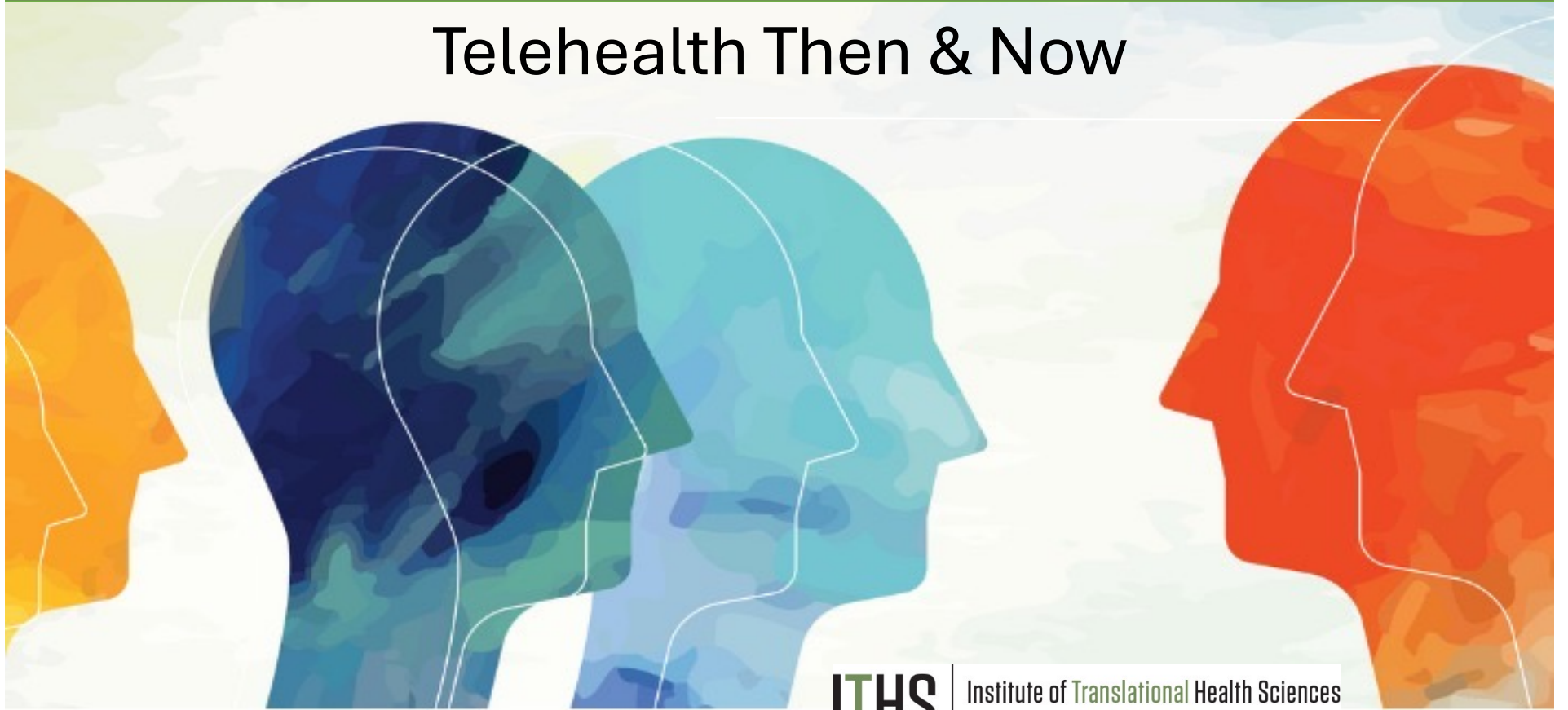


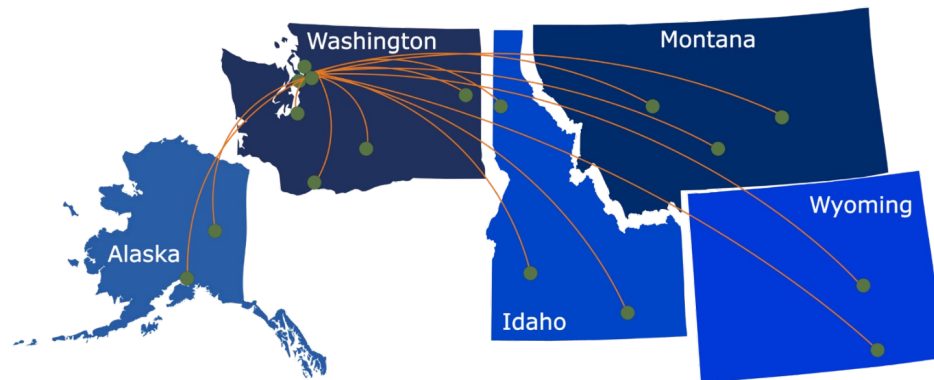
Career Development Series 2024

Telehealth Then & Now



ITHS

Institute of Translational Health Sciences
ACCELERATING RESEARCH. IMPROVING HEALTH.



What We Offer:

- 1 Research Support Services:** Members gain access to the different research services, resources, and tools offered by ITHS, including the ITHS Research Navigator.
- 2 Community Engagement:** Members can connect with regional and community based practice networks
- 3 Education & Training:** Members can access a variety of workforce development and mentoring programs and apply for formal training programs.
- 4 Funding:** Members can apply for local and national pilot grants and other funding opportunities. ITHS also offers letters of support for grant submissions.

Feedback

At the end of the seminar, a link to the feedback survey will be sent to the email address you used to register.

Telemedicine 2.0 Series

Date	Session	Title
	Session 1	Telemedicine 2.0: How Is It Relevant to Me? (Pre-recorded video available)
Sept. 25, 2024	Session 2	Telehealth Then and Now
Oct. 1, 2024	Session 3	Telemedicine Regulatory Issues: Licensing, Standards of Practice, Billing, and Reimbursement
Oct. 8, 2024	Session 4	Protecting Privacy and Maintaining Security in Telemedicine
Oct. 15, 2024	Session 5	The Entrepreneur's Perspective on Telemedicine Technology and Tools Development
Oct. 24, 2024	Session 6	Digital Inclusion and Access to Care by Telemedicine

More details at: https://www.iths.org/event/telemedicine-then-and-now/?instance_id=1372

Telemedicine 2.0 Series – Learning Objectives

At the end of the series, participants will be able to:

- 1** Identify opportunities to improve remote patient care
- 2** Identify security and privacy risks associated with telemedicine technologies
- 3** Mitigate introduction of disparities in access to clinical care

Career Development Series 2024

"Telehealth Then & Now"

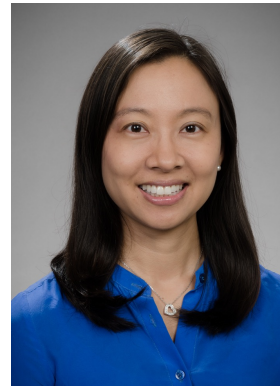
Telemedicine 2.0 Series: Session 2

Presented by:

