

Appendix 1A. Codes and definitions used to define study cohort

Breast Cancer cases

Diagnosis of histologically confirmed invasive (*behaviour*=3, ICD-O) breast cancer between Jan 1st, 2007 and Dec 31st, 2011 from the OCR using dxcode= 174.0 to 174.9 (ICD-9)

Stage: Using 'best stage' from Ontario Cancer Registry (OCR) to assign TNM 6th edition stage I, II, III, IV

Components of treatment-related variables

Lumpectomy

- From CIHI (DAD and SDS) databases, find **all** the lumpectomy procedures (Canadian Classification of Health Interventions (CCI) codes are: 1YM87^^, 1YM88^^, 1YK87^^, 1YK89^^, 1YL87LA, 1YL89LA) from -2weeks to +9 months within the date of diagnosis

1YM87DA	Excision partial, breast using endoscopic approach with simple apposition
1YM87GB	Excision partial, breast using endoscopic guide wire (or needle hook) excision technique with simple apposition of tissue
1YM87LA	Excision partial, breast using open approach with simple apposition of tissue (e.g. suturing)
1YM87LAXXA	Excision partial, breast using open approach and full thickness autograft to close defect
1YM87UT	Excision partial, breast using open guide wire (or needle hook) excision technique and simple apposition of tissue
1YM88LAPM	Excision partial with reconstruction, breast without tissue with implantation of prosthesis
1YM88LAPME	Excision partial with reconstruction, breast with local flap with implantation of prosthesis
1YM88LAPMF	Excision partial with reconstruction, breast using free flap with implantation of prosthesis
1YM88LAPMG	Excision partial with reconstruction, breast using distant pedicled flap with implantation of prosthesis
1YM88LAQF	Excision partial with reconstruction, breast without tissue with implantation of prosthesis and expander
1YM88LAQFE	Excision partial with reconstruction, breast with local flap with implantation of prosthesis and expander
1YM88LAQFF	Excision partial with reconstruction, breast using free flap with implantation of prosthesis and expander
1YM88LAQFG	Excision partial with reconstruction, breast using distant pedicled flap with implantation of prosthesis and expander
1YM88LATP	Excision partial with reconstruction, breast without tissue with implantation of tissue expander
1YM88LATPE	Excision partial with reconstruction, breast with local flap with tissue expander
1YM88LATPF	Excision partial with reconstruction, breast using free flap with implantation of tissue expander
1YM88LATPG	Excision partial with reconstruction, breast using distant pedicled flap with implantation of tissue expander
1YM88LAXXE	Excision partial with reconstruction, breast using local flap with no implanted device
1YM88LAXXF	Excision partial with reconstruction, breast using free flap with no implanted device
1YM88LAXXG	Excision partial with reconstruction, breast using distant pedicled flap with no implanted device
1YK87LA	Excision partial, nipple using open excisional approach
1YK87LAXXA	Excision partial, nipple using open excisional approach and full thickness autograft
1YK87LAXXB	Excision partial, nipple using open excisional approach and split thickness autograft

1YK87LAXXE Excision partial, nipple using open excisional approach and local flap for closure
 1YK89LA Excision total, nipple using open approach
 1YK89LAXXA Excision total, nipple using open approach and full thickness autograft
 1YK89LAXXE Excision total, nipple using open approach and local flap
 1YL87LA Excision partial, lactiferous duct using open approach
 1YL89LA Excision total, lactiferous duct using open approach

Mastectomy

- From CIHI (DAD and SDS) databases, find **all** the mastectomy procedures (CCI codes are: 1YM89^^, 1YM90^^, 1YM91^^, 1YM92^^) from -2weeks to +9 months within the date of diagnosis

