# Co-Occurring Dysphagia and Frailty are Common and Associated with Increased Disease Severity in Older Adults Presenting with Community-Acquired Pneumonia

**Michael Pulia[1,2], Raele Robison[2,3], Rebecca Schwei[1], Sara Gustafson[2,3], Charles Broghammer[1], Rachelle Herrin[1], Nicole Rogus-Pulia[2,3,4]** [1]Dept. of Emergency Medicine, University of Wisconsin-Madison (UW-Madison); [2]Swallowing and Salivary Bioscience Laboratory, UW-Madison; [3]Dept. of Medicine, UW-Madison; [4]Geriatric Research Education and Clinical Center, William S. Middleton Memorial Veterans Hospital.

## CONTACT INFORMATION

**Contact:** Dr. Michael Pulia, Director Emergency Care for Infectious Diseases (EC-ID) Research Program

**Email:** mspulia@medicine.wisc.edu

**Telephone:** 608.265.8228

**Mailing Address:** 800 University Bay Drive, Suite 310, MC 9123, Madison, WI 53705

## ABSTRACT

- **Background:** Impaired swallowing (dysphagia) and physical (frailty) function are associated with community-acquired pneumonia (CAP), however, neither are routinely screened for in patients with CAP. We sought to: 1) examine frailty and dysphagia screening profiles in a cohort of older adults with CAP; and 2) determine if these screening profiles differ across CAP severity levels.
- **Methods:** Older adults (≥65) meeting diagnostic criteria for pneumonia are included as participants. During the index encounter, dysphagia (3-ounce water swallow) and frailty ((FSQ;4 ≥3 = frailty) screeners are administered. Thirty days post-enrollment, a standardized clinical severity scale is used to document CAP severity (mild (ambulatory management); moderate-severe (hospitalization)). Statistical analysis included descriptives and cross tabulations.
- **Results:** To date, we have enrolled 26 participants (13 female) with a mean age of 73 (SD: 7.1). Nine (34.6%) and 17 (65.4%) patients had mild and moderate-severe CAP severity, respectively. Twenty (76.9%) and 14 (53.8%) patients met screening criteria for dysphagia and frailty, respectively. Screening profiles included: no frailty or dysphagia (15.4%), frailty and no dysphagia (11.5%), no frailty but dysphagia (30.8%), frailty and dysphagia (42.3%). No frailty but dysphagia (44.4%) was the most common mild CAP severity profile. When CAP severity worsened (moderate-severe), co-occurring frailty and dysphagia was most prevalent (47.1%).
- **Conclusions:** Standardized screenings for dysphagia and frailty revealed both were common and frequently co-occurred, particularly in the high acuity group. These data suggest older adults with pneumonia may have underlying dysphagia and/or frailty that warrant further evaluation. These potential impairments should be considered when selecting antibiotics to mitigate or prevent negative sequelae.

## BACKGROUND

Impairments in dysphagia and frailty may go unaddressed in patients with community acquired pneumonia (CAP) as neither are routinely screened for in CAP.

## STUDY OBJECTIVES

1. **Examine if frailty and dysphagia profiles differ across CAP severity levels.**
2. **Determine frailty and dysphagia screening profiles in a cohort of older adults diagnosed with CAP.**

## METHODS

### Study Cohort:

Older adults (≥65) meeting objective, diagnostic criteria for CAP presenting to an academic Emergency Department.

### Dysphagia Screening:

- The *3-oz Water Swallow Test*[1] was used to assess dysphagia status.
- ***Test Instruction:*** *"Please drink this water continuously without stopping".*
- ***Pass Criteria (No Dysphagia):***
  - ❑ No coughing/choking
  - ❑ No voice change
  - ❑ Uninterrupted Drinking
- ***Fail Criteria (Dysphagia):***
  - ❑ Coughing/choking
  - ❑ Voice change
  - ❑ Interrupted Drinking

## METHODS cont'd

### Frailty Screening:

- Self-reported frailty status was derived from a modified *Frailty Screening Questionnaire (FSQ).*[2]
- ***Outcome:*** ≥3 = Frailty

**Table 1. A Modified Frailty Screening Questionnaire.**

| Component | Question | Scoring |
|---|---|---|
| Unintentional Weight Loss | *Have you had unintentional weight loss of 10 pounds or greater in the last year?* | No = 0 Yes = 1 |
| Slowness | *Can you walk one block without difficulty?* | |
| Weakness | *How much difficulty do you have lifting or carrying 10 pounds?* | |
| Exercise | *In a normal week, how much do you exercise?* | |
| Exhaustion | *How often in the past week have you felt this way: "Everything I did was an effort?"* | No = 0 Yes to either question = 1 |
| | *How often in the past week have you felt this way: "I could not get going?"* | |

### Pneumonia Severity:

- A standardized clinical severity scale documented CAP severity at 30 days post enrollment.
- ***Severity Outcomes:*** 0-3=Mild; 4-8=Mod-Severe

