Validation of a Patient-Centered Digital Tele-Health Tool

Sheryl Flynn PT, PhD
Co-Founder/CEO

Improving health all over the world!
@blumarblehealth

Disclosures

- Financial: honoraria, intellectual property rights, grants, & ownership of Blue Marble Health; travel from AVREA, and honorarium from MIREC.
- Non-Financial: Dr. Flynn is the co-founder and CEO of Blue Marble Health and has received government grants/contracts to develop the products described.

Learning Objectives

Following this course, learners will be able to:
- Evaluate a Patient-Centered Digital Tele-Health Tool.
- Describe implementation protocol options for a variety of settings.
- Describe data and reports for program evaluation.

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Instructional Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 min</td>
<td>Introduction</td>
<td>Lecture</td>
</tr>
<tr>
<td>5-20 min</td>
<td>Platform</td>
<td>Lecture/Demo/Video of platform</td>
</tr>
<tr>
<td>20-30 min</td>
<td>Validation Outcomes</td>
<td>Lecture</td>
</tr>
<tr>
<td>30-40 min</td>
<td>Reporting Functionality</td>
<td>Lecture</td>
</tr>
<tr>
<td>40-45 min</td>
<td>Implementation</td>
<td>Lecture</td>
</tr>
<tr>
<td>45-50 min</td>
<td>Summary/Q&amp;A</td>
<td>Lecture</td>
</tr>
</tbody>
</table>
Funded by the DOD and NIA

CATT: This work is supported by the US Army Medical Research and Material Command under Contract No. W81XWH-03-C-0159. The views, opinions, and findings contained in this report are those of the authors and should not be construed to represent the official position of the Army, the Department of Defense, or the United States government.

Health in Motion: Research reported in this publication was supported by the National Institute of Aging of the National Institutes of Health under Award Numbers R01AG033424 and R01AG034175. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Blue Marble Team

Plan

1. Evaluate a Patient-Centered Digital TeleHealth Tool.
2. Describe implementation protocol options for a variety of settings.
3. Describe data and reports for program evaluation.
Plan

1. Evaluate a Patient-Centered Digital Tele-Health Tool.
2. Describe implementation protocol options for a variety of settings.
3. Describe data and reports for program evaluation.

Challenges and Opportunities

**Challenges**
- Lack of standardization
- Massive Need - Poor Access
- Paper based home programs
- Vestibular
- Brachial slip
- Travel inconvenience
- Weather
- Distance
- Equitable Distribution of Care
- High Cost

**Opportunities**
- Standardized assessment
- Ability to track adherence
- Remote monitoring
- Anytime/Anywhere access
- Work flow
- Flexibility in system - Personalized care
- HIPAA compliant - double encryption
- Equitable Distribution of Care
- Near time data
- Population data reports
- Self-monitoring
- Integrates with EHR
- Screening

Blue Marble Platform

**Cognitive**
- Assessment
- Intervention

**Physical**
- Assessment
- Intervention
Step 1 - Create a Routine

Self-Assessments

Go To Routine 2

Routine 1
Exercise 3d/wk/1mo
Self-Assessments
Repeat
Routine 2
Exercise 3d/wk/1mo

Step 2 - Client performs the routine
Step 3. The Administrator Tracks Performance

Step 4. The Administrator updates the routines and plan based on client’s performance.

Routine 3
- Routine
- Self-Assessment
- Repeat

Routine 4
- Routine
- Self-Assessment
- Repeat

Step 5. The Administrator continues to track the client over time.
Step 5. The Client creates self-reports to see program changes in progress.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 17, 2017</td>
<td>6</td>
</tr>
<tr>
<td>April 14, 2017</td>
<td>4</td>
</tr>
<tr>
<td>ABC</td>
<td>75%</td>
</tr>
<tr>
<td>24h</td>
<td>85%</td>
</tr>
<tr>
<td>Distance MD</td>
<td>5</td>
</tr>
<tr>
<td>der Straband</td>
<td>8</td>
</tr>
</tbody>
</table>

Step 6. The Administrator keeps track of many clients at the same time.

Step 7. The Administrator creates population reports.

<table>
<thead>
<tr>
<th>Period 1</th>
<th>Period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dates</td>
<td>Last Month</td>
</tr>
<tr>
<td>Users</td>
<td>100</td>
</tr>
<tr>
<td>Adherence</td>
<td>3hr/wk</td>
</tr>
<tr>
<td>Data 1</td>
<td>100%</td>
</tr>
<tr>
<td>Data 2</td>
<td>25</td>
</tr>
<tr>
<td>Data 3</td>
<td>Yes</td>
</tr>
<tr>
<td>Data 4</td>
<td>30</td>
</tr>
<tr>
<td>Data 5</td>
<td>Yes</td>
</tr>
<tr>
<td>Data 6</td>
<td>100%</td>
</tr>
<tr>
<td>Data 7</td>
<td>25</td>
</tr>
<tr>
<td>Data 8</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Blue Marble Platform

Cognitive
- Assessment
- Intervention

Physical
- Assessment
- Intervention

Cognitive
- Attention
- Memory
- Visual Processing
- Executive Function
- Perceptual Motor Skills

Physical
- Balance
- Coordination
- Strength
- Depression
- Dizziness

Cognitive
- Selective Attention
- Divided Attention
- Visual Spatial Attention
- Processing Speed
- Organization
- Impulse Control
- Working Memory

