Title: Identifying the DEAD: Development and Validation of a Patient-Level Model to Predict Death Status in Population-Level Claims

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Characteristic	Development Dataset		Validation Datasets							
	OPTUM DOD test/train		**OPTUM validation**		**CCAE**		**MDCD**		**MDCR**	
	Non dead	Dead (all death)	Non dead	Dead (death at discharge)	Non dead	Dead (death at discharge)	Non dead	Dead (death at discharge)	Non dead	Dead (death at discharge)
	% (n = 975,469)	% (n = 24,531)	% (n = 389,080)	% (n = 996)	% (n = 409,238)	% (n = 1,000)	% (n = 289,870)	% (n = 989)	% (n = 456,399)	% (n = 960)
Gender: female	50.6	49.8	50.1	42.3	51.7	45	60.5	63.8	51.9	47.2
Medical history: General										
Acute respiratory disease	26.2	48.0	19.6	40.8	21.6	58.3	25.3	50.2	15.2	57
Attention deficit hyperactivity disorder	2.4	0.3	1.3	0.5	1.5	0.8	2.5	0.9	0.1	0
Chronic liver disease	1	4.4	0.5	3	0.5	9.2	0.4	6.1	0.7	1.9
Chronic obstructive lung disease	2.1	36.5	1.1	29.8	0.6	22.8	1.6	38.4	7.2	38.2
Crohn's disease	0.3	0.7	0.2	0.6	0.2	1.2	0.1	0.4	0.3	0.8

Dementia	0.8	23.7	0.3	14.8	0.1	1.8	0.5	31.2	2.2	16.7
Depressive disorder	7.1	23,1	4.4	20.1	4.1	17.4	4.9	32.6	4.8	14.9
Diabetes mellitus	7.1	36.3	3.9	39.2	3.9	26.7	3.3	39.7	18.6	30.1
Gastroesophageal reflux disease	5.7	22.4	3.3	20	3.2	17.1	3.6	24	7.9	13.7
Gastrointestinal hemorrhage	1.4	13.5	0.9	10	0.8	14.9	0.6	13.1	2.5	13.9
Human immunodeficiency virus infection	0.2	0.4	0.1	0.4	0.1	1	0.2	2.1	0.1	0.1
Hyperlipidemia	19.1	50.9	10.5	53.5	10.3	30.7	3.7	33.6	34.4	31.5
Hypertensive disorder	18.3	76.0	10	73.1	10	50.4	6.9	70.8	44.9	64.5
Lesion of liver	0.4	13.1	0.1	4.7	0.1	27.6	0.2	10.4	0.5	6.8
Obesity	4.1	7.6	2.2	11.4	2.2	9.9	2.9	10.9	2.6	4
Osteoarthritis	8.0	34.9	4.3	35.3	4.2	18	2.7	30.1	19.3	27.4
Pneumonia	2.0	39.2	1.2	25.6	1.1	36	2	38.7	3.3	44.7
Psoriasis	0.7	0.9	0.4	1	0.4	1.2	0.1	0.7	0.8	0.9
Renal impairment	2.0	46.6	0.8	34.2	0.4	35.9	1	43.5	5.3	44.7
Rheumatoid arthritis	0.7	3.4	0.4	1.9	0.3	2.6	0.2	1.8	1.5	2.6
Schizophrenia	0.1	0.8	0.1	0.8	0	0.3	0.6	5.9	0.1	0.1
Ulcerative colitis	0.2	1.0	0.1	0.7	0.2	1.5	0	1	0.3	0.8
Urinary tract infectious disease	6.1	37.0	3.9	28.2	3.7	19.8	4.8	36.3	7.3	30.4
Viral hepatitis C	0.3	1.5	0.2	1	0.2	3.5	0.4	4.4	0.2	0.4
Visual system disorder	16.1	39.6	10.8	35.3	9.3	21.7	13.6	34	37.6	43.4
Medical history: Cardiovascular disease										
Atrial fibrillation	1.4	31.8	0.6	25.4	0.3	17	0.4	23	6.9	37.8
Cerebrovascular disease	1.4	25.2	0.6	19	0.4	13.4	0.7	20.9	4.3	28.1
Coronary arteriosclerosis	3.1	35.4	1.6	36.4	1.1	19.8	1.1	27.2	14.3	41.9
Heart disease	8.3	75.9	4.6	79.3	4	71.1	3.9	76.1	29.4	87.4
Heart failure	1.4	42.0	0.7	34.4	0.3	23.9	1	41.4	5.2	52
Ischemic heart disease	1.8	27.7	1.1	27	0.7	18.8	0.7	20.3	6.6	35.6
Peripheral vascular disease	3.9	48.2	1.9	38.5	1.5	30	1.5	38.5	13.7	44.9

