An Introduction to Cardiovascular & Pulmonary Outcome Measures

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New York Physical Therapy Association
Greater New York District Meeting
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Introduction

- As physical therapists, we are committed to helping our patients achieve the highest level of physical functioning & quality of life through our skilled assessment & interventions

- We use outcome measures to:
  - Objectify Progress
  - Justify Services
  - Identify Areas of Impairment
  - Set Attainable & Meaningful Goals
  - Promote Evidence-Based Practice
  - Endorse Patient/Client-Centered Care
Objectives

- Audience members will be able to...
  - Select appropriate outcome measures based upon a patient’s individual needs
  - Identify precautions & contraindications to administer outcome measures safely in the cardiovascular & pulmonary patient population
  - Demonstrate knowledge differentiating functional & patient self-report outcome measures
  - Understand the basic premise, methods, & supporting evidence for the 4 outcome measures presented in today’s lecture
Selecting an Outcome Measure

- **Intended Population**
  - Purpose of test
  - Patient and Disease Characteristics

- **Reliability**
  - Degree of consistency an instrument or rater measures a variable
  - Interclass correlation coefficient (ICC) > .7 desirable
  - Spearman-Brown reliability coefficient ($\rho$) > .7 desirable

- **Minimal Detectable Change (MDC)**
  - Amount of change required to exceed measurement error
  - MDC will assist in determining if a real change has occurred
    - MDC is calculated using the standard error of measure (SEM)

- **Validity**
  - Degree to which an instrument measures what it is intended to measure
    - **Criterion validity** compares the measure to a gold standard
    - **Construct validity** compares the measure to a theoretical framework
    - **Concurrent validity** compares how well a measure correlates with a previously validated measure
    - **Predictive validity** determines how well a measure will predict a future event or performance
  - Pearson product-moment coefficient of correlation (r)
    - Values closer to +1 demonstrate a strong positive correlation
    - Values closer to -1 demonstrate a strong negative correlation
Selecting an Outcome Measure

- **Responsiveness to Change**
  - Ability of a test to demonstrate when true change occurs
  - Responsiveness Index: is the ability of a measure to detect minimally clinically important differences after an intervention

- **Clinically Significant Difference**
  - The smallest amount of change in a score that would mandate a change in the patient’s management

- **Suggested Clinical Usage**
  - Administration/interpretation of the tool in clinical settings

(1), (2), (3)
Tips for Success

- Select an instrument with known reliability, sensitivity, & responsiveness
- Be familiar with how to score the instrument & Understand the clinical meaning of the range of scores
- Administer the measure upon intake, re-evaluation, & discharge
- Be able to interpret change in scores & how those changes will affect clinical management/treatment plan
- Stay organized with administration of instruments & tracking outcomes
- Utilize outcomes over time to evaluate treatment effectiveness
Today’s Topics

- **Functional Outcome Measures**
  - 6 Minute Walk Test
  - Physical Performance Test

- **Quality of Life Outcome Measures**
  - Minnesota Living with Heart Failure Questionnaire
  - Chronic Respiratory Disease Questionnaire
Patient Safety during Functional Measurement

- **Contraindications**
  - Unstable Angina
  - Resting HR > 120bpm
  - Resting Systolic BP > 180mmHg
  - Resting Diastolic BP > 100mmHg

- Patients exhibiting any of the above symptoms should be referred to their physician for clinical assessment & clearance to participate.
Patient Safety during Functional Measurement

- **Reasons to terminate exercise testing**
  - Signs/symptoms of significant distress
  - Angina
  - Dyspnea
  - Severe musculoskeletal pain including claudication
  - Confusion
  - Dysrhythmia
    - Increasing multi-focal or coupled PVCs
    - Ventricular Tachycardia
    - Rapid atrial dysrhythmia
  - Fall in systolic BP > 20mmHg in presence of elevated HR or increasing workload
  - Extreme Hypertensive response (systolic BP > 240mmHg/diastolic BP > 130mmHg)
  - Ataxic gait
  - Pallor
  - Diaphoresis