**John Scott,
MD, MSc, FIDSA**



**Cindy Lin,
MD, FACSM, FAAPMR**



Career Development Series 2024

Disclosures

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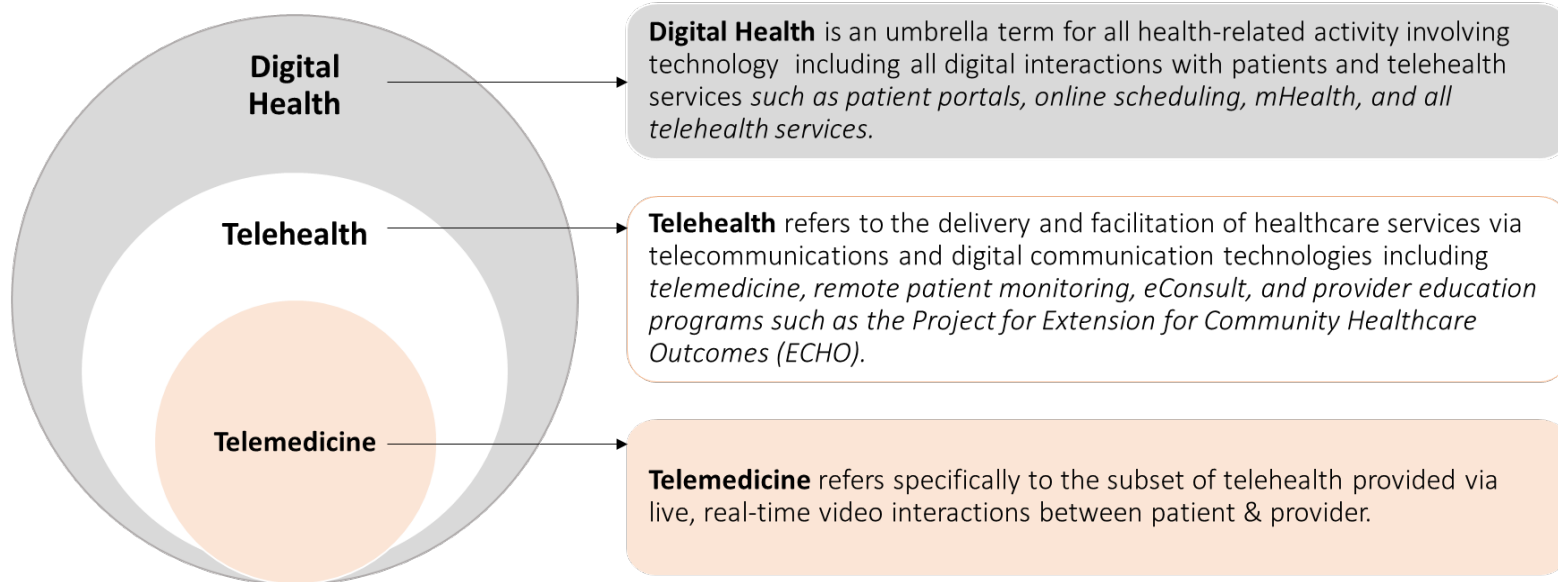
Session 2 Learning Objectives

At the end of the session, participants will be able to:









- 1** Identify and describe basic overall clinical, regulatory, and business concepts underlying telehealth/telemedicine and device-related digital health, including how the two areas are generally related to or different from each other.
- 2** Identify and describe different modalities for delivery of telehealth services
- 3** Identify and describe unique challenges in the adoption of telehealth in rural areas

Definitions: Digital Health, Telehealth and Telemedicine

The terms **telemedicine** and **telehealth** are often used interchangeably, however there are differences.

