Pragmatic Trial Implementing High-Intensity Rehabilitation in Skilled Nursing Facilities

Katie J Seidler, PT, DPT, MSCI[1], Danielle Derlein, BS[1], Cherie LeDoux, PT, DPT[1], Daniel Malone, PT, PhD, CCS[1],
Jennifer Stevens-Lapsley, PT, PhD[1,2], Allison Gustavson, PT, DPT, PhD[1]
[1]University of Colorado Anschutz Medical Campus, Aurora, CO [2]Eastern Colorado Geriatric Research Education and Clinical Center, Aurora, CO

Physical Therapy Program
SCHOOL OF MEDICINE
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

VA U.S. Department of Veterans Affairs

BACKGROUND

- **Functional recovery during a skilled nursing facility (SNF) stay is poor**. Only 43.5% of patients exhibit improvement in bed mobility, transfers, and ambulation during a SNF stay.[1] 1 in 3 Medicare beneficiaries report no improvement in function after a SNF stay.[2]
- Therapists are directed to deliver quality care and superior outcomes in less time, though rehabilitation practices across SNFs are inconsistent.[3-5]
- High-intensity resistance training demonstrates functional improvements in community-dwelling and long-term care populations, but has not been generalized to the SNF population.
- The **i-STRONGER Program** (IntenSive Therapeutic Rehabiliation for Older Skilled NursinG HomE Residents) integrates principles of physiologic tissue overload and strength training into rehabilitation to reduce disability in community-dwelling older adults.[6,7]

PURPOSE

To evaluate implementation feasibility and preliminary effectiveness of high-intensity resistance training in a skilled nursing facility.

PARTICIPANTS

Hospitalized patients discharged to SNF

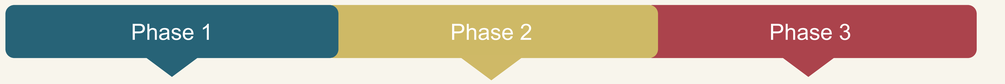
- 103 participants
- Age: 77.7 ± 10 years
- 89% male

Inclusion Criteria: Admitted to the VA Community Living Center at Fitzsimons for rehabilitation following a hospitalization.
Exclusion Criteria: Inability to ambulate; weight-bearing restrictions at admission; acute neurological diagnoses that would benefit from a different therapy regimen; conditions determined to contraindicate safe participation in a high-intensity therapy regimen.

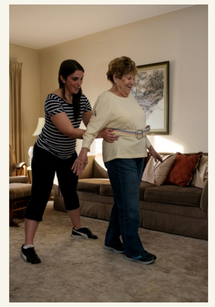
METHODS

- We used **PRISM** and the **RE-AIM** framework to guide and evaluate implementation processes.
- **i-STRONGER** was compared with Usual Care in a staged, 2-independent group design with the SNF serving as its own control.
- Demographic and clinical data, including falls during admission and length of stay (LOS), were sourced from the Minimum Data Set and the SNF medical record.
- Short Physical Performance Battery (SPPB) and gait speed assessments were administered at admission and discharge by facility therapists.
- Treatment fidelity was assessed with an observational checklist and documentation audits.
- Functional change in SPPB and gait speed were evaluated with a linear regression model.

METHODS: i-STRONGER



The patient on the left is wearing a weighted vest as part of a sit-to-stand functional strength-training exercise. The patient on the right is completing a gait task that challenges her balance. Activities like these are part of the i-STRONGER program to maximize recovery and functional independence in older adults.



RESULTS: FUNCTIONAL MEASURES

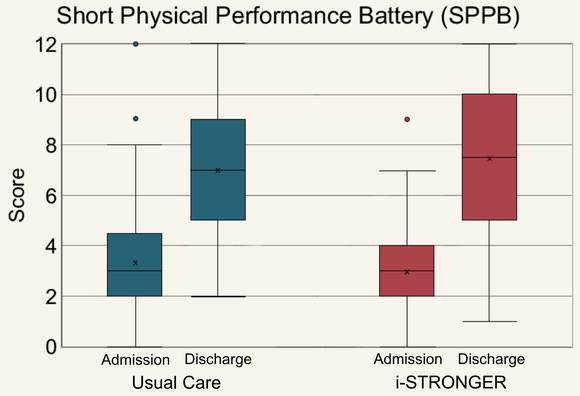


Figure 1: SPPB score at admission and discharge for Usual Care and i-STRONGER.
Usual Care (in blue). At admission: 3.4 ±2.5 (53). At discharge: 7.0 ±2.8 (53)
Change: 3.0 ±2.3 (53)
i-STRONGER (in red). At admission: 3.0 ±2.1 (50). At discharge: 7.5 ±3.0 (48).
Change: 4.3 ±2.7 (50)
There is no significance (p=0.17).
A score <10 indicates one or more mobility limitations.
A score <6 indicates increased risk for adverse events.