1YM89LA Excision total, breast without tissue repair
 1YM89LAXXA Excision total, breast with full thickness autograft
 1YM90LAPM Excision total with reconstruction, breast simple mastectomy with no node dissection without tissue with implantation of breast prosthesis
 1YM90LAPME Excision total with reconstruction, breast simple mastectomy with no node dissection using local flap with implantation of breast prosthesis
 1YM90LAPMF Excision total with reconstruction, breast simple mastectomy with no node dissection using free flap (2) with implantation of breast prosthesis
 1YM90LAPMG Excision total with reconstruction, breast simple mastectomy with no node dissection using distant pedicled flap(1) with implantation of breast prosthesis
 1YM90LAQF Excision total with reconstruction, breast simple mastectomy with no node dissection without tissue with implantation of prosthesis and expander
 1YM90LAQFE Excision total with reconstruction, breast simple mastectomy with no node dissection using local flap with implantation of prosthesis and expander
 1YM90LAQFF Excision total with reconstruction, breast simple mastectomy with no node dissection using free flap (2) with implantation of prosthesis and expander
 1YM90LAQFG Excision total with reconstruction, breast simple mastectomy with no node dissection using distant pedicled flap(1) with implantation of prosthesis and expander
 1YM90LATP Excision total with reconstruction, breast simple mastectomy with no node dissection without tissue with implantation of tissue expander
 1YM90LATPF Excision total with reconstruction, breast simple mastectomy with no node dissection using free flap (2) with implantation of tissue expander
 1YM90LATPG Excision total with reconstruction, breast simple mastectomy with no node dissection using distant pedicled flap(1) with implantation of tissue expander
 1YM90LAXXE Excision total with reconstruction, breast simple mastectomy with no node dissection using local flap with no implanted device
 1YM90LAXXF Excision total with reconstruction, breast simple mastectomy with no node dissection using free flap (2) with no implanted device
 1YM90LAXXG Excision total with reconstruction, breast simple mastectomy with no node dissection using distant pedicled flap(1) with no implanted device
 1YM91LA Excision (modified) radical, breast without tissue
 1YM91LATP Excision (modified) radical, breast with implantation of tissue expander
 1YM91LAXXA Excision radical (modified), breast using full thickness autograft
 1YM91LAXXE Excision (modified) radical, breast using local flap
 1YM91TR Excision extended radical, breast without tissue
 1YM91TRXXA Excision extended radical, breast using full thickness autograft

1YM91TRXXE	Excision extended radical, breast using local flap
1YM91WP	Excision super radical, breast without tissue
1YM91WPXXA	Excision super radical, breast using full thickness autograft
1YM91WPXXE	Excision super radical, breast using local flap
1YM92LAPME	Excision (modified) radical with reconstruction, breast using local flap with implantation of breast prosthesis
1YM92LAPMF	Excision (modified) radical with reconstruction, breast using free flap with implantation of breast prosthesis
1YM92LAPMG	Excision (modified) radical with reconstruction, breast using distant pedicled flap with implantation of breast prosthesis
1YM92LAQFE	Excision (modified) radical with reconstruction, breast using local flap with implantation of prosthesis and expander
1YM92LAQFF	Excision (modified) radical with reconstruction, breast using free flap with implantation of prosthesis and expander
1YM92LAQFG	Excision (modified) radical with reconstruction, breast using distant pedicled flap with implantation of prosthesis and expander
1YM92LATPE	Excision (modified) radical with reconstruction, breast using local flap with implantation of tissue expander
1YM92LATPF	Excision (modified) radical with reconstruction, breast using free flap with implantation of tissue expander
1YM92LATPG	Excision (modified) radical with reconstruction, breast using distant pedicled flap with implantation of tissue expander
1YM92LAXXE	Excision (modified) radical with reconstruction, breast using local flap with no implanted device
1YM92LAXXF	Excision (modified) radical with reconstruction, breast using free flap with no implanted device
1YM92LAXXG	Excision (modified) radical with reconstruction, breast using distant pedicled flap with no implanted device
1YM92TRPME	Excision extended radical with reconstruction, breast using local flap with implantation of breast prosthesis
1YM92TRPMF	Excision extended radical with reconstruction, breast using free flap with implantation of breast prosthesis
1YM92TRPMG	Excision extended radical with reconstruction, breast using distant pedicled flap with implantation of breast prosthesis
1YM92TRQFE	Excision extended radical with reconstruction, breast using local flap with implantation of prosthesis and expander
1YM92TRQFF	Excision extended radical with reconstruction, breast using free flap with implantation of prosthesis and expander
1YM92TRQFG	Excision extended radical with reconstruction, breast using distant pedicled flap with implantation of prosthesis and expander
1YM92TRTPE	Excision extended radical with reconstruction, breast using local flap with implantation of tissue expander
1YM92TRTPF	Excision extended radical with reconstruction, breast using free flap with implantation of tissue expander
1YM92TRTPG	Excision extended radical with reconstruction, breast using distant pedicled flap with implantation of tissue expander
1YM92TRXXE	Excision extended radical with reconstruction, breast using local flap with no implanted device
1YM92TRXXF	Excision extended radical with reconstruction, breast using free flap with no implanted device
1YM92TRXXG	Excision extended radical with reconstruction, breast using distant pedicled flap with no implanted device

