COVID-19 Major Comorbidity Count Algorithm Specifications for RAIπMDS 2.0

interRAI

Canadian Institute for Health Information
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Introduction

In March 2020, interRAI Canada, in collaboration with the Canadian Institute for Health Information (CIHI), developed the Major Comorbidity Count algorithm to identify residents who may be at increased risk of mortality should they contract coronavirus disease (COVID-19). CIHI has released an information sheet on the Major Comorbidity Counts highlighting specifics of the algorithm. For more COVID-related information, please visit our webpage (cihi.ca).

This companion document provides the technical specifications for the Major Comorbidity Count algorithm for the RAI MDS 2.0. Instructions are included on how to calculate the count, ranging from 0 to 6. These counts can then be aggregated into three groups to facilitate identification of individuals at highest risk within the population.

The three groupings are:

- Low risk=0
- Moderate risk=1-2
- High risk=3 or more

The specifications are based on the Continuing Care Reporting System and are for use within Canada only. Algorithm specifications are also available for the Home Care Reporting System and the Integrated interRAI Reporting System (for the interRAI LTCF and interRAI HC).

Specification conventions

The logic used in the specifications is “pseudo code”: it has been designed to be software neutral and will require some translation into a specific programming language.

The logic is provided in a series of “IF-THEN-ELSE” constructs, which have the following general form:

```
IF (first_condition) THEN
        statements
ELSE IF (second_condition) THEN
        statements
ELSE
        statements
END IF
```

The conditions are Boolean expressions, which are evaluated and, if true, executed.

The specifications include nested IF statements; wherever possible, formatting has been used to facilitate the understanding of the logic. The specifications provide the range of valid values for each of the outputs, with labels where the output has discrete categories.

Some variables are created and used solely in the derivation process. As they have no meaning outside of the specifications and do not need to be stored, they are considered temporary variables. All temporary variables can be identified with a “T_” prefix. Temporary variables that are used only in the calculation are computed at the beginning of the logic.

Major Comorbidity Count Algorithm

Version	1.0
Valid values	Values range from 0 to 6, with higher values indicating greater risk of mortality. This was developed to support identification of individuals at risk during the COVID-19 pandemic. Values can be grouped into the following risk levels: 0 = Low risk 1-2 = Moderate risk 3+ = High risk
Data elements used and corresponding valid values	I1aa Parkinson's disease (0, 1) I1bb Quadriplegia (0, 1) I1cc Seizure disorder (0, 1) I1d Arteriosclerotic heart disease (0, 1) I1dd Transient ischemic attack (0, 1) I1e Cardiac dysrhythmia (0, 1) I1f Congestive heart failure (0, 1) I1jj Asthma (0, 1) I1k Other cardiovascular disease (0, 1) I1kk Emphysema/COPD (0, 1) I1q Amyotrophic lateral sclerosis (ALS) (0, 1) I1r Alzheimer's disease (0, 1) I1rr Cancer (0, 1) I1s Aphasia (0, 1) I1t Cerebral palsy (0, 1) I1tt Liver disease (0, 1) I1u Cerebrovascular accident (0, 1) I1uu Renal failure (0, 1) I1v Dementia other than Alzheimer's (0, 1) I1w Hemiplegia/hemiparesis (0, 1) I1x Huntington's chorea (0, 1) I1y Multiple sclerosis (0, 1) I1z Paraplegia (0, 1) I2g Respiratory infection (0, 1) I2j Tuberculosis (active) (0, 1) I2l Viral hepatitis (0, 1) P1aa Chemotherapy (0, 1) P1ab Renal Dialysis (0, 1) P1ag Oxygen therapy (0, 1) P1ah Radiation (0, 1) P1ai Suctioning (0, 1) P1aj Tracheostomy care (0, 1) P1al Ventilator or respirator (0, 1) P1bdA Respiratory therapy - Days (0 - 7) P1bdB Respiratory therapy - Minutes (0 - 9999)
Prerequisite calculations	None
Missing values	Some of the items used in the calculation are only collected on the Full RAI MDS 2.0 assessment. To calculate the algorithm on a Quarterly RAI MDS 2.0 assessment, values for items from the person's previous Full RAI MDS 2.0 Assessment can be used. This applies to the following items: I1aa, I1cc, I1d, I1dd, I1e, I1f, I1jj, I1k, I1kk, I1r, I1rr, I1z.

Missing values (cont'd)	For instances where a quarterly assessment is the first assessment for a particular resident, or if any other data element does not contain valid values, the algorithm is not calculated for that assessment.

Logic	**{Temporary Variables}**
	(1) T_heart
	IF I1e = 1 OR I1d = 1 OR I1f = 1 OR i1k = 1 THEN
	T_heart = 1
	ELSE
	T_heart = 0
	END IF
	
	(2) T_liver
	IF I1tt = 1 OR I2l = 1 THEN
	T_liver = 1
	ELSE
	T_liver = 0
	END IF
	
	(3) T_lung
	IF I1jj = 1 OR I1kk = 1 OR I2g = 1 OR I2j = 1 OR P1al=1 OR P1aj = 1 OR P1ai = 1 OR P1ag = 1 OR P1bda > 0 OR P1bdb > 0 THEN
	T_lung = 1
	ELSE
	T_lung = 0
	END IF
	
	(4) T_kidney
	IF I1uu = 1 OR P1ab = 1 THEN
	T_kidney = 1
	ELSE
	T_kidney = 0
	END IF
	
	(5) T_neuro
	IF I1q = 1 THEN
	T_neuro = 1
	ELSE IF I1r = 1 OR I1v = 1 THEN
	T_neuro = 1
	ELSE IF I1u = 1 OR I1s = 1 OR I1dd = 1 THEN
	T_neuro = 1
	ELSE IF I1w = 1 OR I1z = 1 OR I1bb = 1 THEN
	T_neuro = 1
	ELSE IF I1x = 1 THEN
	T_neuro = 1
	ELSE IF I1y = 1 THEN
	T_neuro = 1
	ELSE IF I1aa = 1 THEN
	T_neuro = 1
	ELSE IF I1cc = 1 THEN
	T_neuro = 1
	ELSE IF I1t = 1 THEN
	T_neuro = 1
	ELSE
	T_neuro = 0
	END IF

Logic (cont'd)	**(6) T_cancer_treat**
	IF I1rr = 1 AND (P1aa = 1 OR P1ah = 1) THEN
	T_cancer_treat = 1
	ELSE
	T_cancer_treat = 0
	END IF
	
	{Computation of Output}
	Major Comorbidity Count:
	Major_comorbidity_count = T_heart + T_liver + T_lung + T_kidney + T_neuro + T_cancer_treat

Notes	None.

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