(4), (5), (6)
Patient Safety during Functional Measurement

- **In case of Emergency**
  - Testing should be performed in an area where rapid response is available
  - Always have a telephone near by
  - Know the location of the crash cart & other supplies
    - Supplemental O2
    - Sublingual Nitro
    - Aspirin
    - Metered dose inhaler
    - Nebulizer
    - Glucose monitor
  - Test administrator should be at minimum BCLS certified, ACLS preferred
  - Physician attendance for certain individuals should be provided when necessary
  - If the patient is on chronic oxygen therapy, O2 should always be provided during testing at the patient’s standard rate or as directed by physician
6 Minute Walk Test

Background

- The 6MWT is an objective field test used to measure
  - Functional Capacity
  - Treatment Outcomes
  - Exercise Tolerance
  - Peak Oxygen Consumption
  - Patient Prognosis

(7), (8)
6 MWT

Intended Population

- Older Adults

- Patients with Heart & Lung Disease
  - Heart/Lung Transplantation
  - Congestive Heart Failure
  - Pulmonary Hypertension
  - Lung Resection
  - Lung Volume Reduction Surgery
  - COPD
  - Peripheral Vascular Disease
  - Cystic Fibrosis

(4), (5), (6)
6 MWT
Reliability/Validity

- **Reliability**
  - Test-Retest: ICC = .96-.99

- **Validity**
  - Significant correlation (r=.73) between 6 minute walk distance (6MWD) & peak O2 uptake (Vo2 max) in patients with end stage lung disease
  - Significant correlation (r=.64) between 6MWD & Vo2 max in patients with advanced heart failure
  - **Concurrent Validity**: Correlates moderately to strongly with other established measures of function
  - **Predictive Validity**: of short-term survival (p=.04) in patients with heart failure

(5), (6), (4), (8)
6 MWT
Changes in Score

● **Minimal Detectable Change**
  ● Largely unreported
  ● All changes should be documented in absolute values (meters) rather than alternate forms (percentages)

● **Responsiveness**
  ● 6MWT has been documented to be more responsive to deterioration than improvement in heart failure symptoms
  ● One study documents responsiveness index = .6

● **Clinically Significant Difference**
  ● One study examining patients with COPD suggests than an improvement of 70 meters is necessary to demonstrate significant change with 95% confidence
  ● A second observational trial reported a mean decrease of 43 meters in 6MWD as the smallest significant change correlated with a decline in patient functional status
6 MWT
Suggested Usage

- May be utilized in any setting
  - Acute care
  - Rehabilitation
  - SNF
  - Out-patient
  - Home
- Pre & Post-treatment comparisons
  - Physical therapy treatment
  - Medication
  - Surgery
- Functional Status (Single measurement)
  - Heart & Lung Disease
  - Geriatric Populations
- Predictor of Morbidity & Mortality
  - Heart Failure
  - COPD
6 MWT
Administration

- **Materials**
  - Stop watch
  - 30m Corridor
  - 2 Small cones to mark the course
  - 1 Chair
  - Scoring Sheets/Pen/Clipboard
  - Sphygmomanometer
  - Pulse-oximetry monitor
  - Source of Supplemental O2
  - Telephone
  - AED

- **Set-up**
  - Measure the walking course to 30m (100ft) & mark with cones
  - Allow the patient to rest in seated position x 10 minutes prior to the test, while gathering pre-test data
  - Once patient is cleared for participation, obtain baseline dyspnea & fatigue ratings in standing
  - Move to the starting point
6 MWT
Administration

● **Timed-test**
  - Read scripted instruction at the starting point
  - Instruct the patient to begin and start the timer
  - Scripted encouragement may be provided during the test at standardized intervals
  - The patient may self-select gait speed/variation & may take standing or seated rests as needed