1YM92WPPME	Excision super radical with reconstruction, breast using local flap with implantation of breast prosthesis
1YM92WPPMF	Excision super radical with reconstruction, breast using free flap with implantation of breast prosthesis
1YM92WPPMG	Excision super radical with reconstruction, breast using distant pedicled flap with implantation of breast prosthesis
1YM92WPQFE	Excision super radical with reconstruction, breast using local flap with implantation of prosthesis and expander
1YM92WPQFF	Excision super radical with reconstruction, breast using free flap with implantation of prosthesis and expander
1YM92WPQFG	Excision super radical with reconstruction, breast using distant pedicled flap with implantation of prosthesis and expander
1YM92WPTPE	Excision super radical with reconstruction, breast using local flap with implantation of tissue expander
1YM92WPTPF	Excision super radical with reconstruction, breast using free flap with implantation of tissue expander
1YM92WPTPG	Excision super radical with reconstruction, breast using distant pedicled flap with implantation of tissue expander
1YM92WPXXE	Excision super radical with reconstruction, breast using local flap with no implanted device
1YM92WPXXF	Excision super radical with reconstruction, breast using free flap with no implanted device
1YM92WPXXG	Excision super radical with reconstruction, breast using distant pedicled flap with no implanted device

Chemotherapy Receipt

- From OHIP databases, look for *the first* chemotherapy within 9 months of the date of diagnosis for all patients
- For patients with a **Surgery Date** (see lumpectomy and mastectomy definitions above), look further for the *first* chemotherapy within 4 months after the surgery.
- OHIP chemotherapy billing fee codes = G281, G339, G345, G359 or G381
 - G281 Inj/inf. each add'l inj. with G381*
 - G339 Inj/inf. chemotherapy & pt assess. single agent I.V.*
 - G345 Inj/inf. chemotherapy & pt assess. multip. Agent I.V.*
 - G359 Inj/inf. chemotherapy & pt assess. sp. single agent etc.*
 - G381 Inj/inf. Chemotherapy (marrow suppress.) single inj.*

Radiotherapy

- From activity level reporting (ALR) data, look for the first “visit date” of radiotherapy treatment within 9 months of from the date of diagnosis that satisfies the following conditions:
 - o The *”Intent_of_radiation_treatment”* ≠ *”P”* (*Palliative*) **and**
 - o There was a “Dose per Fraction” record greater than zero on that visit date (could be two different records but on the same day)
 - o Restrict the disease sites to breast, chest wall, supraclavicular nodes and axilla

Mental Health History

OHIP Mental Health Codes used for determining mental health visits to primary care (1,2):

OHIP Number	Diagnosis
295	Schizophrenia
296	Manic depressive psychosis, involuntional melancholia
297	Paranoid states
298	Other psychoses
300	Anxiety neurosis, hysteria, neurasthenia, obsessive compulsive neurosis, reactive depression
301	Personality disorders
302	Sexual deviations
303	Alcoholism
304	Drug dependence, drug addiction
306	Psychosomatic disturbances
307	Habit spasms, tics, stuttering, tension headaches, anorexia nervosa, sleep disorders, enuresis
309	Adjustment reaction
311	Depressive or other non-psychotic disorders, not elsewhere classified
897	Economic problems
898	Marital difficulties
899	Parent-child problems (e.g. child-abuse, battered child, child neglect)
900	Problems with aged parents or in-laws
901	Family disruption, divorce
902	Educational problems
903	Illegitimacy
904	Social maladjustment
905	Occupational problems, unemployment, difficulty at work
906	Legal problems, litigation, imprisonment
909	Other problems of social adjustment

(1) Steele LS, Glazier RH, Lin E, Evans M. Using administrative data to measure ambulatory mental health service provision in primary care. *Med Care* 2004 Oct;42(10):960-965.

(2) Ontario Ministry of Health and Long-Term Care. Online Resource Manual for Physicians Section 4. Online Resource Manual for Physicians. 2.0th ed. Ontario; 2015.