**Table 2. The CAP Severity Scale.**

| Patient State | Descriptor | Score |
|---|---|---|
| Uninfected | No clinical or virological evidence of infection | 0 |
| Ambulatory | No limitation of activities | 1 |
| | Limitation of activities | 2 |
| Hospitalized *Mild Disease* | Hospitalized, no oxygen therapy | 3 |
| | Oxygen by mask or nasal prongs | 4 |
| Hospitalized *Severe Disease* | Non-invasive ventilation or high-flow oxygen | 5 |
| | Intubation and mechanical ventilation | 6 |
| | Ventilation + additional organ support | 7 |
| Dead | Death | 8 |

***Statistical Analysis:*** Descriptives and cross tabulations were generated using SPSS (Version 27) to analyze the data.

## RESULTS


### Participants:

- **Twenty-six** older adults with CAP who presented to the academic medical center.
- **Mean age:** 73 years (SD: 7.1)

### CAP Severity Profiles:

**Table 3. CAP Severity Profiles in this Cohort.**

| CAP Severity | Frequency: | Percent: |
|---|---|---|
| Mild | 9 | 34.6% |
| Moderate-Severe | 17 | 65.4% |

### Dysphagia and Frailty Screening Profiles:

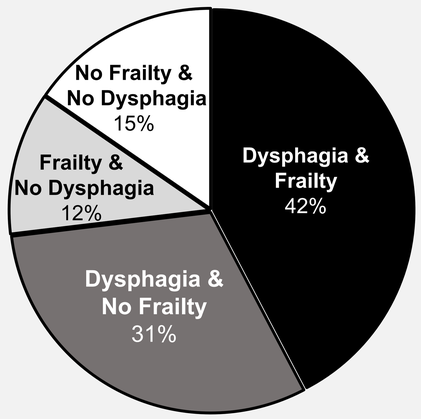


**Fig. 1. Combined dysphagia and frailty screening profiles for this cohort. Dysphagia only was highly prevalent (31%), however, the majority of individuals presented with co-occurring dysphagia and frailty (42%).**

### Dysphagia and Frailty Profiles Across CAP Severity Levels:

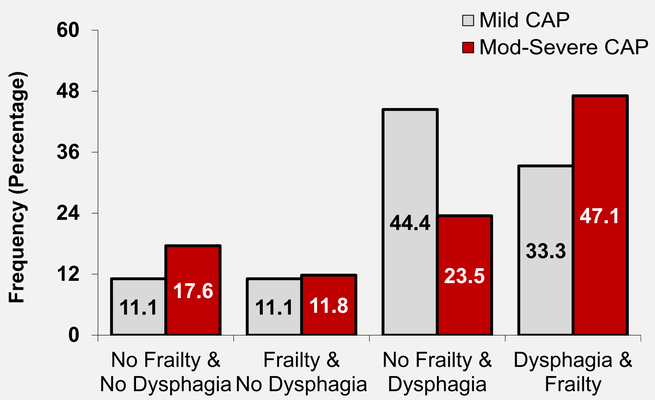


**Fig. 2. Screening profiles across CAP severity levels. No frailty/dysphagia (44.4%) was the most common mild CAP profile. Co-occurring frailty/dysphagia was most prevalent (47.1%) in mod-severe CAP.**

## CONCLUSIONS

- Frailty and dysphagia were prevalent and frequently co-occurred in this cohort of older adults diagnosed with CAP, particularly in the high acuity group.
- These data suggest in patients with suspected CAP, providers should consider dysphagia related aspiration as a potential contributing factor before initiating antibiotic therapy.
- Implementation of screening and referral for rehabilitation services to address frailty and dysphagia in the emergency department may help mitigate or prevent long-term sequelae of CAP (e.g. recurrence and functional decline).

## REFERENCES

- [1]Suiter DM, Leder SB. Clinical utility of the 3-ounce water swallow test. Dysphagia. 2008 Sep;23(3):244-50.
- [2]Liu H, Shang N, Chhetri JK, Liu L, Guo W, Li P, Guo S, Ma L. A Frailty Screening Questionnaire (FSQ) to Rapidly Predict Negative Health Outcomes of Older Adults in Emergency Care Settings. J Nutr Health Aging. 2020;24(6):627-633.

## ACKNOWLEDGMENTS

### Funding and Support:

*Support for this research was provided by the University of Wisconsin-Madison, Office of the Vice Chancellor for Research and Graduate Education with funding from the Wisconsin Alumni Research Foundation.*

## CONFLICT OF INTEREST

*The authors declare that they have no conflicts of interest.*

## ADDITIONAL INFORMATION

EC-ID EMERGENCY CARE for INFECTIOUS DISEASES

SSBL SWALLOWING AND SALIVARY BIOSCIENCE LAB

BerbeeWalsh Department of Emergency Medicine
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH