<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter(s)</th>
<th>Title</th>
<th>Institution</th>
</tr>
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<tr>
<td>7:30 AM - 8:30 AM</td>
<td>David McWilliams, PT, PhD</td>
<td>An Evaluation of the Clinical Use of an Early Mobility Device to Support Rehabilitation for Patients Admitted to ICU</td>
<td>University Hospitals Coventry &amp; Warwickshire NHS Trust, Coventry, England</td>
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<tr>
<td></td>
<td>Alessandra Lago, MSc</td>
<td>Effects of Physical Therapy With Neuromuscular Electrical Stimulation in the Acute and Late Septic Shock Patients: Randomised Crossover Clinical Trial</td>
<td>Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, Brazil</td>
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<td>Marybeth Moscierella, OTD, OTR/L</td>
<td>Utilization of the Coma Recovery Scale - Revised Across Various Specialty ICUs to Optimize Patient Engagement</td>
<td>Johns Hopkins Hospital, Baltimore, MD, USA</td>
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<td>Caitlyn Anderson, PT, DPT, NCS, GCS</td>
<td>Non-Conventional Treatment in a Non-Conventional Time: Outcomes in a COVID-19 Ventilator Care Unit</td>
<td>University of Wisconsin - Milwaukee, Milwaukee, WI, USA</td>
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<td></td>
<td>Susan Piras, PhD, RN</td>
<td>The Use and Usefulness of ICU Diaries to Support Family Members of Critically Ill Patients</td>
<td>Tennessee Tech University, Cookeville, TN, USA</td>
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<tr>
<td></td>
<td>David Zemmel, PT</td>
<td>Creative Re-Purposing of Common ICU Equipment to Facilitate Rehab Interventions</td>
<td>New York-Presbyterian Hospital/Columbia University Irving Medical Center, New York, NY, USA</td>
</tr>
<tr>
<td></td>
<td>Avital Isenberg, CScD, MS</td>
<td>Assessing Daily Living Skills Among Critical Illness Survivors: Self-report or Performance-Based Measures?</td>
<td>University of Pittsburgh, Pittsburgh, PA, USA</td>
</tr>
<tr>
<td></td>
<td>David Zorko, MD</td>
<td>Physical Rehabilitation Interventions in Pediatric Critical Care Research: a Scoping Review of Methodology and Reporting</td>
<td>Hospital for Sick Children, Toronto, Canada</td>
</tr>
</tbody>
</table>
An evaluation of the clinical use of an early mobility device to support rehabilitation for patients admitted to ICU.

D. McWilliams

1. Centre for care excellence, University Hospitals Coventry and Warwickshire NHS Trust, UK

Objectives
Early mobility within the ICU is associated with positive outcomes. The exact definition of ‘early’ mobility is not defined, with ability to mobilise limited by several perceived factors.

A recent trial demonstrated an early mobility device (the Sara Combifier® which is a combined tilt table and stretcher chair) allowed passive and earlier transfer of patients out of bed [1]. We sought to understand how this device is used in clinical practice and to identify potential areas for future investigation.

Methods
We developed, piloted and completed an on-line survey to evaluate the clinical use of the early mobility device. The survey was translated into 7 languages (Danish, Dutch, French, German, Norwegian, Swedish, and English) and sent to lead clinicians within ICU’s who used the device identified using manufacturer/distributor records. Data was collected between 15th April and 14th May 2021.

Results
In total 69/312 (22%) of invited clinicians completed the survey. The most common respondents were physiotherapists (59%) or nursing staff (37%). 78% of responders reported the device helped with promoting earlier mobilisation, although a protocol for use was reported by 22% of responders.

The largest reported indications for use were profound ICU-acquired weakness (69%) and poor physiological reserve (63%) (see figure 1).

![Figure 1. Indications to use the early mobility device](image)

Contact: David.mcwilliams@uhcw.nhs.uk

Approximately half of respondents reported using the device to overcome barriers including presence of an ET tube (51%), inotropic/vasopressor support (49%), and haemofiltration (42%). The device was predominantly used in mixed medical/surgical ICU’s (94%), with lower use reported in neurological (25%), cardiothoracic (22%) and trauma (17%) ICU’s.

