (n=940)	70.9%	10.4%	18.7%

*In patients ≥65 years old.