LiveWell RERC
State of the Science Conference
The Future of mHealth and mRehab for People with Disabilities

Partner Institutions

The opinions are those of the LiveWell RERC and do not necessarily reflect those of the U.S. Department of Health and Human Services or NIDILRR.

LiveWell RERC – Twofold Mission

- Promote ICT access to existing and emerging technologies for all people regardless of ability

- Develop and validate ICT applications to improve the capacity for independent living and community participation.

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SOS Conference – Purpose/Objectives

Purpose:

Set the future ICT research & development agenda to ensure full inclusion of people with disabilities in the digital health revolution.

Objectives:

1. Showcase presentations reflecting the current state of the science
2. Discuss potential barriers and opportunities to adoption of ICT in mHealth/mRehab
3. Map out the future direction for the field

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SOS Conference – Agenda

Session 1: The Future of mHealth for People with Disabilities

- **Capturing remote patient data and making it useful for clinicians**
  Devin Mann, MD, NYU Langone Health

- **Technology adoption, demonstrating value to healthcare delivery organizations, clinicians and patients**
  David Putrino, PT, PhD, Mt. Sinai Medical Center

- **Consumer perspectives, user acceptance/adherence, and abandonment of mHealth technology solutions**
  June Kailes, MSW, LCSW, Western University of Health Sciences

- **Discussant**
  Mark Bayley, MD, University of Toronto / Toronto Rehabilitation Institute

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SOS Conference – Agenda

Session 2: The Future of mRehab for People with Disabilities

- **Quality versus quantity: Optimizing physical rehabilitation at a distance**
  Catherine Lang, PT, PhD, Washington University

- **Evaluating mobile apps for usability, engagement, and effectiveness; techniques for behavior change**
  Danielle Jake-Schoffman, PhD, University of Florida

- **Consumer perspectives, strategies to promote engagement by patients, family, caregivers and other users of digital health solutions**
  Kate Lorig, DPhil, Stanford University Center for Self Management

- **Discussant**
  Paolo Bonato, PhD, Spaulding Rehabilitation Hospital

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SOS Conference – Agenda

Session 3: Consensus on Future Needs for mHealth/ mRehab for People with Disabilities

- **Barriers to adoption**
  - Acceptance
  - Accessibility and usability
  - Use of evidence-based approaches
  - Evidence of effectiveness/implementation
  - Logistics of working into clinical practice
  - Reimbursement

- **Facilitators**
  - Change in payment paradigms
  - Advances in technology integration
  - Automation thru AI/Machine Learning

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SOS Conference – Deliverable

Special Issue - *Mobile Health and Mobile Rehabilitation for People with Disabilities*