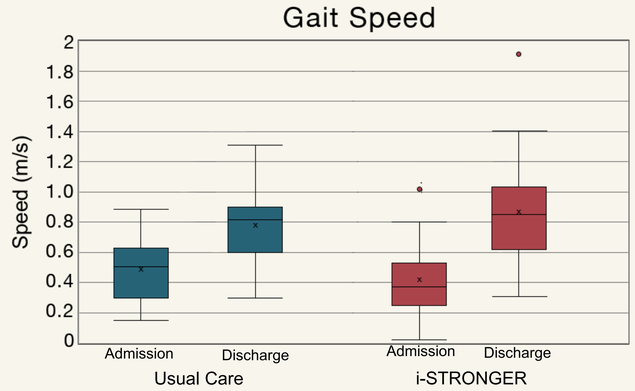


Figure 2: Gait speed at admission and discharge for Usual Care and i-STRONGER.
Usual Care (in blue). At admission: 0.5 ±0.2 (40). At discharge: 0.8 ±0.2 (44)
Change: 0.3 ±0.2 (37)
i-STRONGER (in red). At admission: 0.4 ±0.2 (44). At discharge: 0.9 ±0.3 (48)
Change: 0.5 ±0.3 (43)
Patients in the i-STRONGER group exhibited a more positive change of 0.13m/s (p=0.05) than the Usual Care group.
Gait speed >1m/s is appropriate for community ambulation.
Gait speed <0.8m/s indicates limited mobility and increased risk for adverse events.

RESULTS: PATIENT CHARACTERISTICS & FEASIBILITY

	Usual Care	i-STRONGER	
Variable	**Mean ±SD (N) and Median (Range) or Frequency (N)**	**Mean ±SD (N) and Median (Range) or Frequency (N)**	***t*-test P-Value**
SNF LOS	25.1 ±14.8 (53) 21.0 (6.0-73.0)	21.6 ±12.0 (50) 18.0 (3.0-54.0)	P=0.26
Average Cost per Patient per SNF Day	$439.60 ±35.3 (46) $427.20 (374.30-542.20)	$438.90 ±52.1 (45) $427.20 (320.50-632.00)	P=0.61
Average Total Cost per Patient per SNF Stay	$10743.40 ±6971.3 (46) $9389.50 (3369.00-34157.00)	$9323.60 ±5163.7 (45) $7982.00 (1282.00-23067.70)	P=0.41
Total Therapy Minutes	1805.9 ±1113.2 (53) 1542.0 (477.0-5016.0)	1696.4 ±868.5 (50) 1485.0 (304.0-3961.0)	P=0.89
Patient Refusals for Rehabilitation Sessions	0.2 ±0.5 (53) 0.0 (0.0-2.0)	0.1 ±0.3 (50) 0.0 (0.0-2.0)	P=0.07
Patient Satisfaction Survey	54.6 ±7.9 (29) 55.0 (34.0-69.0)	59.4 ±7.3 (39) 61.0 (38.0-70.0)	P=0.01

Table 1. Patient characteristics between Usual Care and i-STRONGER groups sourced from the medical record; and measures of feasibility between Usual Care and i-STRONGER groups as part of the *implementation* construct in RE-AIM. Under the i-STRONGER model, patients receive a comparable amount of therapy, but report significantly increased satisfaction with rehabilitation (p=0.01).

CONCLUSIONS

- High-intensity rehabilitation for patients admitted to a SNF following hospitalization effectively and safely improved gait speed outcomes.
- Total therapy minutes did not increase with high-intensity rehabilitation.
- Patients receiving high-intensity rehabilitation reported higher satisfaction with their therapy.

LIMITATIONS

- Use of a single VA site, non-blinded therapists, and non-randomized groups limit generalizability.
- The study was not powered to detect responders and non-responders.
- The low R^2 values observed in the regression model suggest the data are not capturing important factors driving functional changes during the SNF stay.

PRAGMATIC RELEVANCE

- Post-acute care reform policy changes will track patient functional outcomes during and after a SNF stay, and reimbursement will be linked to these outcomes.
- Optimizing rehabilitation approaches and functional outcomes within a SNF setting is imperative in providing high-quality care at reduced cost.
- Interventions like i-STRONGER may improve patient functional outcomes and satisfaction without incurring increased cost.

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