● **Post-test**
  - Mark the spot where the patient stopped walking
  - Record post-walk dyspnea & fatigue ratings, pulse-oximetry, blood pressure
  - The patient may sit at this time if desired
  - Calculate total distance ambulated by adding the number of laps to the additional distance ambulated in the final partial lap
  - Congratulate the patient for test completion!
6 MWT

Additional Guidelines

- Choose a quiet space with little distraction/pedestrian traffic
- Encourage patients to dress in comfortable clothing & secure footwear
- Patients may utilize their regular assistive devices (walkers, canes, orthoses), as well as supplemental O2 (with patient’s regular delivery method & flow settings) if required
- Scheduling a practice test (>1hr prior to the “real” test) may help some patients improve their performance
- Be sure to document any medications taken & time of administration prior to 6MWT (bronchodilators, nitrates, etc.)
- It is recommended that the test administrator stand in one place near the starting point. Walking along with the patient is discouraged
6 MWT
Scoring & Interpretation

- **Scoring**
  - Distance scores are recorded in feet or meters
  - Baseline & post-test dyspnea & fatigue ratings are selected by the patient from the BORG scale

- **Interpretation**
  - Optimal reference equations for healthy population-based “norms” are not yet published
  - It has been widely documented that 6MWD < 300m is indicative of increased morbidity & mortality in patients with heart failure
  - Repeated measures may provide insight into a patient’s progress with functional measures, Vo2 max, & response to treatment
APPENDIX

The following elements should be present on the 6MWT worksheet and report:

Lap counter: __________ __________ __________ __________

Patient name: ____________________________ Patient ID#: ____________

Walk # _______ Tech ID: ___________ Date: ____________

Gender: M F Age: ____ Race: ____ Height: _____ ft _____ in, _____ meters

Weight: _____ lbs, _____ kg Blood pressure: _____ / _____

Medications taken before the test (dose and time): ___________________

Supplemental oxygen during the test: No Yes, flow _____ L/min, type _____

<table>
<thead>
<tr>
<th>Baseline</th>
<th>End of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time: <em><strong>:</strong></em></td>
<td><em><strong>:</strong></em></td>
</tr>
<tr>
<td>Heart Rate: ____</td>
<td>____</td>
</tr>
<tr>
<td>Dyspnea: ____</td>
<td>____ (Borg scale)</td>
</tr>
<tr>
<td>Fatigue: ____</td>
<td>____ (Borg scale)</td>
</tr>
<tr>
<td>SpO₂: ____ %</td>
<td>____ %</td>
</tr>
</tbody>
</table>

Stopped or paused before 6 minutes? No Yes, reason: ___________________

Other symptoms at end of exercise: angina dizziness hip, leg, or calf pain

Number of laps: ____ (×60 meters) + final partial lap: _____ meters =

Total distance walked in 6 minutes: _____ meters

Predicted distance: _____ meters Percent predicted: ____%

Tech comments:

Interpretation (including comparison with a preintervention 6MWD):
6MWT

Developers & Contact Info

- Balke, B
  - First developed 6MWT, published 1963

- Standardized by American Thoracic Society, 2002
  - www.thoracic.org
Physical Performance Test

Background

- The Physical Function Test (PPT) is a direct observational field test that is used to measure
  - Multiple dimensions of physical function
  - Basic & complex ADL skills
  - Prediction in physical decline
  - Degrees of motor, sensory, cognitive impairment affecting physical function

- Available in 7-item & 9-item versions
PPT

Intended Population

- Older Adults
  - Frail & Community Dwelling
  - Parkinson’s Disease
  - Alzheimer's Disease
  - Degenerative Joint Disease
  - COPD

- Patients with Pulmonary Disease
  - COPD
  - Chronic Bronchitis
  - End-Stage Lung Disease
  - Lung Transplant
PPT
Reliability/Validity