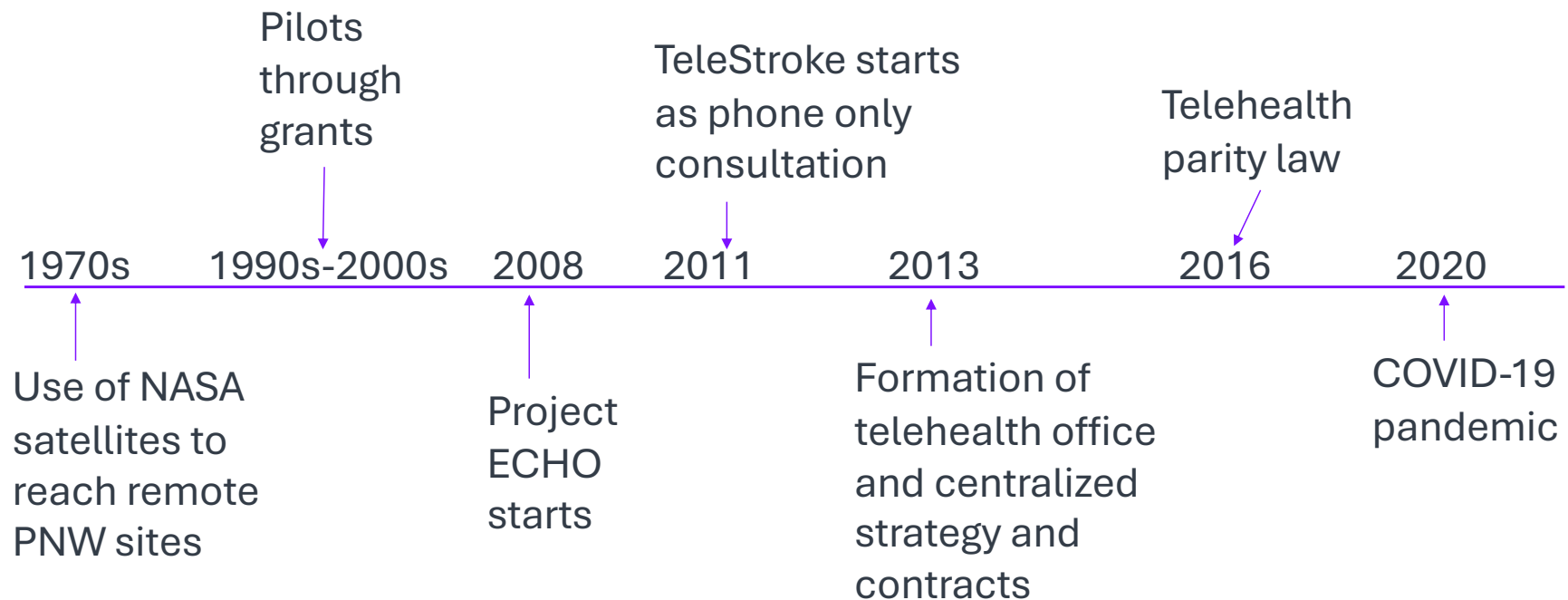


Types of Telehealth

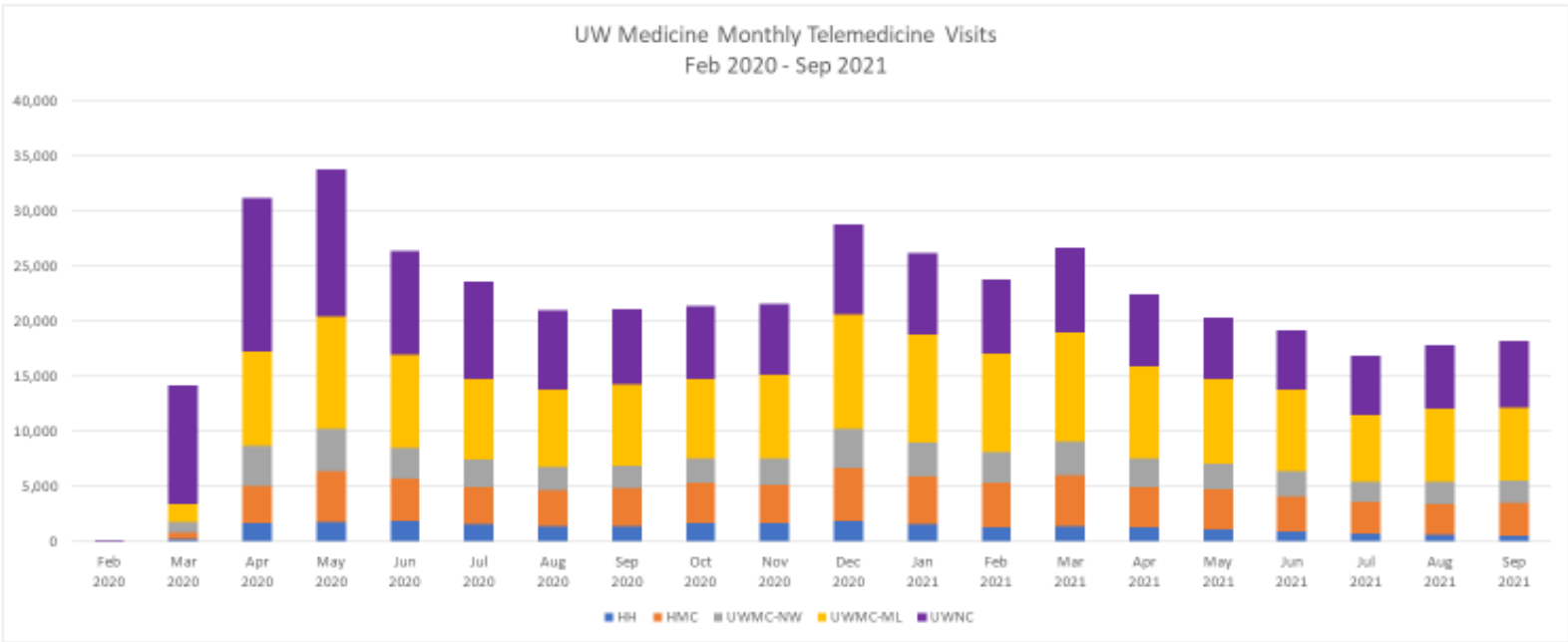
 Live Video and Chat "Synchronous"	 Store-and-Forward "Asynchronous"	 Remote Patient Monitoring	 mHealth	 Provider Education
<p>Medical devices and communication technology to deliver healthcare remotely</p> <p>Examples: TeleStroke, TelePsychiatry</p>	<p>Provider-provider or provider-patients consults that include data storage, transfer, review and response</p> <p>Examples: eConsults, e-visit questionnaires</p>	<p>Health data collected from an individual and transmitted electronically to a provider</p> <p>Examples: Blood glucose or blood pressure monitoring from home</p>	<p>Use of mobile and wireless devices to improve health outcomes, services and research</p> <p>Examples: medical apps, decision support, data collection</p>	<p>Remote case review to upskill providers and peers working in rural and urban communities</p> <p>Examples: Project ECHO for HIV or Hepatitis C</p>
				
				
				



History of Telehealth at UW

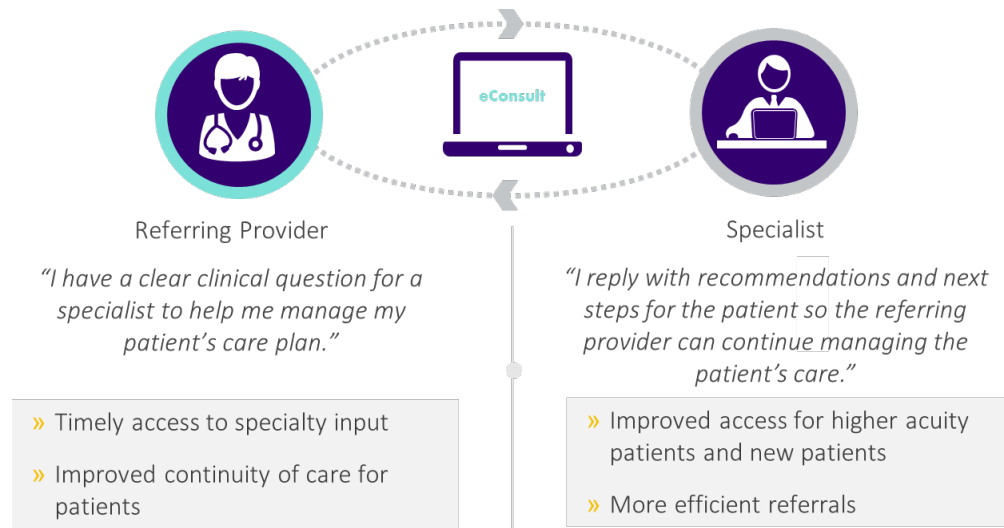


UW Medicine COVID-19 Telehealth Response



eConsults Program

eConsults are a **cost-effective** solution to **improve access** to specialty care



eConsults

- Secure written exchange between providers
- Condition-specific templates
- Include relevant labs, tests, images
- 3 business day turnaround

Impact

- Over 40,000 eConsults completed since 2016

Live Specialties at UW Medicine

- Allergy, Cardiology, Dermatology
- Endocrinology, Gyn, Heme
- Infectious Dis, Renal, Neuro
- Psychiatry, Pulmonary, Rheum
- Urology, Wt loss, Palliative Care

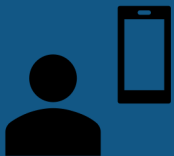
eConsults

- Improved access by 30% for first 4 specialties
- Helps PCPs to work at top of their license
- Support collaborative care model
- Reimburse both requesting provider and responding specialist 0.7 rVU
 - CMS, WA Medicaid and most commercial insurance companies reimburse
- Leverages electronic medical record
- Currently only available within UW Medicine system

