New York State Department of Health
Office of Quality and Patient Safety
Division of Quality Measurement

Statistical Brief #2
June 2018

Functional Need and Frailty in the New York State Managed Long-Term Care Population

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HIGHLIGHTS

- The relationship between functional need and frailty in the Managed Long-Term Care population was assessed.
- Functional need is the state of requiring assistance with activities to function and was measured in the MLTC population by an assessment based level of care score.
- Frailty is the state of being weak or delicate and was measured with a published, validated frailty indicator.
- Level of care score and frailty indicator were moderately positively correlated (rho = 0.413) and the validated definition of frailty (probability of frailty ≥ 0.2) was reasonable for the MLTC population.
- Both frailty and functional need yield important information about an individual's health status and may be useful to inform and improve planning and provision of care for the MLTC population.

Introduction

New York State (NYS) Managed Long-Term Care (MLTC) health plans help people who are chronically ill or have disabilities and who need health and long-term care services to stay in their homes and communities as long as possible. The MLTC program includes four types of health insurance products that provide a range of health and long-term care services to eligible individuals, and requires a comprehensive Community Health Assessment (CHA) every six months. The CHA includes various assessment items that measure an individual's functional ability and cognitive capacity. The CHA also includes International Classification of Diseases (ICD) codes for current conditions an individual has been diagnosed with. This assessment information may be used for multiple purposes, including MLTC program eligibility, comprehensive care planning, health plan quality evaluation, and payment rate setting.

Functional need is the state of requiring assistance with activities to function. An assessment-based Level of Care (LOC) functional scoring algorithm quantifies an individual's functional need on a scale of 0 (independent) to 48 (maximal dependence), and is used to determine eligibility for some types of MLTC products. The LOC score is comprised of 11 components that are derived from 22 items from the CHA. The items include the areas of bladder and bowel continence, cognitive performance, behavioral symptoms, and Activities of Daily Living (ADLs). Points are allocated to different levels of functioning with the number of points increasing as functional deficits increase. A LOC score of five or greater indicates need of nursing home level services.

Frailty is the state of being weak or delicate and can be measured as a phenotype or an index. The frailty phenotype is a well-documented and validated measure of an individual's frailty status that can be utilized in clinical and research settings.[1] The frailty phenotype is based on clinical performance measures including documented unintentional weight loss, weakness measured

through grip strength, self-reported exhaustion, low physical activity, and slow walking speed.[1] However, these five clinical measures are not easily accessible to researchers because they are not commonly collected in administrative data. In attempt to create a reliable and replicable frailty indicator based on widely available discrete data elements, Segal et al. developed a frailty index using diagnosis codes obtained from administrative claims data, and validated the resulting frailty indicator.[2] This frailty index was based on 22 data elements and clinical diagnosis categories that are widely available in administrative data. Based on the index, the frailty indicator was defined as frailty probability (FP) of greater than or equal to 0.2, and was found to be predictive of nursing home admission, hospital admission within five years, disability within five years, and death within five years.[2] Utilizing the same 22 standardized and available data elements, the current study calculated the indicator for the MLTC population.

The current study sought to assess how frailty and functional care need are related by comparing the LOC score with a validated frailty indicator. This information may be useful to those planning care and providing care to the MLTC or similar populations. The hypothesis was that frailty and functional need are correlated, and that the importance of various frailty predictors would differ for LOC.

Methods

This retrospective, observational, population-based cohort study consisted of all individuals enrolled in an MLTC plan between January and June 2016. Uniform Assessment System for New York (UAS-NY) CHA data for MLTC members was utilized to calculate an individual's LOC score and a frailty indicator based on the methodology established by Segal et al.[2]

Measures

Study variables included functional and cognitive assessment items that describe the population and that align with predictors used for the frailty indicator. ICD diagnosis codes documented on the assessment were also used to indicate the presence of various conditions and diseases. The LOC score was derived from assessment data related to bladder and bowel continence, cognitive performance, behavioral symptoms, and ADLs. A FP was calculated for each individual by applying to the CHA data, the frailty predictor beta coefficients reported by Segal et al.[2] The frailty predictors included impaired mobility, depression, congestive heart failure, Parkinson's disease, race, arthritis, cognitive impairment, Charlson comorbidity index, stroke, paranoia, chronic skin ulcer, pneumonia, gender, skin and soft tissue infection, mycoses, age, inpatient admission in the past 6 months, gout or other crystal-induced arthropathy, falls, musculoskeletal problems, and urinary tract infection. These frailty predictors were identified using ICD diagnosis codes and other information recorded in the CHA.

Analysis

Aggregate descriptive statistics were generated for the following population characteristics: mean age, gender, race, living situation, Medicaid & Medicare beneficiary status, mean FP, and mean LOC score. Pearson's correlation coefficient (rho) was calculated to evaluate the relationship between LOC score and the calculated FP. A correlation coefficient less than 0.3 was considered a weak correlation, a coefficient greater than or equal to 0.3 and less than 0.5 was considered a moderate correlation, and a coefficient greater than or equal to 0.5 was considered a strong correlation.[3]

Multivariable linear regression was utilized to measure the influence of the frailty predictors (independent variables) upon LOC score (dependent variable). Statistics such as parameter estimates and p-values from the regression models were evaluated to assess the relationship between the frailty predictors and LOC score.

Additionally, the frailty threshold (frail = FP greater than or equal to 0.2) established by Segal et al.[2] was examined in relation to LOC score. First, to determine if the frailty threshold of FP greater than or equal to 0.2 was reasonable for this population, the distribution of LOC score was assessed within various FP levels (FP <0.1, 0.1-<0.2, 0.2-<0.3, 0.3-<0.4, 0.4-<0.5, 0.5-<0.6, 0.6-<0.7, 0.7-<0.8, 0.8-<0.9, 0.9-<1.0). Second, LOC score was categorized into five mutually exclusive groups (LOC less than 5, 5-10, 11-20, 21-30, and greater than 30). The percentage of frail was calculated within each LOC category.

Results

The most recent UAS-NY CHA conducted between January 1, 2016 through June 30, 2016 was analyzed for 166,493 MLTC members. Table 1 shows the mean age of an MLTC member was 76.1 years, 70.1% were female, 31.4% were white non-Hispanic, 41.7% lived alone, and 88.9% were dual Medicare and Medicaid beneficiaries. The mean calculated FP was 0.25 (range = 0.00-0.98). The mean LOC score was 18.9 (range = 0-46). The distribution of individuals among the five LOC categories, as well as the distribution of frail (52%) and not frail (48%) is depicted in Figure 1.

LOC score and FP were found to be moderately positively correlated (rho = 0.413). Table 2 summarizes the relationship between LOC score and individual frailty predictors. Predictors were presented in order of importance (highest to lowest absolute value of the beta coefficient) in the frailty model developed by Segal et al.[2] Predictors were also ranked by order of importance (highest to lowest absolute value of the parameter estimate) in the multivariable linear regression model predicting LOC score. Two frailty predictors (mycoses and gout or other crystal-induced arthropathy) did not significantly predict LOC score. Impaired mobility was found to be the most important predictor in both the frailty model and the LOC model used to assess the relationship between frailty predictors and LOC score. However, the importance of other significant frailty predictors differed between the LOC score model and the frailty model.

Figure 2 depicts the distribution of LOC score by mutually exclusive FP categories. Notably beyond the FP greater than or equal to 0.2 threshold, the mean LOC score within each FP category increases as the FP categories increase. Figure 3 depicts the percentage of individuals categorized as frail across the five LOC categories. The FP of 0.2 threshold appears to be reasonable for this population as indicated by a steady increase in the percentage of individuals categorized as frail across LOC score groups. However, 13% in the lowest LOC group (LOC less than 5) were categorized as frail and 24% in the highest LOC group (LOC greater than 30) were not categorized as frail, which suggests that LOC and frailty are different measures.

Discussion

Although functional need and frailty were found to be moderately correlated, this analysis showed that the two measures provide different information about an individual. The importance of significant frailty predictors differed for LOC. Two frailty predictors did not significantly predict LOC. The 0.2 FP threshold was reasonable for this population as evidenced by a steady increase in LOC quartiles with increasing FP beyond this threshold. However, some with a low LOC were categorized as frail and some with a high LOC were not categorized as frail. Within five mutually exclusive LOC groupings the percentage of frail increased as LOC increased, although there was little difference between the two highest LOC groupings. Overall, both frailty and functional need yield important information about an individual's health status and may be useful to inform and improve planning and provision of care for the MLTC population.

References

1. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci.* 2001;56(3):M146-56.

2. Segal JB, Chang HY, Du Y, Watson JD, Carlson MC, Varadhan T. Development of a claims-based frailty indicator anchored to a well-established frailty phenotype. *Medical Care.* 2017;55(7):716–22.

3. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale, NJ: Erlbaum; 1988.

Tables and Figures

Table 1. Population Characteristics, N = 166,493

Characteristic	N or Mean	Percent or Standard Deviation
Age (years), mean	76.1	±12.8
Female gender	116,674	70.1%
Race		
White non-Hispanic	39,822	34.1%
Black non-Hispanic	20,915	17.9%
Hispanic	27,684	23.7%
Other	28,279	24.2%
Living alone	69,345	41.7%
Insurance		
Medicaid	166,493	100.0%
Medicare	148,042	88.9%
Frailty probability, mean	0.25	±0.19
LOC score, mean	18.9	±8.1

Table 2. Relationship between Functional Need (LOC Score) and Frailty Predictors, N = 166,493

Predictors*	LOC Model Order of Importance†	Parameter Estimate	Percent
1. Impaired mobility	1	8.92	2.09
2. Depression	16	0.34	35.85
3. Congestive heart failure	14	0.74	15.2
4. Parkinson disease	4	4.04	3.19
5. White race	15	0.42	40.47
6. Arthritis (any type)	9	-1.57	61
7. Cognitive impairment	2	6.68	25.29
8. Charlson comorbidity index (>0, 0)	19	0.12	68.56
9. Stroke	5	3.44	7.23
10. Paranoia	13	-0.95	5.18
11. Chronic skin ulcer	3	4.87	0.94
12. Pneumonia	7	2.84	0.47
13. Male sex	12	-1.02	29.92
14. Skin and soft tissue infection	10	1.42	0.52
15. Mycoses	18	0.20‡	1.38
16. Age (1 year increments)	20	0.11	§
17. Inpatient admission in past 6 months	8	1.81	14.62
18. Gout or other crystal-induced arthropathy	21	-0.09‡	4.81
19. Falls	11	1.06	0.13
20. Musculoskeletal problems	17	-0.24	47.77
21. Urinary tract infection	6	3.03	1.35

*Predictors were presented in order of importance (highest to lowest beta coefficient absolute value) in the frailty model developed by Segal et al.[2]

†Importance was defined by highest to lowest parameter estimate absolute value.