https://www.mdpi.com/journal/ijerph/
special_issues/mHealth_mRehab

Deadline for submissions: 31 October 2019

Healthcare today...
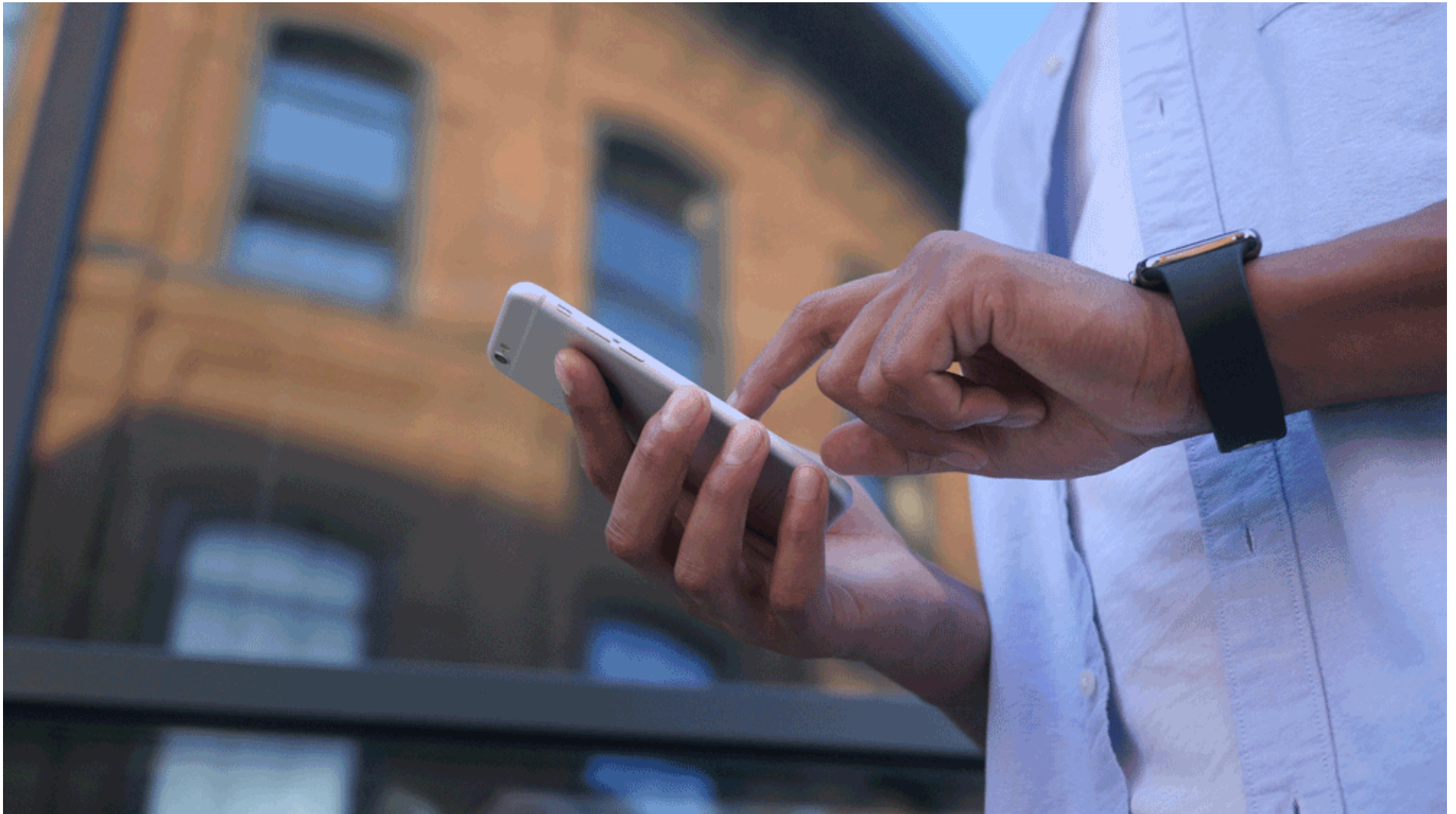
Digital Health – definition

Includes categories such as mobile health, information & communication technology, wearable devices, sensors, telehealth, personalized medicine to manage and track health and wellness related activities.

The convergence of digital technologies enhances the efficiency of healthcare delivery and makes medicine more personalized and precise.

Digital health should complement, and not replace, in-person care. It has the potential to address barriers to improve access to care.

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Digital Health – market

A rapidly maturing market:

2010-2018 – "Cute Point Solutions"

- Started with an interesting idea that became small company with a solution that occasionally got enough traction to become a real company

2018-today – "Products Informing Everyday Decisions"

- Innovation in digital therapeutics, medical devices, system-level platforms, patient-centric approaches, digital technologies are all extending the existing care model.

- Companies on the forefront of innovation are having a deeper and broader impact on the healthcare ecosystem.