Source: Gaye M, Mehrotra A, Byrnes-Enoch H, et al. Association of eConsult Implementation With Access to Specialist Care in a Large Urban Safety-Net System. JAMA Health Forum 2021, 2(5):e210456.doi: 10.1001/jamahealthforum.2021.0456

Asynchronous Psychiatry

Synchronous Telepsychiatry



Asynchronous Telepsychiatry

Step 1: Provider refers patient to telepsychiatry

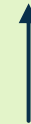


Step 4: Psychiatrist sends consult note with treatment recs to PCP

Step 2: A video of the patient interview is recorded



Step 3: Video & history sent to consulting psychiatrist



Solid Literature to Support Concept

JOURNAL OF MEDICAL INTERNET RESEARCH

Yellowlees et al

Original Paper

Clinical Outcomes of Asynchronous Versus Synchronous Telepsychiatry in Primary Care: Randomized Controlled Trial






Peter M Yellowlees¹, MBBS, MD; Michelle Burke Parish¹, MA, PhD; Alvaro D Gonzalez¹, MA; Steven R Chan^{2,3}, MBA, MD; Donald M Hilty⁴, MD; Byung-Kwang Yoo⁵, PhD, MD; J Paul Leigh⁵, PhD; Robert M McCarron⁶, DO; Lorin M Scher¹, MD; Andres F Sciolla¹, MD; Jay Shore⁷, MD; Glen Xiong¹, MD; Katherine M Soltero⁸, LCSW; Alice Fisher⁵, BA; Jeffrey R Fine⁵, MPH; Jennifer Bannister¹, EdM; Ana-Maria Iosif⁵, PhD

A Pilot Randomized Trial of Asynchronous and Synchronous Telepsychiatry in Skilled Nursing Facilities

Glen L. Xiong, MD • Ana-Maria Iosif, PhD • Haley T. Godwin, BS • Murtaza Khan • Michelle B. Parish, MA • Peter Yellowlees, MD • Debra Kahn, MD • [Show less](#)

DOI: <https://doi.org/10.1016/j.jamda.2018.02.007> •  Check for updates

Primary Care Physician Adherence to Telepsychiatry Recommendations: Intermediate Outcomes from a Randomized Clinical Trial

Monica K. Lieng  , Magi S. Aurora, Young Kang, Joseph M. Kim, James P. Marciniak , Steven R. Chan, Jamie L. Mouzoon , Daniel J. Tancredi, Michelle Parish , Alvaro D. Gonzalez , Lorin Scher, Glen Xiong, Robert M. McCarron, and Peter Yellowlees

Published Online: 7 Jun 2022 | <https://doi.org/10.1089/tmj.2021.0389>

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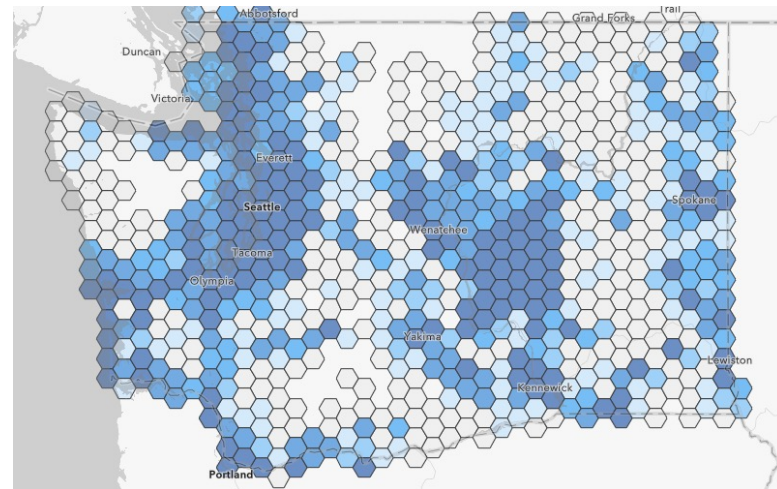
Abstract

Objective: To compare clinical recommendations given by psychiatrists and the adherence to these recommendations by primary care physicians (PCP) following consultations conducted by asynchronous telepsychiatry (ATP) and synchronous telepsychiatry (STP).

Materials and Methods: ATP and STP consultations were compared using intermediate data from a randomized clinical trial with adult participant enrollment between April 2014 and December 2017. In both study arms, PCPs received written recommendations from the psychiatrist after each encounter. Independent clinicians reviewed PCP documentation to measure adherence to those recommendations in the 6 months following the baseline consultation.

Challenges for Telehealth in Rural Areas

- Broadband Access
- Digital Literacy
- Financial Barriers
- Privacy



<https://broadband-wacommerce.hub.arcgis.com/pages/broadband-service-comparison>

Current Challenges

- Rollback of PHE and many policies are changing
- Privacy and security for mHealth
- Ryan Haight Act regulations for prescribing controlled substances
- Integration of patient-reported information into EMR
- Who owns data?
- Payment system and misalignment of incentives

Telehealth Then & Now

Cindy Lin, MD, FAAPMR, FACSM

Clinical Professor, Sports & Spine Medicine,
University of Washington Medical Center
Endowed Professorship in Sports and Exercise Medicine
Director of Clinical Innovation, The Sports
Institute

September 25, 2024



Career Development Series 2024

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Outline of Topics

1. Defining remote patient and remote therapeutic monitoring (RPM/RTM)
 2. RTM/RPM benefits, safety considerations
 3. Example of how RTM meets the clinical needs in rehabilitation and physical activity support
 4. Intro to Teleradiology
-

The Digital Health Market is Expanding Rapidly

Mobile Health

Wellness, fitness trackers and nutrition apps

Digital Therapeutics (DTx) deliver medical interventions to patients using evidence-based, clinical software to treat, manage, and prevent conditions.

The global DTx market is projected to increase from \$5.8 billion to \$56 billion by 2025.

Telehealth

Telemedicine visits
Remote patient monitoring
Remote therapeutic monitoring
Teleradiology

Health Information Technology

Electronic health records

Devices, Sensors and Wearables

Wearable and wireless devices

Personalized Healthcare

Predictive analysis

Telehealth: The Role of Remote Monitoring

- . Monitor important health metrics in the home setting for chronic or post-acute care conditions
- . Helps address some barriers to access and transportation for patients and enables healthcare in the home and community setting.