Physical
- Balance
- Coordination
- Strength
- Depression
- Dizziness
**Cognitive**
- Trails
- Go/No-Go
- Digit Symbol
- Line Crossing
- Patient Reported Outcomes NIH PROMIS
- Visual Perception
- Two-Choice
- Card Sort

**Physical**
- Fall Risk Questionnaire
- Depression Screen
- One Legged Stand Test
- 10 Sec Sit to Stand Test
- Timed Up and Go*
- Stair Climb Test*
- Vestibular Tests*

**Cognitive**
- Activities that challenge
- Attention
- Memory
- Visual Perception
- Executive Function

**Physical**
- Otago Exercise Program
- Tai Chi
- VOR x 1*
- VOR x 2*
- Arthritis-CJR* (pre/rehab)
In-app Progress Graph

Blue Marble Platform

The Blue Marble Platform

- Video here
Product Validation

**Usability**
- The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (usabilitynet.org).
- **Effectiveness**: can users complete the tasks, achieve the goals?
- **Efficiency**: how much effort do users require to do this? (measured in time)
- **Satisfaction**: what do users think about the product's ease of use?
- All are affected by the user, their goals, and the situation

**Reliability**
- Consistency and repeatability

**Validity**
- Does the instrument measure what it is supposed to measure?

**Efficacy**
- Does the intervention have an effect in a controlled setting?
- Effectiveness: does the intervention have an effect in the real world?
Cognitive
- Assessments: 76th percentile
- Intervention: 79th percentile

Physical
- Assessments: 69th percentile
- Intervention: 69th percentile

Cognitive
- Range: r=0.61-.89 (p<.01)
- Younger: range r=.70-.81 (p<.01)
- Older: range r=.45-.81 (p<.01)

Physical
- Range: r=.67-.90 (p<.01)
- Older: ICC ranged from .582-.90 (p<.05 and .01)

Validit
Cognitive
- Effect size: Cohen’s D: .432

Physical
- Not inferior
- Less pain

Cognitive
- Adherence: better than paper

Physical
- Adherence: not different from paper

Cognitive
- Sensitive to aging

Physical
- Reduced fall risk
Validation Research

- **Usability**: the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.
  - **Effectiveness**: can users complete the tasks, achieve the goals?
  - **Efficiency**: how much effort do users require to do their (measured in time)?
  - **Satisfaction**: what do users think about the product’s ease of use?
  - **Reliability**: consistency and repeatability
  - **Validity**: does the instrument measure what it is supposed to measure?
  - **Efficacy**: does the intervention have an effect in a controlled setting?
  - **Effectiveness**: does the intervention have an effect in the real world?

Rock Steady©

- **Purpose**: To develop a mobile self-clinic-based assessment and exercise tool for adults with vestibular impairment

  - Integrate Assessments and Exercises related to vestibular rehabilitation
Assessments

- Activity-Specific Balance Confidence Inventory
- Disability Rating Scale-Vestibular
- Dizziness Handicap Inventory
- Dizziness Interference
- Dizziness Visual Analog Scale
- Oscillopsia Visual Analog Scale
- Disequilibrium Visual Analog Scale

Exercises

- VOR x 1
- VOR x 2
Plan

1. The learner will evaluate a Patient-Centered Digital Tele-Health Tool
2. The learner will describe implementation protocol options for a variety of settings
3. The learner will describe data and reports for program evaluation

Based on what you have seen, what value does this platform bring?

- Audience response

What value does this platform bring?

- It depends...
  - Work flow efficiency
  - Adherence
  - Population Health
  - Documentation
  - Standardized Clinical Outcomes
Admission process - preassessment battery

Based on patient performance, care-team completes appropriate risk interventions.

Upon discharge, patients are given a discharge plan to use at home or SNF. Data is used to track change and risk.

In-house care team tracks patient performance over time.

Prior to meeting with Patient, clinician reviews outcomes of assessment.

Clinicians focus treatment on areas of impairment.

Clinician assigns tests for patient to do at home.

Data is used to track change and update plan.

Patient completes self assessments and exercises at home.

Data is used to track change and update plan.
1. The learner will evaluate a Patient-Centered Digital Tele-Health Tool

2. The learner will describe implementation protocol options for a variety of settings

3. The learner will describe data and reports for program evaluation

Senior Center Use Case
- Senior Center: 18,000 seniors/year
- Sponsors 3 Matter of Balance classes/year
  - 45 seniors @ $5/visit
- 2 month Pilot of Health in Motion
  - 13 users
  - 3-4 hours of exercise/user/month
- Late 2017
  - HM part of "meals of wheels" program
  - Launch cognitive assessments
  - Goal: reach 10,000 seniors

Plan
Admin Dashboard - view status of all patients at the same time. Sort to see most impaired patients in top positions.

Population Report - obtain population data for individualized periods of time. Useful for annual, semiannual reporting requirements.

Individual User data dashboard - view status of a single patient to determine progress, change over time, adherence and consistency.
Prevent a Million Falls

We built Health in Motion with funding from the National Institutes on Aging. Our goal is to give back to our communities by preventing 1,000,000 falls.

We cannot do this alone? Will you help us?

Thank you!

For Research – we are seeking research partnerships
Sheryl Flynn: sheryl@bluemarblehealthco.com

For Pilots – we are seeking implementation pilots with VA facilities
Chris Ashford: chris@bluemarblehealthco.com