**Analytic plan**

* Split the cohort into 2. One for derivation. One for validation.
* We are actually creating a series of 5 models. We will work on the 1st model initially… but the below might be helpful to understand the overall goal.

1st model: 1st year. There are logistic regressions—probability of death (dichotomous) at time i (ti)

Index ti (eligibility): alive between dx and 3 mo.

1ry outcomes: death at 1 year after dx; >7 days in hospital between mo 11 and 12.

2ry outcomes: pain/functional score/dyspnea/well-being score at 11 (+/- 1) mo. after dx.

2nd model: conditional on 1 year survival

Index ti (eligibility): alive 1 year post dx.

1ry outcomes: death at 2 year after dx; >7 days in hospital between mo 23 and 24.

2ry outcomes: pain/functional score/dyspnea/well-being score at 23 (+/- 1) mo. after dx.

3rd model: conditional on 2 year survival

Index ti (eligibility): alive 2 year post dx.

1ry outcomes: death at 3 year after dx; >7 days in hospital between mo 35 and 36.

2ry outcomes: pain/functional score/dyspnea/well-being score at 35 (+/- 1) mo. after dx.

4th model: conditional on 3 year survival

Index ti (eligibility): alive 3 year post dx.

1ry outcomes: death at 4 year after dx; >7 days in hospital between mo 47 and 48.

2ry outcomes: pain/functional score/dyspnea/well-being score at 47 (+/- 1) mo. after dx.

5th model: conditional on 4 year survivial

Index ti (eligibility): alive 4 year post dx.

1ry outcomes: death at 5 year after dx; >7 days in hospital between mo 59 and 60.

2ry outcomes: pain/functional score/dyspnea/well-being score at 59 (+/- 1) mo. after dx.

**Baseline (i.e. at “index ti”) covariates**

(will look at a window of +/- 3 months for the multi-assessment, time-varying covariates [e.g. interRAI])

1. Age at ti (based on dx date)
2. Sex
3. Do they have X specific chronic disease (n=13?) (from the list of ICES registries)
4. Cancer type
5. Cancer stage
6. Treatment - radiation
7. Treatment - chemo
8. Treatment – surgery
9. Distance from cancer centre (PCCF + RPDB) dichotomize at <=50km and above.
10. Functional Score (+/- 3 mo from ti)
11. ESAS score for each of the symptoms (n=9) (+/- 3 mo from ti)
12. Has a primary caregiver at ti (+/- 3 mo from ti) (use InterRAI)
13. Has a primary caregiver at ti who lives at home with patient (+/- 3 mo from ti) (use InterRAI)
14. Has a secondary caregiver at ti (+/- 3 mo from ti) (use InterRAI)
15. Has a secondary caregiver at ti who lives at home with patient (+/- 3 mo from ti) (use InterRAI)
16. Has a regular primary care physician (use OHIP)
17. That primary care physician makes palliative care home visits (See Peter Tanuseputro’s Appendix)
18. Has had palliative care in an acute care setting (hospital, ICU, or CCC) (See Peter T’s Appendix)
19. Has had end-of-life (code95) homecare nursing
20. Has had end-of-life (code95) homecare: personal support, homemaking, and/or personal support and homemaking (3 different services that we will group into 1)

**Outcomes:**

There are 6 outcomes.

1. Death at tx (1 year after dx, 2 years after dx, 3 years after dx, etc.) [use RPDB not ORGD]
2. Spent >7 days in month Xti; where Xti is month 11-12, 23-24, 35-36, 47-48, and 59-60 respectively after dx. [use DAD]

Symptom Outcomes

1. Functional Score at Xti; where Xti is month 11, 23, 35, 47, and 59 respectively after dx (+/- 1 mo window)
2. Pain at Xti; where Xti is month 11, 23, 35, 47, and 59 respectively after dx (+/- 1 mo window)
3. Well-being at Xti; where Xti is month 11, 23, 35, 47, and 59 respectively after dx (+/- 1 mo window)
4. Dyspnea at Xti; where Xti is month 11, 23, 35, 47, and 59 respectively after dx (+/- 1 mo window)

Here is how the 4 symptom outcomes are defined, as they come from multiple data sources.

3. Functional Score

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PPS | ECOG | PRFS | RAI-CA (use CHESS)  http://www.interrai.org/assets/files/Scales/CHESS%20Scale.pdf | RAI-HC  Use C2a to C2d; each is 0 or 1, add them together for score= 0 to 4 (max) |
| PPS 100 | ECOG 0 | PRFS 0 | CHESS 0 | 0 |
| PPS 90/80 | ECOG 1 | PRFS 1 | CHESS 1 | 1 |
| PPS 70/60 | ECOG 2 | PRFS 2 | CHESS 2 | 2 |
| PPS 50/40 | ECOG 3 | PRFS 3 | CHESS 3 | 3 |
| PPS 30/20 | ECOG 4 | PRFS 4 | CHESS 4 | 4 |
| PPS 10 | ECOG 4 | PRFS 4 | CHESS 5 | 4 |
| PPS 0 (dead) | ECOG 5 (dead) | N/A | N/A | N/A |

For now, let’s make this 5 categories… see color groups above. Eventually, we will likely break it up into dichotomous, green or not (PRFS 4 or less).

4. Pain

|  |  |  |
| --- | --- | --- |
| ESAS - pain | RAI-CA – Db9 – pain intensity | RAI-HC – K4b – pain intensity |
| 0 = none | 0 = No pain | 0 = No pain |
| 1-3 = low/ mild | 1 = Mild | 1 = Mild |
| 4-6 = moderate | 2 = Moderate | 2 = Moderate |
| 7-10 – severe / excruciating | 3 = Severe or excruciating  4 = Times when pain is horrible | 3 = Severe or excruciating  4 = Times when pain is horrible |

For now, please show all 4 categories. Eventually, we will likely break it up into dichotomous, green or not (ESAS 7-10 or not)

5. Well-being

|  |  |  |
| --- | --- | --- |
| ESAS well-being | RAI – CA – C4 self-reported health | RAI – HC – K8a – poor health (0 or 1) |
| 0=best well-being; (excellent) | 0 = Excellent | 0 |
| 1-3=low; (good) | 1 = Good | 0 |
| 4-6=medium; (fair) | 2 = Fair | 0 |
| 7-10=worst well-being; (poor) | 3 = Poor | 1 |
|  | 8 = Could not (would not) respond |  |

For now, please show all 5 categories. Eventually, we will likely break it up into dichotomous, green or not (ESAS 7-10 or not, excluding missing)

6. Dyspnea

|  |  |  |
| --- | --- | --- |
| ESAS - Dyspnea | RAI-CA – C3 - dyspnea | RAI-HC - K3E (problem condition - shortness of breath |
| ESAS 0 to 6 | 0 = Absence of symptom 1 = Absent at rest, present with moderate activity | 0 |
| ESAS 7-10 | 2 = Absent at rest, present with normal daily activity 3 = Present at rest | 1 |

1. **Depression**

|  |  |  |
| --- | --- | --- |
| ESAS – Depression | RAI-CA –D3 (self reported mood) | RAI-HC – E1a to E1i (indicators of depressions, anxiety, and sad mood) |
| ESAS 0 to 3 | 0 = Absence of symptom | Score of less than 3 (0, 1, or 2). |
| ESAS 4-10 | 1 = Yes | Score of 3 or more out of 14 |
|  | (8= missing) |  |

Depression Rating Scale (DRS) Score

7 Items (E1a to E1i)

0-3 Made negative statements

0-3 Persistent anger with self or others

0-3 Expressions (including non-verbal) of what appear to be unrealistic fears

0-3 Repetitive health complaints

0-3 Repetitive anxious complaints/concerns (non-health related)

0-3 Sad, pained, worried facial expression

0-3 Crying, tearfulness

Range: 0-14

Scoring: 0 = No mood symptoms 14 = All mood symptoms present in last 3 days

Scores of 3 or greater indicate major or minor depressive disorders.

The Depression Rating Scale (DRS) is calculated by summing all seven input items after recoding each input item to a three-point (0, 1, 2) scale. For each input item, above, the first two levels, 0 and 1, are not recoded; level 2 is recoded to 1; and level 3 is recoded to 2.

Source: Burrows A, Morris JN, Simon S, Hirdes JP, Phillips C. (2000) Development of a Minimum Data Set-based Depression Rating Scale for Use in Nursing Homes. Age and Ageing 29(2): 165-172.

**Next steps:**

* Please just do model 1 first. Eligibility is alive at month 3 after dx. (show my # that die within first 3 months).
* Then show the baseline for that group. If multiple values, choose the one closest to 3 month index date.
* Then show the descriptive outcomes at 1 year after dx and at time Xti (+/- 1 month). Want to see the # of each outcomes (as they will all have an outcome for death and # hospital days, but not the symptom ones)
* Then do a logistic regression for the outcomes, based on baseline covariates.