Conclusion
Our survey showed regular use of the early mobility device to support programmes of early mobilisation. Whilst it was commonly used to overcome reported barriers to mobilisation, these indications varied between respondents and there was a lack of robust protocol to guide its use.

Future work is needed to evaluate the safety of utilising the early mobility device for high-risk populations and to develop guidelines to support its use.

References
OBJECTIVES
To evaluate whether neuromuscular electrical stimulation (NMES) performed in septic shock patients within the first 72 hours of diagnosis of septic shock and in patients in sepsis and septic shock after 72 hours of diagnosis is metabolically and physiologically safe.

METHODS
This is the analysis of two randomised controlled crossover studies. Patients with acute septic shock (<72 hours of diagnosis) and sepsis and septic shock in the late phase (> 72 hours of diagnosis) were eligible and submitted in a random order to:
- The intervention protocol (dorsal decubitus position with the lower limbs raised and NMES) and
- The control protocol (dorsal decubitus position with the lower limbs raised without NMES).

The patients were allocated in group 1 (intervention and control) or group 2 (control and intervention) with a wash-out period of 4 to 6 hours. The metabolic and physiological variables were measured.

RESULTS
The main results are described in table 1.

CONCLUSIONS
As there were no alterations in the metabolic and physiological rate during neuromuscular electrical stimulation, it can be considered a safe intervention in the metabolic and physiological scope, even considering that septic shock patients present a higher metabolic demand during the acute phase of shock.

Table 1. Demographic and clinical data.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Sepsis and septic shock (&gt;72h)</th>
<th>Septic shock patients (&lt;72h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yrs*</td>
<td>57 ± 15.97</td>
<td>56 ± 15.48</td>
</tr>
<tr>
<td>SAPS 3 score*</td>
<td>75 ± 17.39</td>
<td>82.54 ± 19.21</td>
</tr>
<tr>
<td>SOFA on day of intervention*</td>
<td>8 ± 4.04</td>
<td>11 ± 3.17</td>
</tr>
<tr>
<td>ICU mortality*</td>
<td>5 (23%)</td>
<td>6 (38%)</td>
</tr>
</tbody>
</table>

**Metabolic values**

| VO2 (ml/kg/min) rest          | 186.59 ± 46.10                 | 224.22 ± 53.99               |
| VO2 (ml/kg/min) intervention  | 183.64 ± 41.39                 | 226.20 ± 49.64               |
| VO2 (ml/kg/min) control       | 188.97 ± 44.88                 | 226.79 ± 58.25               |
| EE (kcal/day) rest            | 1265.66 ± 282.00               | 1482.85 ± 357.59             |
| EE (kcal/day) intervention    | 1243.58 ± 249.94               | 1488.58 ± 346.12             |
| EE (kcal/day) control         | 1274.95 ± 278.71               | 1492.43 ± 398.15             |
| VCO2 (ml/kg/min) rest         | 149.88 ± 25.78                 | 153.78 ± 41.59               |
| VCO2 (ml/kg/min) intervention | 144.97 ± 21.37                 | 152.61 ± 45.10               |
| VCO2 (ml/kg/min) control      | 148.10 ± 27.44                 | 153.86 ± 48.86               |
| RQ rest                       | 0.82 ± 0.15                    | 0.79 ± 0.05                  |
| RQ intervention               | 0.82 ± 0.15                    | 0.68 ± 0.05                  |
| RQ control                    | 0.80 ± 0.15                    | 0.68 ± 0.06                  |

**Physiological values**

| MAP (mmHg) rest               | 84.09 ± 12.76                  | 75.43 ± 9.15                 |
| MAP (mmHg) intervention       | 84.95 ± 13.39                  | 76.66 ± 10.52                |
| MAP (mmHg) control            | 83.76 ± 13.61                  | 75.18 ± 9.50                 |
| HR (bpm) rest                 | 88.24 ± 11.48                  | 88.24 ± 19.82                |
| HR (bpm) intervention         | 90.95 ± 14.73                  | 84.81 ± 18.79                |
| HR (bpm) control              | 89.90 ± 13.18                  | 87.19 ± 20.27                |
| MV (L/min) rest               | 8.47 ± 1.98                    | 9.68 ± 2.92                  |
| MV (L/min) intervention       | 8.34 ± 1.99                    | 9.42 ± 2.75                  |
| MV (L/min) control            | 8.16 ± 2.04                    | 9.79 ± 2.84                  |
| SpO2 rest                     | 96.57 ± 2.13                   | 96.37 ± 1.89                 |
| SpO2 intervention             | 96.90 ± 1.99                   | 96.68 ± 1.85                 |
| SpO2 control                  | 97.23 ± 2.36                   | 96.62 ± 1.78                 |