Appendix 1B. Data sources used to obtain data elements for variable creation

Data Source	Data Elements
Ontario Cancer Registry (OCR)	Date of breast cancer diagnosis, age at diagnosis, sex, other cancer diagnoses, cancer stage
Registered Persons Database (RPDB)	Postal code at time of diagnosis, LHIN
2006 Statistics Canada Census & Postal code conversion file plus, version 5C	Rurality, Neighborhood income quintile
Immigration Refugee and Citizenship Canada (IRCC) database	Immigration status
Ontario Health Insurance Plan (OHIP)	Number of PCP visits (billed encounters) total and per provider, reasons for visits, diagnostic codes, chemotherapy receipt, start of adjuvant chemotherapy
ICES Physician Database	Physician specialty
Client Agency Program Enrollment database (CAPE) & Corporate Provider Database	Primary care enrollment model
Canadian Institute for Health Information: Discharge Abstract Database (DAD) & Same Day Surgery (SDS) database	Diagnosis codes, surgery receipt
Cancer Activity Level Reporting (ALR) database	Date of radiotherapy receipt

Appendix 1C. Relative differences in PCP visit rates– adjusted difference-in-difference model estimates.

	Exponentiated estimate (95% CI)
Intercept	0.01 (0.01-0.01)
Treatment period	2.52 (2.43-2.61)
Mental Health History	1.49 (1.44-1.54)
No Mental Health History	reference
Period*Mental Health History	0.72 (0.69-0.75)
0-5 ADGs	reference
6-9 ADGs	1.82 (1.76-1.88)
10+ ADGs	2.97 (2.83-3.12)
Period*(6-9 ADGs)	0.57 (0.54-0.59)
Period*(10+ ADGs)	0.46 (0.44-0.49)
Age <40 years	0.94 (0.90-0.99)
Age 40-49 years	0.94 (0.91-0.98)
Age 50-59 years	Reference
Age 60-69 years	1.04 (1.01-1.08)
Age 70-74 years	1.13 (1.07-1.18)
Age >74 years	1.20 (1.11-1.29)
Non-immigrant	Reference
Immigrant	1.03 (1.00-1.07)
Income quintile 1	Reference
Income quintile 2	0.99 (0.95-1.03)
Income quintile 3	0.99 (0.95-1.03)
Income quintile 4	0.97 (0.93-1.01)
Income quintile 5	0.93 (0.89-0.97)
Urban	Reference
Rural	0.99 (0.94-1.05)
Rural-remote	0.96 (0.90-1.03)
Rural-very remote	1.20 (1.10-1.31)
LHIN 1 Erie St. Clair	1.06 (0.98-1.14)
LHIN 2 South West	1.11 (1.03-1.19)
LHIN 3 Waterloo Wellington	0.97 (0.90-1.05)
LHIN 4 Hamilton Niagara Haldimand Brant	1.09 (1.02-1.17)
LHIN 5 Central West	1.10 (1.02-1.19)
LHIN 6 Mississauga Halton	1.05 (0.97-1.13)
LHIN 7 Toronto Central	reference
LHIN 8 Central	1.05 (0.98-1.12)
LHIN 9 Central East	1.06 (0.99-1.14)
LHIN 10 South East	1.10 (1.01-1.20)
LHIN 11 Champlain	1.12 (1.04-1.21)
LHIN 12 North Simcoe Muskoka	1.08 (0.98-1.19)
LHIN 13 North East	1.03 (0.94-1.13)
LHIN 14 North West	1.14 (1.00-1.30)
Continuity 0 visits	0.25 (0.23-0.28)
Continuity 1-2 visits	0.39 (0.38-0.41)
Continuity UPC <=0.75	0.95 (0.93-0.98)
Continuity UPC >0.75	Reference
PC model capitation	0.89 (0.85-0.93)
PC model enhanced FFS	1.00 (0.96-1.04)
PC model team-based capitation	0.87 (0.83-0.92)
PC model other	0.74 (0.65-0.83)
PC model straight FFS	reference

Total model degrees of freedom = 40

Appendix 1, as supplied by the authors. Appendix to: Walsh RL, Lofters AK, Moineddin R, et al. The effect of comorbidity on primary care use during breast cancer chemotherapy: a population-based retrospective cohort study using CanIMPACT data. *CMAJ Open* 2021.

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Total number of PCP visits = 119,682 visits during 24-month baseline period and 42,944 visits during 6-month treatment period

Total number of people used for model = 12,739

Exposure time = 24 month baseline period + 6 month treatment period. Note: a few participants (n=72) died during the 6 month treatment period and others (n=319) were not OHIP eligible during the full 24-month baseline period. As such, we included an offset term in our negative binomial model to account for differences in the exposure time of the baseline and treatment periods