- **Reliability**
  - Test-Retest: ICC = .88-.96
  - Inter-rater: ICC = .99

- **Validity**
  - **Concurrent Validity**: PTT has been highly correlated (r = .5-.8) with modified Rosow-Breslau, Basic Activities of ADL Living scales, & Tinetti Gait score.
  - **Construct Validity**: PTT is moderately correlated (r=.24-.47) with self-reported health status, cognitive status, & mental health
  - **Predictive Validity**: for falls with sensitivity 79%, specificity (71%)
Changes in Score

- **Minimal Detectable Change**
  - Unreported at this time

- **Responsiveness**
  - Responsiveness index = .8
  - Responsive to measuring both patient improvement & decline

- **Clinically Significant Difference**
  - One study reports a change in score of 2.4 points is required to demonstrate a clinically significant improvement
PPT
Suggested Usage

- May be utilized in any setting
  - Acute care
  - Rehabilitation
  - SNF
  - Out-patient
  - Home
- Pre & Post-treatment comparisons
  - Physical therapy treatment
  - Surgery
  - Medication
- Functional Status (Single measurement)
  - Lung Disease
  - Geriatric Populations
- Screening Tool
  - Functional Impairments
  - Falls Risk
  - Endurance Impairments
  - Frailty
PPT
Administration

- **Materials**
  - Stop-Watch
  - Tape-measure
  - Table
  - Chair
  - Pen
  - Paper
  - 5 Kidney Beans
  - Bowl
  - Coffee Can
  - Book
  - Shelf
  - Jacket
  - 50ft Corridor
  - Stairs
  - Pulse-oximetry monitor

- **Set-up**
  - Assemble materials
  - Set-up each of the 9 items as described in the testing manual
  - Take baseline vitals to ensure patient safety
PPT Administration

- **Timed Test**
  - Time each of the 9 items as instructed in the testing manual
    - Write a Sentence
    - Simulated Eating
    - Lift a book & place it on a shelf
    - Don/Doff a Jacket
    - Pick up a penny from the floor
    - Turn 360 degrees
    - 50ft walk test
    - Climb one flight of stairs
    - Climb more than 1 flight (up to 4 flights of stairs)

- **Post-Test**
  - Allow patient to rest in seated position
  - Take post-test vitals for patient safety
  - Determine patient score with times recorded for each task
  - Congratulate patient on completing the test!
PPT
Additional Guidelines

- Choose the test version (PPT-9 or PPT-7) that most appropriately suits the patient’s capabilities
- Choose a quiet space with little distraction/pedestrian traffic
- Encourage patients to dress in comfortable clothing & secure footwear
- Subjects are given up to 2 chances to complete each task if necessary
- Assistive devices may be utilized for items 6-9
PPT Scoring & Interpretation

- **Scoring**
  - Each item is timed & times are then converted to values on a 5-point ordinal scale (0-4)
  - Points for each item are summed for a maximum score of 36 on the PTT-9, & 28 on the PPT-7

- **Interpretation**
  - Higher scores indicate higher levels of physical performance
  - Scores are divided into categories for interpretation
    - **PPT-9**

<table>
<thead>
<tr>
<th>Scoring Range</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 to 36</td>
<td>Not Frail (Independent)</td>
</tr>
<tr>
<td>25 to 32</td>
<td>Mild Frailty</td>
</tr>
<tr>
<td>17 to 24</td>
<td>Moderate Frailty</td>
</tr>
<tr>
<td>&gt; 17</td>
<td>Frail (Not likely to function in the community)</td>
</tr>
</tbody>
</table>

- A score of <15 on the PPT-7 has been reported to be predictive of falls
**APPENDIX A: PHYSICAL PERFORMANCE TEST SCORING SHEET**

<table>
<thead>
<tr>
<th>Physical Performance Test</th>
<th>Time</th>
<th>Scoring</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Write a sentence (whales live in the blue ocean)</td>
<td>sec*</td>
<td>≤ 10 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.5–15 sec = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.5–20 sec = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 20 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>2. Simulated eating</td>
<td>sec</td>
<td>≤ 10 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.5–15 sec = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.5–20 sec = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 20 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>3. Lift a book and put it on a shelf</td>
<td>sec</td>
<td>≤ 2 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5–4 sec = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5–6 sec = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 6 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>4. Put on and remove a jacket</td>
<td>sec</td>
<td>≤ 10 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.5–15 sec = 3</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>15.5–20 sec = 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>&gt; 20 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>5. Pick up penny from floor</td>
<td>sec</td>
<td>≤ 2 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5–4 sec = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5–6 sec = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 6 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>6. Turn 360 degrees</td>
<td></td>
<td>discontinuous steps</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>continuous steps</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unsteady (grabs, staggers)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>steady</td>
<td>2</td>
</tr>
<tr>
<td>7. 50-foot walk test</td>
<td>sec</td>
<td>≤ 15 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.5–20 sec = 3</td>
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<tr>
<td></td>
<td></td>
<td>20.5–25 sec = 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>&gt; 25 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>8. Climb one flight of stairs†</td>
<td>sec</td>
<td>≤ 5 sec = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.5–10 sec = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.5–15 sec = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 15 sec = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unable = 0</td>
<td></td>
</tr>
<tr>
<td>9. Climb stairs†</td>
<td>Number of flights of stairs up and down (maximum 4)</td>
<td>nine-item</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>seven-item</td>
<td></td>
</tr>
</tbody>
</table>

*For timed measurements, round to nearest 0.5 seconds.
†Omit for seven-item scoring.
Developers & Contact Info

- David B. Reuben & Albert L. Siu
  - Test developed/published in 1990
Minnesota Living with Heart Failure Questionnaire

Background

- The MLHFQ is a disease-specific health-related quality of life (HRQOL) questionnaire that measures patients’ perception of the influence heart failure diagnosis & treatments has upon
  - Physical Status
  - Emotional Well-Being
  - Socioeconomic Factors
  - Psychological Status

- 21-item, self-administered instrument
  - Summary Score
    - Physical Impairment Score
    - Emotional Impairment Score
MLHFQ
Intended Population

- Patients with Heart Failure
  - CHF
  - R-sided
  - L-sided
  - Systolic
  - Diastolic
  - HF s/p MI
  - Low out-put
  - High out-put
MLHFQ
Reliability/Validity

- **Reliability**
  - Test-Retest: ICC=.99

- **Validity**
  - **Concurrent Validity:**
    - Chronic Heart Failure Questionnaire (r=.81)
    - Functional Status Scale (r=.71)
    - SF-12 (r=.64)
    - MLFHQ scores correlate positively with NYHA Functional Classes (I-IV)
MLHFQ
Changes in Score

- **Minimal Detectable Change**
  - Changes in score must be $> 2.77 \times$ the SEM (standard error of measurement) to be 95% confident the score change was not due to measurement error
    - Estimated values of SEM for different scoring ranges are available at www.mlhfq.org

- **Responsiveness to Change**
  - Has demonstrated responsiveness to change in multiple RCTs examining a variety of clinical interventions

- **Clinically Significant Difference**
  - Multiple trials have suggested a change in score of 5.0 points is required to demonstrate a clinically significant change in patient status

(15), (16)
MLHFQ
Suggested Usage

- May be utilized in any setting
  - Acute care
  - Rehabilitation
  - SNF
  - Out-patient
  - Home

- Pre & Post-treatment comparisons
  - Physical therapy treatment
  - Medication
  - Life-Style Changes
  - Educational Interventions
  - Pacemaker Placement

- Single Measurement Screening tool
  - Identify self-reported HRQOL impairments
    - Physical
    - Emotional
    - Socioeconomic
    - Psychological
MLHFQ Administration

- **Materials**
  - Paper
  - Pen or Pencil
  - Table
  - Chair

- **Set-up**
  - Assemble materials
  - Ensure patient has adequate cognition & reading comprehension to complete the instrument
MLHFQ Administration