SAPS: Simplified Acute Physiology Score; SOFA: Sepsis-related Organ Failure Assessment; ICU: intensive care unit; VO2: Oxygen consumption; EE: Energy expenditure; VCO2: Carbon dioxide production; RQ: Respiratory Quotient; MAP: Mean Arterial Pressure; HR: Heart Rate; MV: Minute ventilation; SpO2: Oxygen Saturation.

* Values expressed as mean ± SD
* Values expressed as number (percentage)
*p<0.005 comparisons between groups sepsis and septic shock >72h and septic shock<72h.
*p<0.005 comparisons between RQ rest and intervention in septic shock <72h.
Utilization of the Coma Recovery Scale – Revised Across Various Specialty ICUs to Optimize Patient Engagement

Marybeth Moscirella, OTD, OTR/L and Kelly Casey, OTD, OTR/L, BCPR, ATP, CPAM
Department of Physical Medicine and Rehabilitation, The Johns Hopkins Hospital

Background:
- The Coma Recovery Scale – Revised (CRS-R)\(^1\) is an interdisciplinary standardized assessment used with patients with disorders of consciousness (e.g., minimally conscious state, emerging conscious state, coma).
- The CRS-R has been more commonly utilized in the neurological critical care population.
- In the critical care environment, the CRS-R can be utilized for patients with decreased arousal, awareness, and/or responsiveness, even without a formal disorder of consciousness.\(^2\)
- The CRS-R measures auditory function, visual function, motor function, oral motor/verbal function, communication skills, and arousal levels in a hierarchical manner, all of which are necessary to optimize patient engagement.
- Research shows these functions return in hierarchical manner.\(^3\) This assessment helps guide clinical decision making in terms of recovery.\(^4\)

Assessment:

<table>
<thead>
<tr>
<th>Assessment Area</th>
<th>Example Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory Function</td>
<td>Follow one-step commands ~50% trials</td>
</tr>
<tr>
<td>Visual Function</td>
<td>Track care partner in room</td>
</tr>
<tr>
<td>Motor Function</td>
<td>Grasp call bell</td>
</tr>
<tr>
<td>Oral motor/verbal function</td>
<td>Lip closure around toothbrush</td>
</tr>
<tr>
<td>Communication skills</td>
<td>Respond to ~50% yes/no questions</td>
</tr>
<tr>
<td>Arousal</td>
<td>Eyes open in response to voice</td>
</tr>
</tbody>
</table>

Patient Cases:
- **Oncological ICU Case**: thrombotic thrombocytopenic purpura complicated by stroke and aspiration pneumonia
  - Initial CRS-R score: 11/23
  - Final CRS-R score: 17/23

- **Medical ICU Case**: acute decompensated heart failure complicated by acute respiratory failure
  - Initial CRS-R score: 4/23
  - Final CRS-R score: 13/23

- **Surgical ICU Case**: spinal cord injury complicated by microinfarcts in brain due to fat embolism syndrome
  - Initial CRS-R score: 4/23
  - Final CRS-R score: 15/23

- Additional potentially relevant diagnoses
  - COVID-19 (e.g., s/p prone positioning and medically-induced paralysis, s/p ECMO)
  - Encephalopathy due to liver failure (pre- or post-transplant)
  - Septic shock and/or infection

Clinical Implications:
- In all types of ICUs the CRS-R benefits patients with low levels of arousal regardless of medical etiology.
- The CRS-R assesses performance and guides treatment for patients with low levels of arousal to optimize patient engagement and document sensitive changes tracking progress and guiding rehabilitation.
- The CRS-R can also be considered for patients on sedation, depending on the purpose and type of sedation. Documentation of the medication (type, dose, and time administered) present at the time of CRS-R administration is beneficial to reflect overall patient presentation.

