

**Title: Identification of healthspan-promoting genes in *Caenorhabditis elegans* based on a human GWAS study**

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**ESM\_1: Scanning of medical reimbursement records**

**Death:** all-cause mortality.

**Death age:** all-cause mortality age.

**HILMO**, The Hospital Discharge Register.

S\_PAADG, Main diagnosis (symptom)

S\_DG2, 1st side diag (symptom)

S\_DG3, 2nd side diag (symptom)

S\_DG4, 3rd side diag (ICD-8/9 only)

S\_PAADGE, Main diagnosis (cause)

S\_DG2E, 1st side diag (cause)

S\_DG3E, 2nd side diag (cause)

**Kela**, Reimbursements for medicine expenses.

**Causes of death:**

k\_tpks, Underlying cause of death

k\_vks, Immediate cause of death

k\_m1, 1st contributing c.o.d.

k\_m2, 2nd contributing c.o.d.

k\_m3, 3rd contributing c.o.d.

**DISEASES**, prevalent or incident.

**Display name:** Cancers.

**Keywords:** abnormal cells divide and invade nearby tissues, neoplasms. **Protocol:** HILMO: C00-C43, C45-C97 (ICD-10) 140-172, 174-208 (ICD-8/9) as S\_PAADG, S\_PAADGE, S\_DG2, S\_DG2E, S\_DG3, S\_DG3E, S\_DG4. CAUSES OF DEATH: Like Hilmo: as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3.

**Display name:** Diabetes.

**Keywords:** endocrine, nutritional and metabolic diseases, glucose intolerance, insulin, E10 (ICD\_10), E11 (ICD-10), E12 (ICD-10), E13 (ICD-13), E14 (ICD-10), 250 (ICD-9), 250 (ICD-9), KELA code 103, ATC class A10.

**Display name:** Dementia.

**Keywords:** brain disorders, loss of intellectual abilities, Alzheimer's disease, mental disorder, F00 (ICD-10), F01 (ICD-10), F02 (ICD-10), F03 (ICD-10), G30 (ICD-10), 3310 (ICD-9), 4378A (ICD-9), 290 (ICD-9), 290 (ICD-8), KELA code 307, ATC class N06D.

**Display name:** Chronic obstructive pulmonary disease. **Keywords:** respiratory system, COPD, J43 (ICD-10), J44 (ICD-10), 491 (ICD-9), 492 (ICD-9), 491 (ICD-8), 492 (ICD-8).

**Display name:** Asthma. **Keywords:** autoimmune, chronic obstructive lung disease, bronchial disorder, chronic lower respiratory diseases, J45 (ICD-10), J46 (ICD-10), 493 (ICD-8), 493 (ICD-9), KELA code 203.

**Display name:** Crohn's disease. **Keywords:** autoimmune, inflammation of the digestive system, noninfective enteritis and colitis, K50 (ICD-10), 555 (ICD-9), 5630 (ICD-8), KELA code 208. **Protocol:** HILMO: K50 (ICD-10); 555 (ICD-8/9) as S\_PAADG, S\_PAADGE, S\_DG2, S\_DG2E, S\_DG3, S\_DG3E, S\_DG4. CAUSES OF DEATH: Like Hilmo: as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3. KELA reimbursed medication: IBD (KELA code 208).

**Display name:** Malabsorption. **Keywords:** autoimmune, decreased absorption of nutrients in the gastrointestinal tract, K90 (ICD-10), K91 (ICD-10), 579 (ICD-8), 579 (ICD-9). **Protocol:** HILMO: K90, K91 (ICD-10); 579 (ICD-8/9) as S\_PAADG, S\_PAADGE, S\_DG2, S\_DG2E, S\_DG3, S\_DG3E, S\_DG4. CAUSES OF DEATH: Like Hilmo: as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3.

**Display name:** Rheuma. **Keywords:** autoimmune, inflammatory polyarthropathies, joints, metabolic derangement, disorder of connective tissue, M05 (ICD-10), M06 (ICD-10), M07 (ICD-10), M08 (ICD-10), M09 (ICD-10), M10 (ICD-10), M11 (ICD-10), M12 (ICD-10), M13 (ICD-10), M32 (ICD-10), M33 (ICD-10), M45 (ICD-10), 710 (ICD-9), 714 (ICD-9), 420 (ICD-9), 725 (ICD-9), 712 (ICD-8), 734 (ICD-8), KELA code 202.

**Display name:** Chronic kidney failure. **Keywords:** genitourinary system, renal failure, N18 (ICD-10), N19 (ICD-10), 585 (ICD-9), 58200 (ICD-8). **Protocol:** HILMO: N18–N19 (ICD-10); 585 (ICD-9); 58200 (ICD-8) as S\_PAADG, S\_PAADGE, S\_DG2, S\_DG2E, S\_DG3, S\_DG3E, S\_DG4. CAUSES OF DEATH: Like Hilmo: as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3.