Pulmonary embolism	0.2	5.7	0.1	3.3	0.1	7.4	0.1	4.9	0.5	5
Venous thrombosis	0.9	13.2	0.5	8.2	0.4	16.6	0.4	10.4	2.2	13.1
Medical history: Neoplasms										
Hematologic neoplasm	0.5	11.0	0.2	4.7	0.2	20.5	0.2	4.9	1.1	5.7
Malignant lymphoma	0.2	2.8	0.1	0.7	0.1	4.8	0.1	1.1	0.6	1.7
Malignant neoplasm of anorectum	0.1	2.0	0	0.9	0	3.7	0	1.1	0.3	1.4
Malignant neoplastic disease	3.7	37.5	1.8	20.3	1.7	53.5	0.8	18.9	13.9	31.3
Malignant tumor of breast	0.6	4.0	0.3	1.8	0.4	8.9	0.2	2.5	2.3	3
Malignant tumor of colon	0.2	4.1	0.1	2	0.1	4.8	0.1	2	0.7	3.5
Malignant tumor of lung	0.2	10.2	0.1	5.2	0	19.2	0	4.6	0.4	5.6
Malignant tumor of urinary bladder	0.1	2.0	0.1	1.1	0	1.7	0	0.7	0.7	2.1
Primary malignant neoplasm of prostate	0.5	5.1	0.2	2.8	0.1	2	0.1	1	3	5.8
Medication use										
Agents acting on the renin-angiotensin system	11.6	41.4	6.2	40.2	7.3	35.1	2.5	14	38.5	46.2
Antibacterials for systemic use	43.7	64.1	30.7	56.3	36.4	72.3	34.5	32.4	43.2	66
Antidepressants	13.0	35.2	8.2	29	9.6	34.9	5.9	16.1	16.8	31.1
Antiepileptics	5.4	19.1	2.9	18.9	3.5	23.1	3.3	16.4	8.9	15.9
Antiinflammatory and antirheumatic products	13.9	15.9	8.5	18.6	11.2	23	12.3	13	19.3	16.4
Antineoplastic agents	1.7	13.3	0.9	7	1.1	32.6	0.5	5.8	3	8
Antipsoriatics	0.4	1.5	0.3	1	0.3	1.4	0.1	0.5	0.6	1.3
Antithrombotic agents	3.0	32.6	1.5	28.7	1.5	35.5	1.4	21.1	14.7	39.8
Beta blocking agents	7.2	43.3	4	39.8	4.3	34.5	1.9	15.1	29.3	50.3

Calcium channel blockers	5.1	27.5	2.7	22.8	2.8	21.5	1.4	11.5	20.6	29.2
Diuretics	9.0	47.8	5.1	44.7	5.9	43.1	2.5	17	32.1	58.3
Drugs for acid related disorders	7.7	36.8	5.2	33.5	6.7	43.9	5.3	23.8	21.8	37.2
Drugs for obstructive airway diseases	14.8	31.9	8.9	27.3	11.5	31.8	13.1	20.4	18	32.5
Drugs used in diabetes	5.5	23.4	3	23.5	3.3	20.4	1.8	10.7	15.8	24
Immunosuppressants	1.1	3.3	0.6	2.2	0.8	7.7	0.3	1.9	2.5	3.7
Lipid modifying agents	12.5	39.0	6.4	36.9	7.5	29.8	2.2	12	43.5	46.3
Opioids	9.7	38.4	6.4	34	8.1	53.3	8.3	26.6	16	31.3
Psycholeptics	12.3	38.4	7.3	33.6	9.4	57.6	7.5	38.3	20.5	38.7
Psychostimulants, agents used for adhd and nootropics	3.8	1.6	1.9	2	2.7	4.2	2.8	1.5	1.1	1.5
Characteristic	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Charlson comorbidity index										
Mean	0.9	7.5	0	6	0	7	0	6	2	7
Age in years										
Mean	37.4	75.3	33	70	32	54	20	70	73	82