Timeline of the Expansion of Remote Monitoring

History of RTM

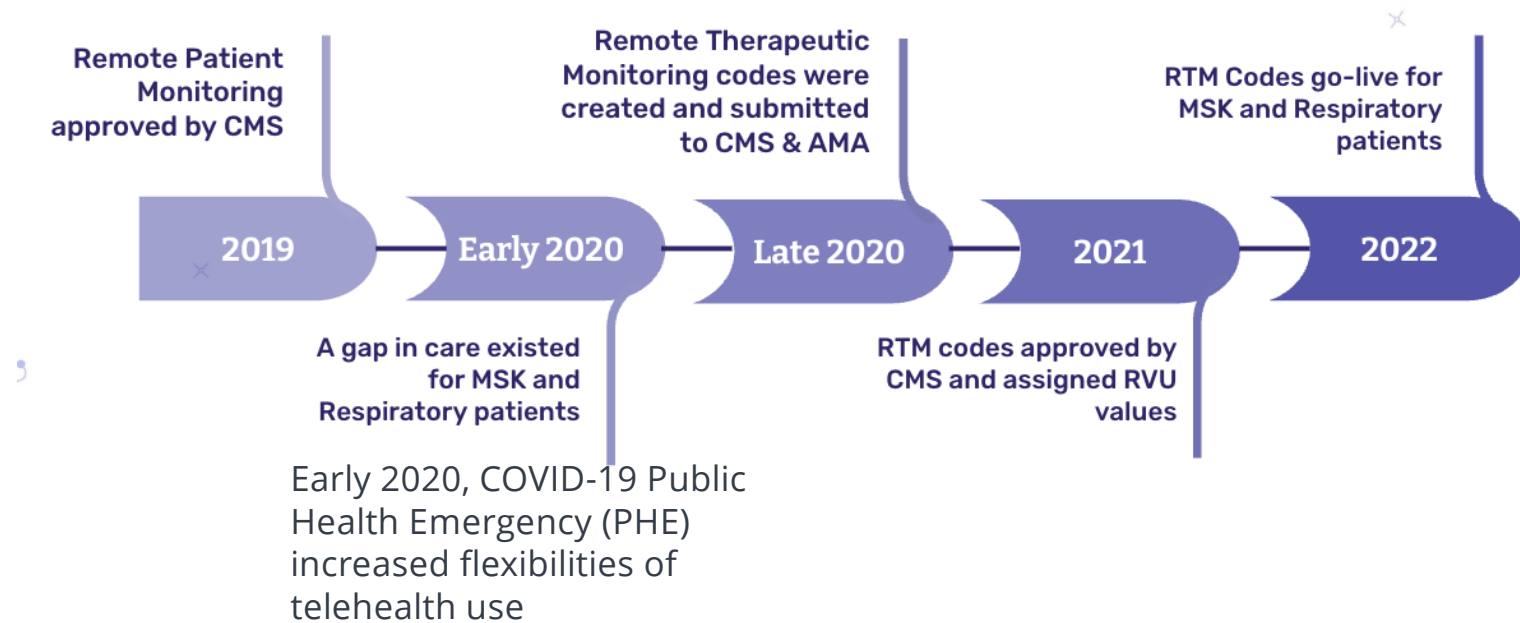
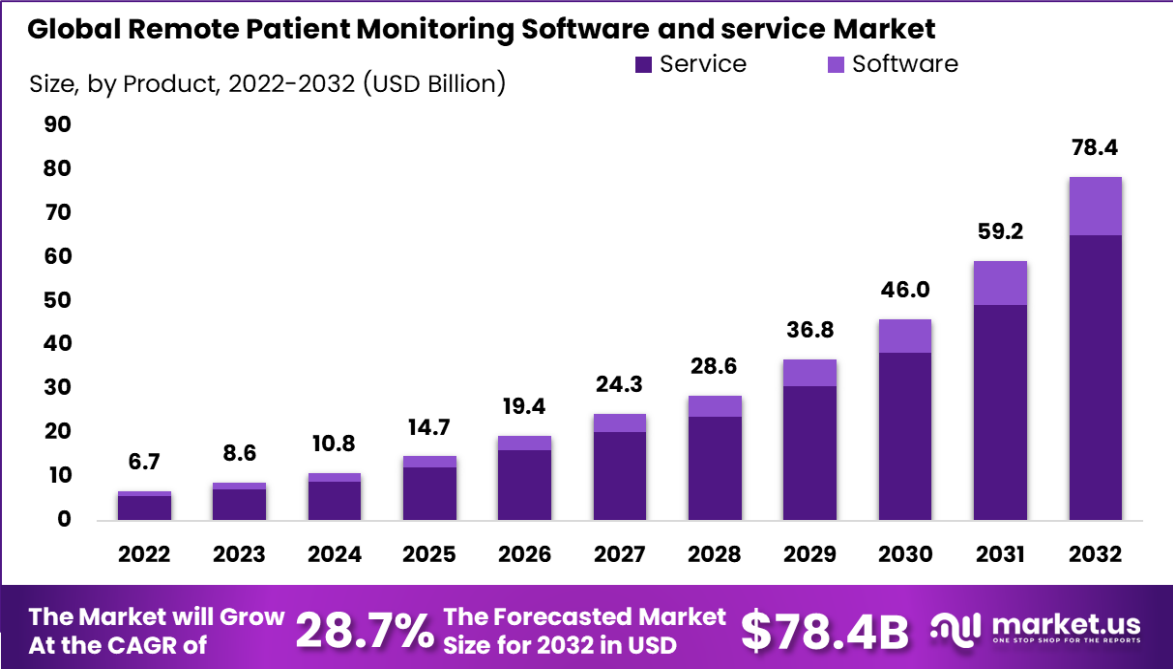


Figure credit: [Remote Therapeutic Monitoring Explained \(limberhealth.com\)](https://limberhealth.com)

Remote Monitoring Market Size



Definition: Remote Patient Monitoring (RPM)

- RPM (P=Patient or Physiologic) is collecting and analyzing *physiological* data from patients via an approved, connected medical device and used to develop and manage a condition
 - Data: weight, blood pressure, blood glucose, pulse, temperature, oximetry, respiratory flow rates, and more
 - Conditions: High blood pressure, diabetes, obesity, heart conditions, chronic obstructive pulmonary disease, sleep apnea, asthma, other

Devices used for RPM

- Weight scales
- Pulse oximeters
- Blood glucose meters (continuous glucose monitoring)
- Blood pressure monitors (self-measured)
- Sleep apnea monitors
- Heart monitors
- Fetal heart rate and movement monitors

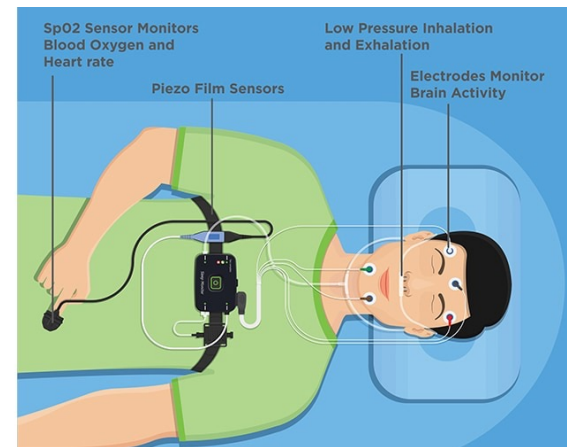
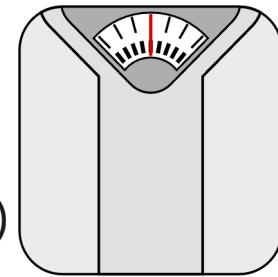


Image credit: <https://www.wired.com/gallery/the-best-continuous-glucose-monitors/>
<https://www.te.com/en/whitepapers/sensors/sensors-for-sleep-apnea-equipment.html>

Reimbursement for RPM



CPT Code	Requirement	Provider
99453	Initial set up and patient education on use of equipment	Clinical Staff
99454	Device supply with daily recording or programmed alert transmission each 30 days	Clinical Staff
99457	Interpretation of data and interactions with patient requiring 20 mins/month	Clinical Staff
99485	Interpretation of data and interactions with patient requiring 20 mins/month Used in conjunction with 99457 for additional mins/month	Clinical Staff
99091	Collection and interpretation of physiological data requiring 30 mins per 30 days	Physician/QHCP

Image credit: Remote patient monitoring: the future of healthcare? - PharmaTimes, [2021 Medicare Coverage of Remote Physiologic Monitoring \(RPM\) \(aamc.org\)](#)

Definition: Remote Therapeutic Monitoring (RTM)



- RTM is a method of monitoring non-physiological data from patients via an approved, connected medical device.
- RTM can monitor therapeutic interventions with the use of telehealth sessions, mhealth applications, or wearable technology
- RTM covers musculoskeletal or respiratory system, motion sensor tracking, cognitive behavioral therapy, pain, and therapy (medication) adherence and response.

RTM Collects Non-Physiological Data

- Data such as pain level, therapy/medication adherence, therapy/medication response, and self-reported data can be evaluated.
- RTM requires the use of an FDA-approved medical device but it can include self-reported data received through an app or web-based platform.
- RTM codes allow for wider practitioner eligibility: including physicians, NP's, PA's, nurses, physical therapists, occupational therapists, speech language pathologists and clinical psychologists.

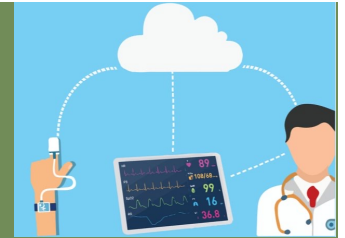
RTM Billing Codes

Table A

CPT® Code	Code Description	Timing
98975	Remote therapeutic monitoring (eg, therapy adherence, therapy response); initial set-up and patient education on use of equipment	Report once per episode of care for monitoring of 16 days or more. Report only once, even if monitoring exceeds 30 days.
98976	Remote therapeutic monitoring (eg, therapy adherence, therapy response); device(s) supply with scheduled (eg, daily) recording(s) and/or programmed alert(s) transmission to monitor respiratory system, each 30 days	Report once per 30-day period for monitoring of 16 days or more.
98977	Remote therapeutic monitoring (eg, therapy adherence, therapy response); device(s) supply with scheduled (eg, daily) recording(s) and/or programmed alert(s) transmission to monitor musculoskeletal system, each 30 days	Report once per 30-day period for monitoring of 16 days or more.
98978	Remote therapeutic monitoring (eg, therapy adherence, therapy response); device(s) supply with scheduled (eg, daily) recording(s) and/or programmed alert(s) transmission to monitor cognitive behavioral therapy, each 30 days	Report once per 30-day period for monitoring of 16 days or more.
98980	Remote therapeutic monitoring treatment management services, physician or other qualified health care professional time in a calendar month requiring at least one interactive communication with the patient or caregiver during the calendar month; first 20 minutes	First full 20 minutes (no increments) per calendar month Must include one interactive communication with patient or caregiver.
+98981	. . . each additional 20 minutes (List separately in addition to code for primary procedure)	Report with 98980 for each additional full 20 minutes (no increments).

<https://www.aapc.com/blog/87433-know-when-to-bill-for-rtm-services/>

RTM Examples



Musculoskeletal

Physical therapy monitoring

Fall detection and prevention

Pain, exercise adherence, fatigue, and strength tracking

Respiratory

Spirometers

Inhalers

Sleep monitors

Cognitive

Tracking mental health, anxiety, depression symptoms and related factors.

Medication adherence

Potential Benefits of Remote Monitoring for Patients & Providers

Patients	Providers
Improved Chronic Disease Management Continuous monitoring allows for early detection of abnormalities, potentially reducing the risk of complications.	Efficient Healthcare Delivery Healthcare providers can efficiently manage a large panel of patients
Enhanced Convenience and Accessibility Patients can receive care from home, reducing need for in person visits. This is beneficial for those with mobility issues or in remote areas.	Timely Intervention and Reduced Hospitalizations
Increased Patient Engagement By monitoring their health metrics, patients become more aware of their health	Enhanced Medication Adherence
Empowerment in Self-Care RPM provides them with valuable insights and encourages informed medical decisions	Streamlined <u>Chronic Care Management</u>
Better Quality of Life	Integration into Healthcare Systems

Patient Safety Considerations with Remote Monitoring

Risks to Patients



- Failure to identify when patients need attention
- Device or tech related challenges
- Inaccurate data collection and risk of misdiagnosis
- Data security and privacy considerations

Organizational Solutions & Strategies



- **Patient selection:** Protocols for identifying appropriate patients to use RPM.
- **Triage and escalation protocols** so that abnormal results are addressed by staff. Thresholds for flagging abnormal results
- **Tech support/device management**
- **Managing data volume & interpretation,** how it will be integrated with EHR and clinical workflow
- **Education and training provider & patient**

Unmet Needs of Rehabilitation & Potential for RTM

Home exercise compliance relies largely on self-report

Challenges with self-report: Accuracy, inefficient data collection, data interpretation by clinicians, how to translate to actionable insights

Newer technologies require wearables – can be costly and associated with accessibility barriers



Work-out Log	
A -- NuStep (machine -- leg and arm pump - 8-10 min)	
B -- Sit/stand (10 reps)	10/25 -- A
C -- Stretch band (standing)	10/28 -- A
D -- Stretch band (sitting, knees 24reps)	10/30 -- A
E -- Walking (10 min plus)	
09/06 -- B,C, D, E	
09/09 -- A	
09/10 -- A, B, E	
09/12 -- A	
09/13 -- A, B, D, E	
09/14 -- A, D, E	
09/16 -- A, D, E	
09/18 -- D, E	
09/20 -- A, C, D	
09/21 -- A, D, E	
09/23 -- A	
09/24 -- A, E	
09/26 -- A, E!	
09/27 -- D, E	
09/30 -- A, D, E	
10/01 -- A, D	
10/02 -- E!	
10/03 -- D, E	
10/04 -- A, B, D, E	
10/07 -- A, B, D, E	
10/08 -- A, D, E	

