Capturing factors associated with frailty using routinely collected electronic medical record data in British Columbia (BC), Canada

Manpreet Thandi*, Sabrina T. Wong, Morgan Price, Jennifer Baumbusch, Rubee Dev, Shardae Brown, Andy Gibb | *Presenting Author (manpreet.thandi@alumni.ubc.ca)

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Background

Frailty is a state of increased vulnerability from physical, social, and cognitive factors resulting in a greater risk of negative health outcomes.

There is potential for better frailty assessment in primary care by using data collected in electronic medical records (EMRs).

Methods

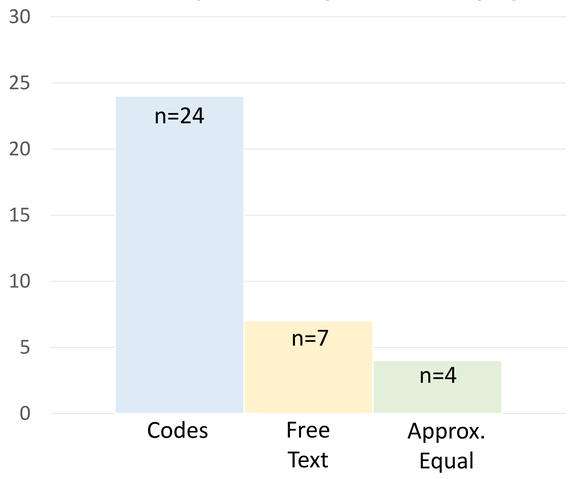
Manual and automatic mapping was used to translate clinical terminologies used in the United Kingdom (read codes) to terminologies used in BC: International Classification of Diseases 9th Revision (ICD9), 9th Revision Clinical Modification (ICD9-CM), and The Logical Observation Identifiers Names and Codes (LOINC)

Manual mapping was completed by 2 coders independently, followed by research term consensus. Automatic mapping was completed using Apelon TermWorks.

Data from the BC Primary Care Sentinel Surveillance Network (BC-CPCSSN) was used to develop a list of semi-structured free text terms. Free text fields related to diagnoses and reasons for patient visits were searched for patients ≥65 from 2017-07-01 to 2022-06-30.

The 36-factor electronic frailty index (eFI) developed in the UK automatically calculates frailty scores using EMR data. To develop a similar tool for use in BC, adaptation of the eFI is necessary due to differences in standardized clinical terminologies.

Number of frailty factors captured mostly by codes or free text (n=35)



*The frailty factor "polypharmacy" was excluded from this count as there were 0 codes and 1 free text term (polypharmacy) reflecting polypharmacy. An algorithm can detect how many medications a patient is prescribed.

Frailty factors captured by codes or free text (n=35)

Frailty Factors Captured Mostly by Codes

Anaemia/Haematinic Deficiency
Arthritis
Cerebrovascular Disease
Chronic Kidney Disease
Diabetes
Dizziness
Foot Problems
Fragility Fracture
Hearing Impairment
Heart Failure
Heart Valve Disease
Hypertension
Ischemic Heart Disease
Memory/Cognitive Problems
Osteoporosis
Peptic Ulcer
Peripheral Vascular Disease
Respiratory Disease
Skin Ulcer
Sleep Disturbance
Thyroid Disease
Urinary incontinence
Urinary System Disease
Visual Impairment

Frailty Factors Captured Mostly by Free Text

Atrial Fibrillation
Dyspnea
Housebound
Hypotension/Syncope
Parkinsonism and Tremor
Social Vulnerability
Weight Loss/Anorexia

Frailty Factors Captured Approximately Equally by Codes and Free Text (Difference of <10% in number of codes/free text)

Activity Limitation
Falls
Mobility/Transfer problems
Requirement for Care

Top 5 free text terms for 3 frailty factors

Activity Limitation
Disability
Weakness
Parking permit
Trouble walking
Deteriorating health

Mobility/Transfer Problem
Gait
Ataxia
Scooter
Hemiplegia
Walker

Social Vulnerability
Housing
Grief
Social work
Bereavement
SW support

Results

3768 total terms were identified for the 36 frailty factors of the eFI.

- **3021** were codes (ICD9, ICD9-CM, LOINC, medication prescriptions).
- Automatic mapping resulted in 16 additional codes.
- 527,521 free text data entries were reviewed, resulting in a total of **747** unique free text terms that reflect the frailty factors.
- Approximately 69% of terms were captured mostly by codes, 20% mostly by free text, and 11% approximately equally by codes and free text.

Discussion

It is difficult to capture frailty using only the standardized terminologies currently widely used in BC. A combination of standardized codes and free text better captures the complexity of frailty.

Next Steps

A subsequent study will develop and test a frailty screening algorithm based on codes/free text terms from this study. The resulting frailty screening tool can facilitate better frailty identification and management, resulting in improved patient & system level outcomes.