- **Test**
  - Patient self-administers the 21 item questionnaire
  - On average requires 10-15 minutes to complete

- **Post-Test**
  - Collect the instrument from the patient for scoring
  - Congratulate the patient on instrument completion!
Scoring & Interpretation

- **Scoring**
  - The patient self-scores each of the 21-items on a 6 point Likert scale (0-5)
    - (0 points indicate “none,” 1 point indicates “very little,” 5 points indicate “very much”)
  - Patient ratings for each item are summed into 3 scoring categories:
    - **Overall Score** (0 to 105 possible points)
    - **Physical Score**
      - Physical sub-scores are drawn from a set of 8 items relating to physical dysfunction
    - **Emotional Score**
      - Emotional sub-scores are drawn from a set of 5 items representing psychological distress
MLHFQ Scoring & Interpretation

- **Interpretation**
  - Lower scores indicate better HRQOL, while higher scores are indicative of worse HRQOL.
  - One study, examining 447 patients, is the first to attempt at establishment of 3 levels of score interpretation for clinical decision-making.

<table>
<thead>
<tr>
<th>Scoring Range</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 24</td>
<td>Good HRQOL</td>
</tr>
<tr>
<td>24-45</td>
<td>Moderate HRQOL</td>
</tr>
<tr>
<td>&gt;45</td>
<td>Poor HRQOL</td>
</tr>
</tbody>
</table>

- Each of the 3 scoring categories correlated highly with:
  - Survival status (p=.004)
  - Self-perceived health status (p=.0032)
  - NYHA functional class (p=.0001)
  - 6MWT (p=.05)
### Content of the Minnesota Living with Heart Failure Questionnaire

These questions concern how your heart failure (heart condition) has prevented you from living as you wanted during the past month. The items listed here describe different ways some people are affected. If you are sure an item does not apply to you or is not related to your heart failure, then circle 0 (No) and go on to the next item. If an item does apply to you, then circle the number rating of how much it prevented you from living as you wanted. Remember to think about ONLY THE PAST MONTH.

Did your heart failure prevent you from living as you wanted during the last month by

<table>
<thead>
<tr>
<th></th>
<th>NO</th>
<th>VERY LITTLE</th>
<th>VERY MUCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. causing swelling in your ankles, legs, etc.?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. making your working around the house or yard difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. making your relating to or doing things with your friends or family difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. making you sit or lie down to rest during the day?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. making you tired, fatigued, or low on energy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. making your working to earn a living difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. making your walking about or climbing stairs difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. making you short of breath?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9. making your sleeping well at night difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10. making you eat less of the foods you like?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11. making your going places away from home difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12. making your sexual activities difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. making your recreational pastimes, sports, or hobbies difficult?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14. making it difficult for you to concentrate or remember things?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15. giving you side effects from medications?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16. making you worry?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17. making you feel depressed?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18. costing you money for medical care?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19. making you feel a loss of self-control in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20. making you stay in a hospital?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>21. making you feel you are a burden to your family or friends?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

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Median responses from 83 patients are underlined for each item.
Spearman rank-order correlation between sum of items 1 to 21 and each item.
MLHFQ
Developers & Contact Info

- Thomas S. Rector
  - Developed/published 1984
  - www.mlhfq.org
Chronic Respiratory Disease Questionnaire

Background

- The CRDQ is the most commonly used disease-specific tool to evaluate HRQOL in patients with chronic respiratory disease

- 20-item, interviewer-administered instrument that examines patient-perception across 4 domains
  - Dyspnea
  - Fatigue
  - Emotional Function
  - Mastery
CRQ

Intended Population

- Patients with chronic respiratory disease (>3 months) and/or other diseases that lead to chronic airflow limitation
  - COPD
  - Emphysema
  - Chronic Bronchitis
  - Bronchiectasis
  - Restrictive Lung Diseases
  - Pulmonary Fibrosis
  - Lung Cancer
  - Scleroderma
  - GVHD