‡P-value > 0.05

§Mean age = 76.1 years

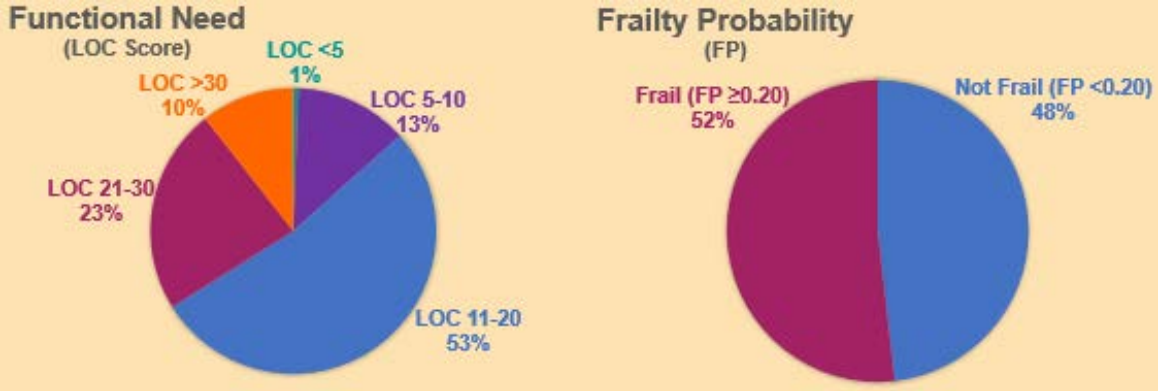

Figure 1. **Description of Functional Need and Frailty**

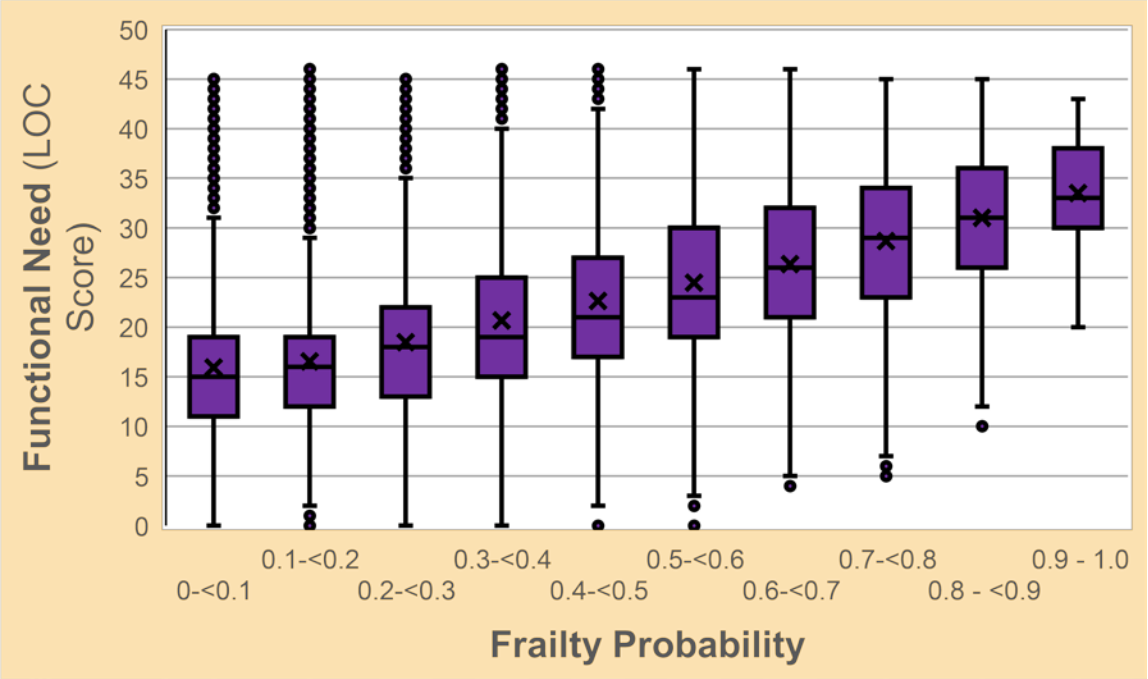

Figure 2. **Evaluation of Functional Need by Frailty Probability**

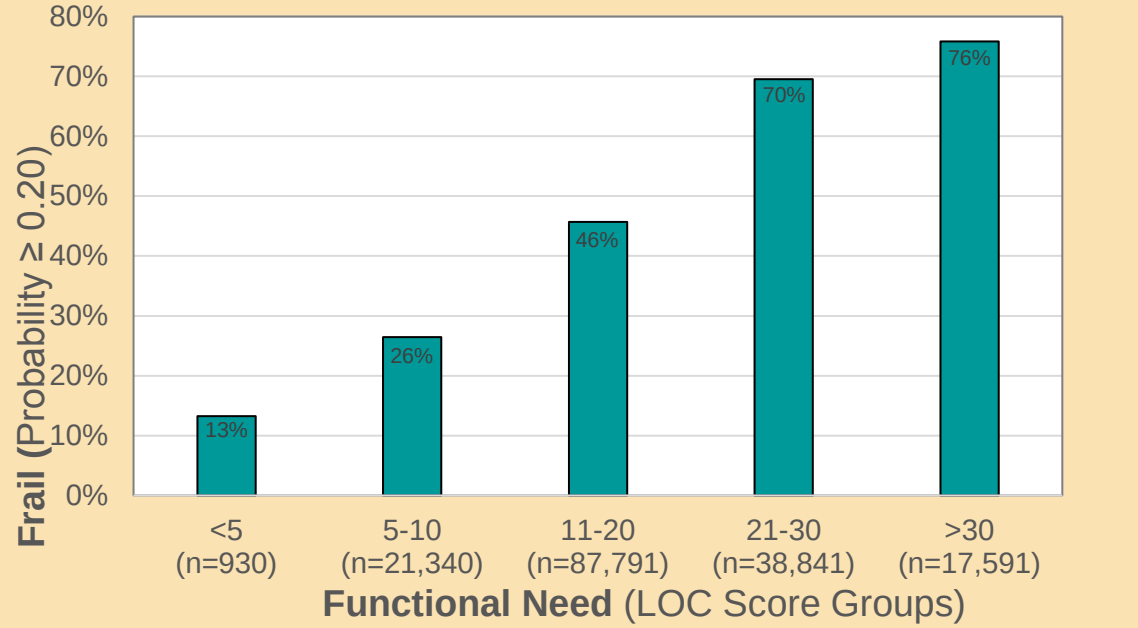

Figure 3. **Percentage of Frail within Functional Need Groups**

Contact Information

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