References:

Assessment areas examined during CRS-R administration

An OT completing the visual function section of the CRS-R with a patient
Non-Conventional Treatment in a Non-Conventional Time: Outcomes in a Covid-19 Ventilator Care Unit

Caitlyn Anderson, PT, DPT, NCS, GCS

BACKGROUND & PURPOSE

The purpose of this report is to outline the unique scenario in which the interdisciplinary team required innovative thinking to manage early best patient (pt) care practices in the COVID-19 ventilator care unit (VCU) at a large, urban teaching hospital. The VCU consisted of critically-ill pts who required continued weaning from mechanical ventilation (MV) while receiving therapy services. Utilization of bi-daily team rounds with coordination between physicians, respiratory therapists (RT), nursing, and physical therapy (PT) allowed for creation of new clinical practices to maximize pt mobility despite no guiding literature.

Adjustments to Mechanical Vent Parameters for PT Treatment

<table>
<thead>
<tr>
<th>Non-COVID/Conventional Parameters</th>
<th>COVID</th>
</tr>
</thead>
<tbody>
<tr>
<td>FiO2 40-70%</td>
<td>FiO2 80-100% with 15L Non-rebreather for recovery</td>
</tr>
<tr>
<td>PEEP 5-8</td>
<td>PEEP up to 10</td>
</tr>
<tr>
<td>Pressure Support</td>
<td>Pressure Support &lt;-&gt; Pressure Control</td>
</tr>
</tbody>
</table>

REFERENCES


OUTCOMES

- 10 patients successfully weaned to tracheostomy mask/supplemental oxygen within 2 weeks & passey-muir valve in 3 weeks despite >80 day ICU length of stay
- Increased tolerance to bi-daily treatment, increased mobility outside of therapy sessions
- Improved AMPAC scores, decreased incidence of delirium
- Improved mood, cognition, participation
- Able to be discharged to acute inpatient rehabilitation instead of long-term acute care hospital

In the complex COVID-19 patient population, PT intervention was tolerated despite unconvonventionally high mechanical vent settings


Multi-system Effects of Covid-19

Wauters et al 2020

Prolonged inflammatory and infectious state of lungs

Decreased blood flow + Decreased oxygen exchange + Fibrotic changes

Prolonged ventilation

Rinnoo Carl et al. 2020

Author contact information: caitland1@gmail.com
The Use and Usefulness of ICU Diaries to Support Family Members of Critically Ill Patients

Susan E. Piras PhD, RN, CNE; Kristin Storey, RN, BSN, CCRN; Linda Brown RN, BSN, CCRN; and Carisa Carlile RN, BSN
Tennessee Tech University and Cookeville Regional Medical Center

Background
- Cognitive impairment occurs in 30-80% of Intensive Care Unit (ICU) survivors.1
- Up to 30% of family members of critically ill illness survivors experience stress, anxiety, depression, and complicated grief.2
- ICU diary use can reduce symptoms of psychological distress in patients and family members.3
- There is a lack of evidence to guide the design of ICU diary interventions.

An adaptation of the Systems Engineering Initiative for Patient Safety (SEIPS) 2.0 model guided this study aimed to identify opportunities to optimize the structure, content, and process of ICU diary interventions.

The purpose of the study is to analyze and describe the use and usefulness of the ICU diary to support family members of critically ill patients.5

Methods
This qualitative content analysis study used triangulated data sources from three ICUs at two hospitals located in the Southeastern U.S. Data were collected from August 2018 through April 2019. Triangulated sources included: (a) family member semi-structured interviews guided by the Family Interview Guide; (b) ICU unit field observations; and (c) ICU diary photographs.