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Digital Health – marketsize

DIGITAL HEALTH FUNDING
2011-2018

TOTAL VENTURE FUNDING   # OF DEALS
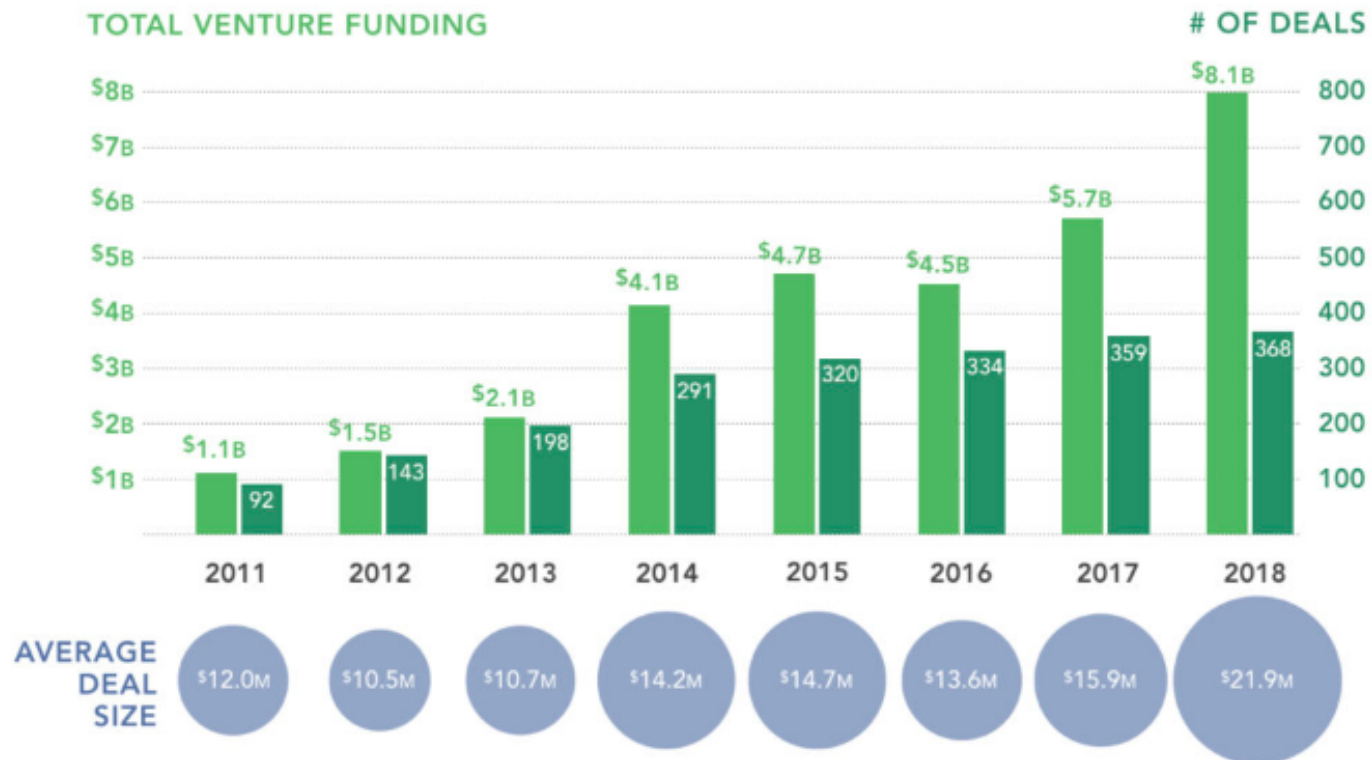
- 2018 an entrepreneurs' market – $8.1B poured into digital health with 368 deals.
- Market expected to grow to $120B in the next 4-6 years.

Digital Health – mHealth vs mRehab

mHealth – mobile health
Delivery of health care services or support for self-management of health via mobile ICT.

mRehab – mobile rehab
Delivery of rehabilitation services or support for home-/community-based rehabilitation via mobile ICT.

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What we know – trending...

- mHealth – increasingly important role in fitness, health maintenance, and healthcare delivery.

- Potential solution to management of chronic health conditions – our greatest challenge in healthcare.

- mHealth capabilities continue to grow – integration with IoT; growing sophistication of apps for behavior change; shear proliferation of apps - >325,000 at the end of 2017.

- Over 360 consumer wearable devices now available.

- Over 55% of top downloaded health apps now make use of data collected from sensors & wearables.

- Only a small subset of mHealth apps and wearables are regulated by the US Food and Drug Administration.

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What we know – population…

- Estimated 57M people with disabilities in the US in 2010. Projected to grow to 64M by 2025.

- Age-related decline likely to push numbers even higher.

- Number of people in the US aged 65 and older will grow:
  - From 48 million in 2015 to 56 million in 2020 and up to over 66 million by 2025
  - Estimated 82.3 million by 2040

- Older individuals with disability are more likely to have multiple disabilities.

What we know – disability…

- People with disabilities could benefit substantially from mHealth. Disability often associated with:

    - More sedentary lifestyles, obesity

    - Lower levels of exercise and community engagement

    - Higher prevalence of chronic health conditions (80% vs. 50%)

- People with disabilities use information and communication technologies (smartphones and apps) at rates similar to the general population (71% vs. 68% in 2014).

- But they are significantly under-represented in the growth of mHealth (34% vs 17%)

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What we know – many challenges persist…

- Rapid development in mHealth but narrow functionality and limited adherence to standards for behavior change

- Uncertain measurement accuracy/calibration of apps/sensors

- Privacy concerns

- High rates of abandonment

- Limited evidence of clinical efficacy

- Discoverability challenges

- Limited relevance for people with disabilities

- Disability focused apps account for about 2% of total

- Usability of mainstream apps unknown

What we know – LiveWell RERC survey…

Consumer Advisory Network

Documented use, satisfaction, and needs for mHealth solutions among tech-savvy people with physical, cognitive, sensory and emotional disabilities. Looked at health/wellness apps:

- Types mobile h/w apps currently used

- Ease/difficulty finding usable & effective h/w apps

- Satisfaction levels with the use of the h/w apps

- Specific problems or challenges using the h/w apps

- "Wish list" for h/w apps that currently do not exist

n=375

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What we know – some survey results…