Image credit: [MyndVR Launches MyndVR at Home to Aid Seniors Aging in Place - Rehab Management \(rehabpub.com\)](https://rehabpub.com)

Digital Rehabilitation Platforms

Require VR Headsets

- MyndVR
- XR Health

Computer Vision Technology

- Kaia
- Fittonic

Utilize GPS Tracking

- Altis

Require Wearable Sensors

- Hinge Health
- SWORD Health

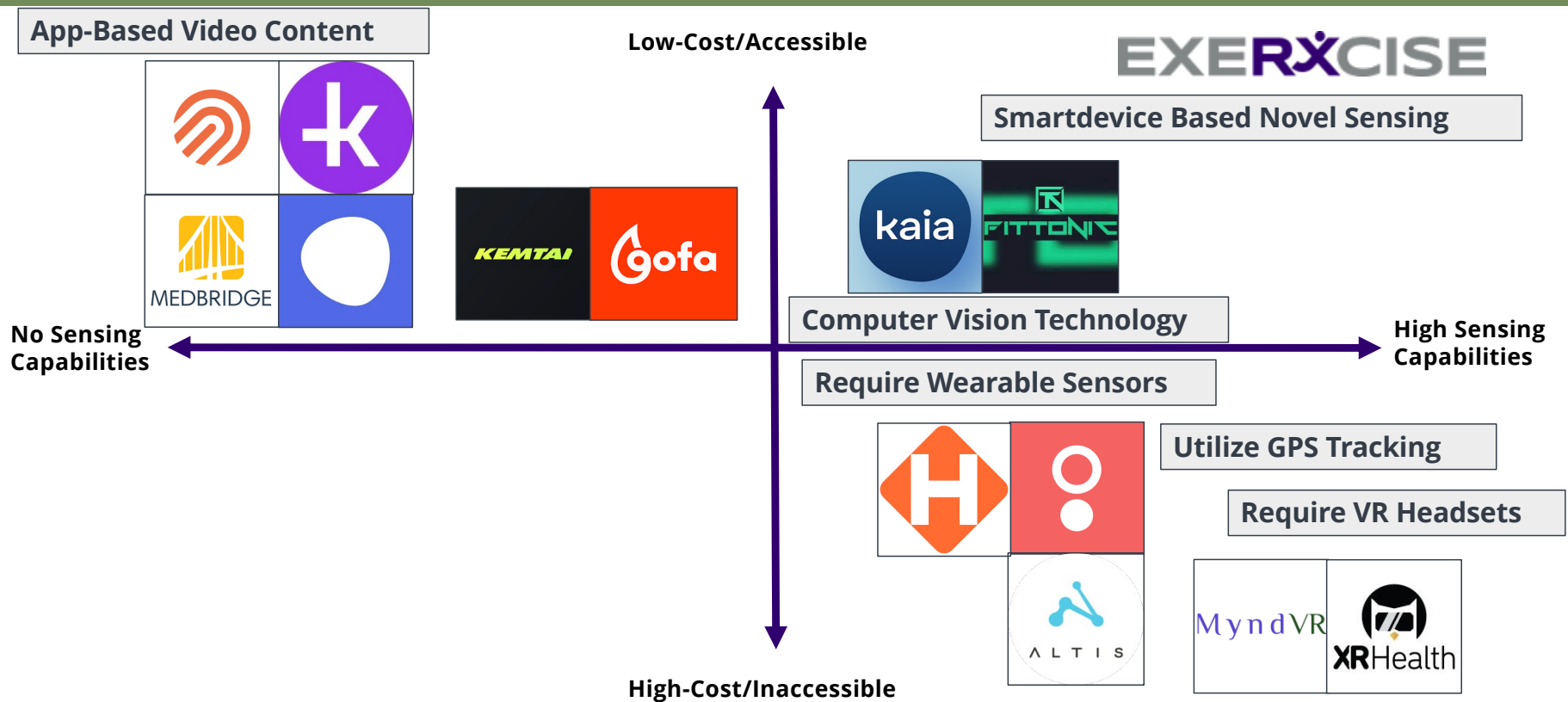
Camera-Based Motion Capture

- Kemtai
- GOFA

App-Based Video Content

- MedBridge GO
- Ventrk
- Omanda Health
- Kii

Digital Rehabilitation Platforms



What Makes ExerciseRx Different?

Physical Therapy



TheraCentric

KEMTAU



Physical Activity



EXI

EXERCISE

- Home exercises for physical therapy
- Progressive activity support
- EHR Integration
- Scalable patient-provider connection

ExerciseRx Team

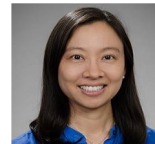


ubicomplab



Samuel R. Browd, MD, PhD
Director

- Professor of Neurological Surgery, UW
- Pediatric Neurosurgeon, Seattle Children's Hospital



Cindy Lin, MD
Director of Clinical Innovation

- Clinical Professor of Sports & Spine Medicine
- Endowed Professorship Sports and Exercise Medicine



Karla Landis, MS
Associate Director

- Chief strategist and head of operations
- Capacity building



Shwetak Patel, PhD
Endowed Professor

- Washington Research Foundation Endowed Professor
- Paul G. Allen School of Computer Science & Engineering



Otari Ioseliani, MS
Software Engineer

- Paul G. Allen School of Computer Science & Engineering, Electrical & Computer Engineering, Ubiquitous Computing Lab



Sean A. Munson, PhD
Associate Professor

- Human Centered Design & Engineering
- HCDE PhD program director



Richard Li, MS
Engineer

- PhD Candidate, Paul G. Allen School of Computer Science & Engineering, Electrical & Computer Engineering, Ubiquitous Computing Lab

ExerciseRx is a pragmatic, scalable platform developed for rehabilitation and physical activity

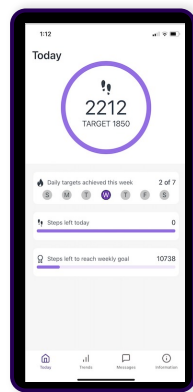
EXERCISE

Patient App

Physical Activity Data Capture



Home Exercise Sensing



Provider Dashboard



Epic



Clinically Relevant Activity Data Integration

Semi-Automated Patient Support



RTM for Rehabilitation and Physical Activity

Current Space

Variety of home exercise and rehabilitation solutions are commercially available

Generally, higher sensing capabilities are associated with increasing costs and potential user challenges