Data were content analyzed using NVivo 12 software with iterative category development for person, task, tool, and context.5

Results

<table>
<thead>
<tr>
<th>Site 1</th>
<th>Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Benefit the patient</td>
</tr>
<tr>
<td>Initiation</td>
<td>High risk for PICS</td>
</tr>
<tr>
<td>Users</td>
<td>Staff, some family</td>
</tr>
<tr>
<td>Entries</td>
<td>Dependent on staff</td>
</tr>
<tr>
<td>Perceived use</td>
<td>Benefits the patient</td>
</tr>
<tr>
<td>Format</td>
<td>Unstructured, open</td>
</tr>
<tr>
<td>Iterations</td>
<td>One diary</td>
</tr>
<tr>
<td>Portability</td>
<td>Not portable</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Highly adaptable</td>
</tr>
<tr>
<td>Control</td>
<td>Controlled by staff</td>
</tr>
<tr>
<td>Instructions</td>
<td>Verbal, textual</td>
</tr>
<tr>
<td>Distribution</td>
<td>Nurse</td>
</tr>
</tbody>
</table>

Benefits the family and patient
- All ICU patients
- Family members, some staff
- Dependent on family
- Benefits the family and the patient
- Structured, directive
- Can have multiple diaries
- Portable
- Less adaptable
- Controlled by family members
- Verbal, diary structure
- Unit Secretary

Usefulness of the ICU Diary

<table>
<thead>
<tr>
<th>Person-Patient</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical</td>
<td>Access and Availability 14 (74)</td>
</tr>
<tr>
<td>Attitudes, Limitations</td>
<td>Usability 13 (66)</td>
</tr>
<tr>
<td>Person-Family</td>
<td>Completeness 8 (42)</td>
</tr>
<tr>
<td>Knowledge, Experience 15 (70)</td>
<td>Context</td>
</tr>
<tr>
<td>Availability</td>
<td>Rules, Roles, Routines 11 (58)</td>
</tr>
<tr>
<td>Relationship Patient</td>
<td>Ownership, Control 9 (47)</td>
</tr>
<tr>
<td>Person-Staff</td>
<td>Physical Environment 8 (42)</td>
</tr>
<tr>
<td>Supportiveness</td>
<td>Concerns for Privacy 5 (26)</td>
</tr>
<tr>
<td></td>
<td>Family Relationships 4 (21)</td>
</tr>
</tbody>
</table>

Barriers & Facilitators of ICU Diary Use

Discussion
1. The ICU diary is a multifunctional tool for patients and family members that reduces stress, tracks information, and communicates with staff and the patient survivors.
2. The two hospitals approached diary design, initiation, ownership, and availability differently. ICU diary use is supported by several factors:
   - Person factors: patient distress and family support
   - Task factors: who, what, and when to journal?
   - Tool factors: ease of use, and adaptability
   - Context factors: privacy and control

Recommendations for ICU design include:
- Structure for privacy, adaptability, and usability
- Support information tracking, emotional expression, communication, and tracking medical information
- Include protocols for accessibility, prompt initiation, and staff instruction and support

Conclusion
Our systems approach suggests the ICU diary (tool) is useful to support emotional coping (person), information management (task), and communication (organization). During the Covid 19 pandemic, staff entries to the diary may be more meaningful to the family due to patient isolation.

References
4. Piras, S. E., Langford, L., Carlile, C., Dumithy, K., & Bennett, L. (2020). The use and usefulness of charts to support family members of critically ill patients. Journal of Chron Care, 81, 139-47.
Creative Re-purposing of Common ICU Equipment to Facilitate Rehab Interventions

David Zemmel, PT, MS, CCS

INTRODUCTION
It can be said that one of the hallmarks of a great clinician is not only clinical skill, knowledge, and experience but the ability to “think outside the box”. Creative thinking can help overcome problems and obstacles thereby improving patient care and outcomes.

OBJECTIVES
To demonstrate that items, supplies, devices, and equipment commonly found in the ICU can be re-purposed to facilitate and enhance early mobility in the ICU.

Fig 1. Air Tap patient positioning device used in conjunction with a standing bed becomes a leg press machine. Difficulty is adjusted by changing the angle of the bed. The Air Tap eliminates friction between the patient and the bed.

Fig 2. Splint material is molded into an “ECMO Snorkel” cannula stabilization device.
Fig 3. Pulse oximeter forehead sensor strap is used to secure an ECMO cannula increasing patient comfort and safety.

Saline bags become dumbbells, splint material and pulse oximeter forehead sensor straps are fabricated into cannula stabilization devices, spare parts from AMBU bags are fabricated into PEEP masks, and the Air Tap patient transfer device is enlisted to become an in bed leg press machine.

MATERIALS AND METHODS

Fig 4. PEEP mask fabricated from AMBU bag spare parts allows the clinician to adjust PEEP and deliver O2 as indicated. Used successfully in COPD patients with severe air trapping.