(20), (22), (23)
CRQ
Reliability/Validity

- **Reliability**
  - Test-Retest: $\rho = .9-.93$

- **Validity**
  - Concurrent Validity:
    - St. George’s Respiratory Questionnaire ($r = .72-.88$)
    - Breathing Problems Questionnaire ($r = .75$)
CRQ
Changes in Score

- **Minimal Detectable Change**
  - Unreported

- **Responsiveness to Change**
  - CRQ consistently shown to be one of the most responsive instruments in measuring & detecting change in pulmonary HRQOL

- **Clinically Significant Difference**
  - One study concludes a mean change of .81-.96 per question indicates moderate effect, while a mean change of .86-1.47 indicates a large effect
  - Another trial recommends that a change > 2 points per domain suggests a clinically significant difference
  - Other sources have indicated minimally clinically significant differences of only .50 to demonstrate significant change
CRQ
Suggested Usage

- May be utilized in any setting
  - Acute care
  - Rehabilitation
  - SNF
  - Out-patient
  - Home

- Pre & Post-Treatment Comparisons
  - Physical therapy treatment
  - Medication
  - Surgery
  - Life-Style Changes
  - Educational Interventions

- Single Measurement Screening tool
  - Identify self-reported HRQOL impairments
    - Dyspnea
    - Fatigue
    - Emotional Function
    - Mastery

- Clinical Research as well as Clinical Practice
CRQ
Administration

● Materials
  ● Paper
  ● Pen or Pencil
  ● Table
  ● 2 Chairs

● Set-up
  ● Assemble materials
  ● Select a private space to minimize distraction & promote patient-confidentiality
CRQ
Administration

- **Test**
  - Interviewer guides patient through 4 domains
    - Dyspnea (5 Questions, Individualized)
    - Fatigue (4 Questions)
    - Emotional Function (7 Questions)
    - Mastery (4 Questions)
  - Instrument takes approximately 20 minutes to complete

- **Post-Test**
  - Congratulate patient on completing the instrument!
  - Sum items in each of the 4 domains for scoring purposes
CRQ
Additional Guidelines

- If the patient is not able to generate 5 items in the dyspnea domain, the interviewer may prompt the patient with a list of 25 common activities from which the patient may select 5 items.

- If time is a limitation in your clinical setting, there is also a self-administered version of the CRQ that only takes 5-8 minutes to complete.
  - The self-administered version has also demonstrated high reliability & validity, similar to the original version.
CRQ
Scoring & Interpretation

Scoring

- Each of the 4 domains contain 4-7 items
  - Dyspnea (35 pts)
  - Fatigue (28 pts)
  - Emotional Function (49 pts)
  - Mastery (28 pts)
- Each item is graded by the patient on a 7-point Likert Scale (1-7)
  - (1 point indicates “maximum impairment,” while 7 points represents “no impairment”)
- The 4 domain scores remain separate to reflect patient status in 4 specific areas
  - Developers do not recommend using a full test score as a means of comparison
CRQ
Scoring & Interpretation

- **Interpretation**
  - Higher scores indicate better HRQOL, while lower scores indicate worse HRQOL
CRQ
Developers & Contact Info

- Gordon H. Guyatt
  - Developed/published in 1987
  - Dept. of Clinical Epidemiology
    McMaster University Med. Ctr.
  - 1200 Main Street
    Hamilton, Ontario
    CANADA L8N 3Z5
  - guyatt@mcmaster.ca
Conclusions

- When choosing an outcome measure, it is important to first examine the evidence in order to determine which instrument is most appropriate for your individual patient & what you are trying to measure.
- Always take appropriate safety precautions when implementing functional measures in cardiovascular & pulmonary patient populations.
- Many of the cardiovascular & pulmonary outcome measures may be implemented efficiently & with common items found in the clinic.
Questions?

- Thank you!

- Contact Information:
  - montanal@mskcc.org
Works Cited