Filling a Needs Gap



Future

Considerations:
Usability & feasibility for patients and providers

Integration of AI/ML algorithms

EHR for scalability and integrating to clinical care

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TELEMEDICINE 2.0

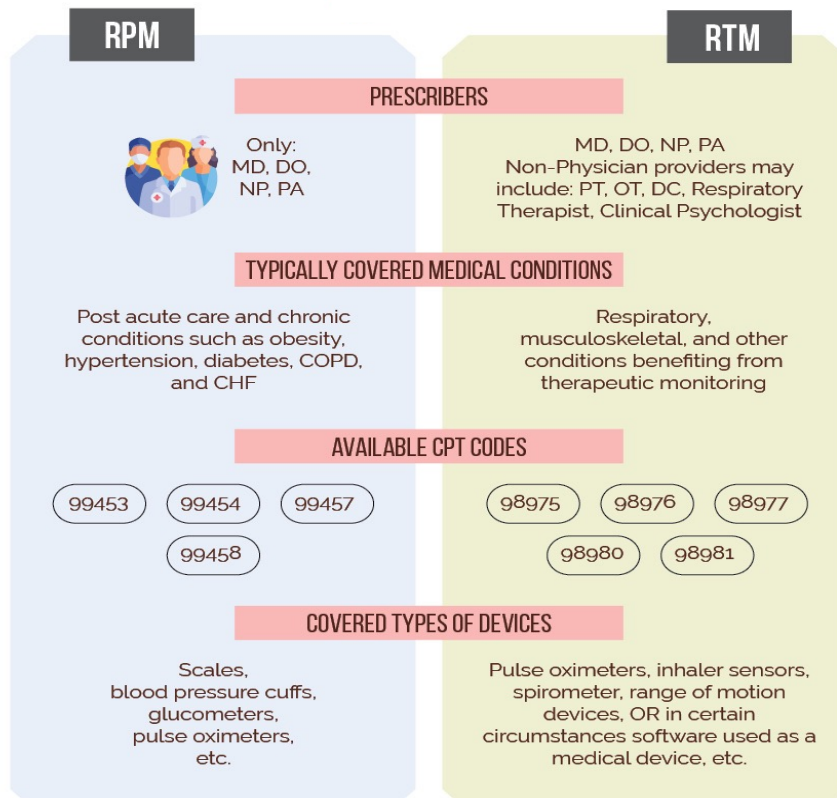
Webinar Series



SESSION 5
The Entrepreneur's
Perspective

Tuesday
10.15.24
3-4pm PDT

In Summary: RPM vs. RTM



Teleradiology



FIXED-TERM & ONGOING

Teleradiology 7 Days Work 7 Days Holiday & Repeat

See more opportunities at
[prescript.com.au/vacancies](https://www.prescript.com.au/vacancies)



PRESCRIPT



Image credit: <https://www.prescript.com.au/prescriptblog/frcr-teleradiology-global>

Definition of Teleradiology

Teleradiology is a subset of telemedicine that involves interpreting diagnostic imaging at a site geographically remote from where the image was taken.



Image credit: <https://www.otherarticles.com/press-release/healthiness/176684-teleradiology-7-benefits-for-patients-and-health-professionals.html>

Teleradiology Framework

Intramural Teleradiology

Intra-organizational

- The radiologist works for or is associated with the organization that acquires the images and cares for the patient

Extramural Teleradiology

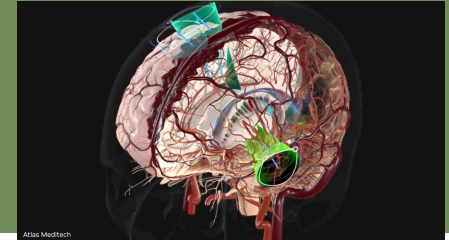
Extra-organizational

- The radiologist interpreting the image works for a radiology practice and/or corporation not affiliated with the healthcare organization acquiring the images

Teleradiology Benefits

- **Remote consultations:** Radiologists can provide interpretations of images regardless of their location
- **Efficiency:** Radiologists can review and interpret images from multiple hospital sources without being physically present, allowing for more efficient scale of image interpretation
- **Second opinions:** Sharing of images with other specialists and hospitals
- **Improved access:** Patients in rural and/or underserved areas can receive radiological assessments without having to travel distance
- **24/7 coverage** for image interpretations, critical for emergencies

Future of Teleradiology



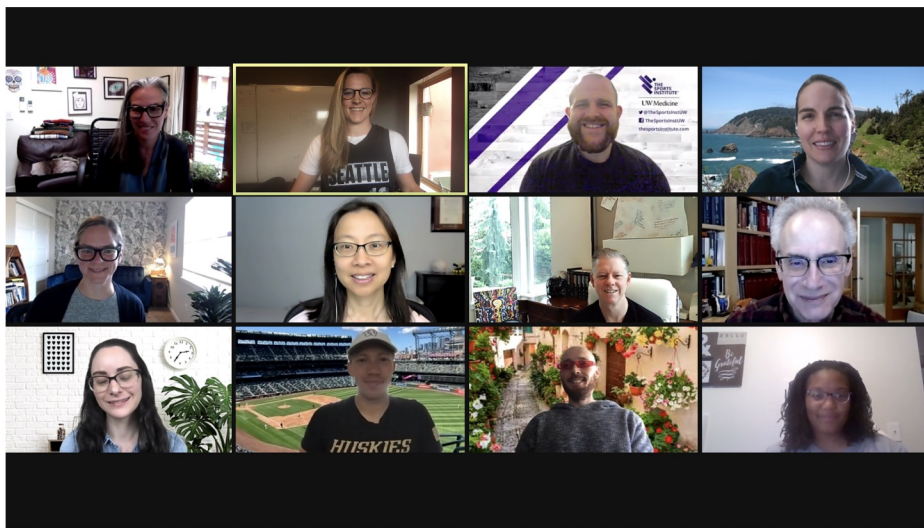
- Integration of AI/ML to augment radiologists' capabilities by assisting in image analysis, pattern recognition, and automated report generation. AI algorithms can help detect abnormalities, provide quantitative measures, and triage critical cases.
- Integration with telemedicine platforms and EHR enables real-time consultations, facilitating multidisciplinary care
- Emerging modalities such as molecular imaging, functional imaging, 3D and 4D imaging are expanding the possibilities for more accurate diagnoses.

<https://dcmsys.com/project/teleradiology-and-telehealth-in-2024/#:~:text=One%20of%20the%20key%20trends,recognition%2C%20and%20automated%20report%20generation>. Image credit: <https://developer.nvidia.com/blog/accelerate-ai-workflows-for-3d-medical-imaging-with-nvidia-monai-cloud-apis/>

Summary and Future Directions

1. Remote monitoring's future potential is significant
2. Patient, provider, and health systems barriers/facilitators can make or break adoption, scale, and sustained use.
3. Demonstrating the value and ROI of RPM and RTM is critical.
4. Future will include integration of AI/ML and help improve personalized medicine, we can help to shape that future

Thank you!



Contact: lincindy@uw.edu
www.thesportsinstitute.com



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Acknowledgements:

Tess Kadian for her assistance with this presentation

Thank You!

Open for Questions

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Feedback Survey

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Please get out your device, find that email, and spend a few moments completing that survey before you leave today.

Tip: If on a mobile device, shift view to landscape view (sideways) for better user experience.