RESULTS

Utilizing readily available re-purposed items in the care of highly complex patients has allowed for improved mobility, strengthening, and enhanced safety, while saving time and money.

CONCLUSIONS
Re-purposing commonly found items is an effective and efficient means of enhancing patient care in the ICU. It can also serve to fill a void when needed equipment is not available. Necessity is indeed the mother of invention.

Fig 5. Saline bags become “Salt Water Dumbbells” Easy to hold and soft if accidentally dropped.
250cc=0.5lb 500cc=1.1lb 1000cc=2.2lb

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Assessing Daily Living Skills Among Critical Illness Survivors: Self Report or Performance-Based Measures?
Avital Isenberg, CScD, MS, OTR/L1, Jennifer White, CScD, MOT, OTR/L1, Maria Shoemaker, OTR/L2, Leslie Scheunemann, MD, MPH3, Elizabeth Skidmore, PhD, OTR/L1

* Corresponding author contact information: asi14@pitt.edu
1 University of Pittsburgh Department of Occupational Therapy, 2 Centers for Inpatient Services, 3 University of Pittsburgh Department of Medicine

**BACKGROUND**
- Critical illness survivors exhibit deficits in physical, cognitive, and mental health for months or years after acute illness.
- Critical illness recovery clinics assess survivors for deficits in mobility, self-care, and cognition.
- Self-report assessments are often administered due to low cost and ease of administration.
- Accurate assessment of deficits is essential to ensure patients receive appropriate services to limit long-lasting disability.
- Little is known about the agreement between self-report and performance observation measures in critical illness survivors.

**METHODS**
Participants: Community-dwelling adults, aged 38+, followed at the Critical Illness Recovery Center, UPMC Mercy. Recent admission to ICU (>4 days) with a diagnosis of sepsis, delirium, or respiratory failure.

**MEASURES**
- Self-Report
- Performance Observation
- Katz ADL
- Lawton IADL
- PASS-H* (Performance Assessment of Self Care Skills - Home)

**STATISTICAL ANALYSIS**
Percent agreement between Katz ADL and Lawton IADL items and PASS-H items were computed using SPSS Software. An a priori benchmark for meaningful agreement was set at or above 80%.

**OBJECTIVE:**
To compare self-report and performance-observed disability in daily living skills in critical illness survivors.

**RESULTS**
Percent agreement between self-report and performance observation assessment was low to moderate in critical illness survivors.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>Percent Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>Bed Mobility</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Dressing</td>
<td>60%</td>
</tr>
<tr>
<td>CIADL</td>
<td>Shopping</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Bill pay check</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Checkbook balancing</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>Medication management</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Telephone use</td>
<td>50%</td>
</tr>
<tr>
<td>PIADL</td>
<td>Sweeping</td>
<td>50%</td>
</tr>
</tbody>
</table>

Shaded items indicate ability to perform task was underreported during self-report assessment.

Critical illness survivors performed tasks with greater independence than they self-reported.

Lowest agreement was found with cognitive instrumental activities of daily living, such as medication management, shopping, and bill pay.

**KEY TAKEAWAYS**
When assessing disability of daily living skills, keep in mind:
- Self report ≠ performance observation
- Critical illness survivors underreport functional ability
- Lowest agreement when assessing cognitive daily living skills

Why is this important?
Accurate assessment is imperative to detecting disability and ensuring appropriate follow-up services. Rehabilitation interventions can be designed effectively when clinicians are aware of existing disability.

Implications for practice:
2. Clinicians & researchers should interpret self-report measures of daily living skills with discretion, specifically cognitive daily living skills.
3. Performance observation measures can assess ability to perform cognitive daily living activities with critical illness survivors.

**FUTURE DIRECTIONS**
Future research should explore the relationship between learned helplessness from critical illness and under-reporting the ability to complete daily activities.

**LIMITATIONS**
Small sample size limits the generalizability of these results and conclusions. However, these findings are similar to larger samples of older adults with acute and chronic conditions.

**ACKNOWLEDGEMENTS**
Thank you to our participants and their families. Thank you to the University of Pittsburgh’s Occupational Therapy Department and UPMC Mercy Critical Illness Recovery Center.