- Types h/w apps used: 40% fitness, 27% diet, 17% lifestyle, 16% other

- Satisfaction index with h/w apps: 3.46 on 5-point scale

- Ease of finding index h/w apps: 3.25 on 5-point scale

- 26% reported difficulty in setting up and using the app consistently

- 17% reported problems with accuracy of monitoring or measurement information

- 10% reported app does not adequately account for disability – (e.g., needs to be compatible with AT being used)

- 86% would use curation website for info and recommendations of mHealth apps specifically for disability

- 89% wanted curation website that provided reviews/feedback about apps from users with similar disability conditions

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What we know – our findings indicate…

- High adoption of mHealth by early adopters but also suggest that people with disabilities have substantial unmet needs.

- Few reported moderate-to-high levels of satisfaction with existing mHealth apps.

- Even fewer reported finding useful apps was easy or very easy.

- Respondents overwhelmingly supported the need for an online resource with information and recommendations for mHealth apps, including app reviews by peers with like disabilities.

- Identified "wish list" items indicated there are substantial unmet needs to be addressed.

- Problems with the accessibility and relevance of "mainstream" apps points to the need for a concerted effort toward inclusion.

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What we know – a call to action…

- As mHealth solutions proliferate, researchers, developers, and advocates must make sure the needs of people with disabilities are addressed.

- Three things are needed: 1) more relevant "mainstream" apps for health management; 2) accessibility interfaces or add-ons for mainstream apps; and 3) apps targeting specific needs of people with disabilities (e.g., pressure ulcer prevention).

- Resources are needed to assist people with disabilities in locating effective, accessible apps that address their needs.

- Research is needed to validate the effectiveness of mHealth in improving the health of all users, including those with disabilities.

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SOS Conference – Session 1

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SOS Conference – Session 2

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- **mRehab: Evaluating mobile apps for usability, engagement, and effectiveness; techniques for behavior change**
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mRehab Challenges and Opportunities

1. Growing demand for rehabilitation services
   - The Silver Tsunami – more people living longer with disability
   - Gap in available workforce – 17-28% annual growth in demand forecast thru 2030

2. Healthcare reimbursement reform
   - Rehab as an "essential (defined) benefit"
   - Bundled payment, population health management
   - Site-neutral payment for post-acute care (PAC PPS)
   - CMS billing codes for remote patient monitoring

3. Acceptance by patients, providers, healthcare systems
   - Comfort with technology
   - Incorporation into clinical workflow
   - Reimbursement challenges
   - Evidence of effectiveness and ROI

mRehab Challenges and Opportunities

1. Solving inefficiencies in outpatient rehabilitation

   – Capacity vs function

   – Technology as the bridge between visits – the "hamburger helper" of outpatient rehab

2. Solving geographic and economic barriers to access

   – Remote monitoring and support

   – Remove transportation barriers

3. Greater patient autonomy and control over outcomes

   – Improved motivation, adherences, and engagement

   – More rapid progression in therapy

Provider Advisory Network

Recent survey of mHealth/mRehab:

Patient needs outside of the clinic		Survey of Providers (n=509)
Percentage of **YOUR PATIENTS** who need additional therapeutic interventions (excluding medications) **AFTER DISCHARGE** from acute care?		72.6%
Percentage of **YOUR PATIENTS** who need additional therapeutic interventions (excluding medications) **BETWEEN VISITS** to the outpatient/day program?		53.5%

February 2019

Provider Advisory Network

Use of mRehab technology		Survey of Providers (n=509)
Do you think mobile/internet technology could be effective in supporting post-acute or between-visit (outside of the clinic) therapy interventions for **YOUR PATIENTS**? *(% Yes)*		95.3%
How comfortable would you be with integrating mRehab technology into **YOUR PRACTICE**? *(% Very Comfortable or Extremely Comfortable)*		47.5%
How knowledgeable do you feel regarding current rehabilitation technology for your clinical specialty or patient population? *(% Very Knowledgeable or Extremely Knowledgeable)*		21.5%

Provider Advisory Network

Use of online/mobile coaching platform		Survey of Providers (n=509)
Are you using any ONLINE COACHING PLATFORMS to support your patients' care? *(% Yes)*		12.5%
If currently using an ONLINE COACHING PLATFORM to support patient care, what do you primarily use it for?		
■ Patient education		9.3%
■ Progress tracking		7.0%
■ Reminders and nudging		6.2%
■ Motivational messaging		4.7%
■ Care management		3.6%
■ Goal setting		2.8%
■ Direct voice and video communication		2.8%

February 2019