**Display name:** Myocardial infarction. **Keywords:** cvd, myocardial necrosis, blood supply interruption, circulatory system, I21 (ICD-10), I22 (ICD-10), 410 (ICD-9), 410 (ICD-8). **Protocol:** HILMO: I21, I22 (ICD-10); 410 (ICD-8/9) as S\_PAADG, S\_PAADGE, S\_DG2, S\_DG2E, S\_DG3, S\_DG3E, S\_DG4. CAUSES OF DEATH: I21, I22 (ICD-10); 410 (ICD-8/9) as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3.

**Display name:** Major coronary heart disease event. **Keywords:** cvd, narrowing or blockage of the coronary arteries, ischaemic heart disease, circulatory system, I200 (ICD-10), I21 (ICD-10), I22 (ICD-10), 410 (ICD-9), 4110 (ICD-9), 410 (ICD-8), 4110 (ICD-8).

**Display name:** Ischaemic heart disease. **Keywords:** cvd, myocardial ischemia, ischaemic heart disease, circulatory system, I20 (ICD-10), I21 (ICD-10), I22 (ICD-10), I23 (ICD-10), I24 (ICD-10), I25 (ICD-10), 410 (ICD-9), 411 (ICD-9), 412 (ICD-9), 413 (ICD-9), 414 (ICD-9), 410 (ICD-8), 411 (ICD-8), 412 (ICD-8), 413 (ICD-8), 414 (ICD-8), KELA code 206.

**Display name:** Cardiovascular diseases. **Keywords:** cvd, circulatory system. **Protocol:** Major coronary heart disease event (CHD), or Stroke, excluding SAH (STR) - whichever of these happens first.

**Display name:** Stroke, ex SAH. **Comments:** Note: includes intracerebral haemorrhage. **Keywords:** 434 (ICD-8), 436 (ICD-8), cvd, blood flow to brain stops, cerebrovascular disorder, circulatory system, I61 (ICD-10), I63 (ICD-10), 431 (ICD-9), 4330A (ICD-9), 4331A (ICD-9), 4339A (ICD-9), 4340A (ICD-9), 4341A (ICD-9), 4349A (ICD-9), 436 (ICD-9), 431 (ICD-8) (except 43101, 43191), 433 (ICD-8).

**Display name:** Stroke, inc SAH. **Comments:** Note: also includes intracerebral haemorrhage.

**Keywords:** cvd, blood flow to brain stops, cerebrovascular disorder, circulatory system, I60 (ICD-10), I61 (ICD-10), I63 (ICD-10), I64 (ICD-10), 430 (ICD-9), 431 (ICD-9), 4330A (ICD-9), 4331A (ICD-9), 4339A (ICD-9), 4340A (ICD-9), 4341A (ICD-9), 4349A (ICD-9), 436 (ICD-9), 430 (ICD-8), 431 (ICD-8) (except 43101, 43191), 433 (ICD-8), 434 (ICD-8), 436 (ICD-8). **Protocol:** HILMO: I60-I64 (not I636) (ICD-10); 430, 431, 4330A, 4331A, 4339A, 4340A, 4341A, 4349A, 436 (ICD-9); 430, 431 (except 43101, 43191) 433, 434, 436 (ICD-8). CAUSES OF DEATH: Like Hilmo: as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3.

**Display name:** Ischaemic stroke, ex all haemorrhages. **Keywords:** cvd, cerebrovascular disorder, circulatory system, I63 (ICD-10), I64 (ICD-10), 4330A (ICD-9), 4331A (ICD-9), 4339A (ICD-9), 4340A (ICD-9), 4341A (ICD-9), 4349A (ICD-9), 436 (ICD-9), 433 (ICD-8), 434 (ICD-8), 436 (ICD-8). **Protocol:** HILMO: I63-I64 (not I636) (ICD-10); 4330A, 4331A, 4339A, 4340A, 4341A, 4349A, 436 (ICD-9); 433, 434, 436 (ICD-8) as S\_PAADG, S\_PAADGE, S\_DG2, S\_DG2E, S\_DG3, S\_DG3E, S\_DG4. CAUSES OF DEATH: Like Hilmo: as k\_tpks, k\_vks, k\_m1, k\_m2, k\_m3.

**Display name:** Heart failure. **Keywords:** cvd, inability of the heart to pump blood at an adequate rate, circulatory system, I50 (ICD-10), I110 (ICD-10), I130 (ICD-10), I132 (ICD-10), 4029B (ICD-9), 4148 (ICD-9), 428 (ICD-9), 42700 (ICD-8), 42710 (ICD-8), 428 (ICD-8), KELA code 201, ATC code C03CA01, ATC code C03EB01.

**Display name:** Major adverse cardiovascular event. **Keywords:** cvd, circulatory system. **Protocol:** Cardiovascular disease (CVD), or Heart failure (HFAIL) - whichever of these happens first