*References available upon request.
Physical Rehabilitation Interventions in Pediatric Critical Care Research: A scoping review of methodology and reporting

D. Zorko1, J. Reid2, J. Unger3, D. Mccaskell4, M. Sadiik5, K. Choong1,6, and M. Kho2

1 Department of Paediatrics, McMaster University, Hamilton, Ontario, Canada; 2 School of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada; 3 Rehabilitation Sciences Institute, University of Toronto, Ontario, Canada; 4 Department of Physical Therapy, St. Joseph’s Healthcare Hamilton, Hamilton, Ontario, Canada; 5 Department of Surgery, McMaster University, Hamilton, Ontario, Canada; 6 Department of Paediatrics Critical Care, McMaster University, Hamilton, Ontario, Canada.

INTRODUCTION

- There is significant interest in physical rehabilitation (PR) interventions and their efficacy in minimizing PICU-acquired complications and optimizing functional outcomes in critically ill children.
- PR interventions are complex, multifaceted, and tailored within patients when applied to a heterogeneous population of critically ill children.
- PR interventions are not reported in a consistent manner in critical care publications. This variability in reporting has been identified as a barrier to evaluating PR intervention efficacy.

AIMS

- To describe the extent and nature of PR research in critically ill children.
- To describe outcomes evaluated and completeness of PR intervention reporting.

METHODS

- 5 databases (MEDLINE, CINAHL, AMED, EMBASE, PEDro) from inception to December 2018.
- Prospective studies evaluating any PR intervention in the PICU.
- Citation screening and data abstraction performed in duplicate.
- Types of PR interventions:
  - Stated primary outcomes—Where possible, outcomes were coded according to the WHI International Classification of Functioning, Disability and Health Framework (Child and Youth version; ICF-CY).
  - Completeness of PR intervention reporting—Assessed using the Consensus on Exercise Reporting Template (CERT).
  - Quality of study reporting—Assessed using standardized tools: CONSORT for RCTs and non-randomized trials; STROBE for observational studies; and SQUIRE for QI studies.
- Reporting classified as good (>70%), moderate (50-70%), or poor (<50%).

RESULTS

We identified only 20 studies evaluating PR interventions in critically ill children.

PR studies were small, single-centered, focused on chest physiotherapy interventions, and evaluated surrogate functional outcomes.

PR interventions are inadequately reported in PICU studies—especially in control groups—impacting appraisal and replication of interventions in clinical practice.

Quality of intervention reporting in future research may be improved by using standardized reporting frameworks for rehabilitation interventions (e.g. CERT).

FIGURE 1. Physical Rehabilitation Interventions Studied, n (%)

<table>
<thead>
<tr>
<th>Physical Activity</th>
<th>Chest Physiotherapy</th>
<th>Multicomponent</th>
<th>Manual techniques</th>
<th>Lung inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive mobility</td>
<td>9 (45.0)</td>
<td>5 (25.0)</td>
<td>5 (25.0)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>Active intervention</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>Passive Intervention</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>In-hospital STIC</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>Multicomponent</td>
<td>3 (15.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
<td>1 (5.0)</td>
</tr>
</tbody>
</table>

FIGURE 2. Quality of Study and Physical Rehabilitation Intervention Reporting, median (Q1, Q3)

TABLE 1. Study Designs and Stated Outcomes

<table>
<thead>
<tr>
<th>Study Design (n (%))</th>
<th>RCT</th>
<th>Observational</th>
<th>Quality Improvement</th>
<th>Non-randomised trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stated Outcomes (n (%))</td>
<td>20 (30.0)</td>
<td>5 (12.5)</td>
<td>5 (12.5)</td>
<td>4 (10.0)</td>
</tr>
</tbody>
</table>

| ICF-CY Categorized Outcomes |
| Body structure and function | 20 (30.0) |
| Environmental factors | 5 (12.5) |
| Personal factors | 5 (12.5) |
| Process measures | 4 (10.0) |

- 1,886 full texts screened for eligibility, 20 pediatric studies met eligibility criteria, yielding 2,644 participants.
- Median (Q1, Q3) sample size was 57 (44, 104) and participant age was 15.2 months (8.8, 57.1).
- All studies were single-centered.

REFERENCES