Supporting Therapists' Practice

Using Sensor-Based Patient Arm Movement Information

University of Massachusetts
University of Maryland
Harvard Medical School

Research Goal

What Are Current Challenges?

Capacity

Learned and practiced in Rehabilitation Setting

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Performance

Transfer of learned skills in Daily Living

Research Goal

What Are Current Challenges?

How

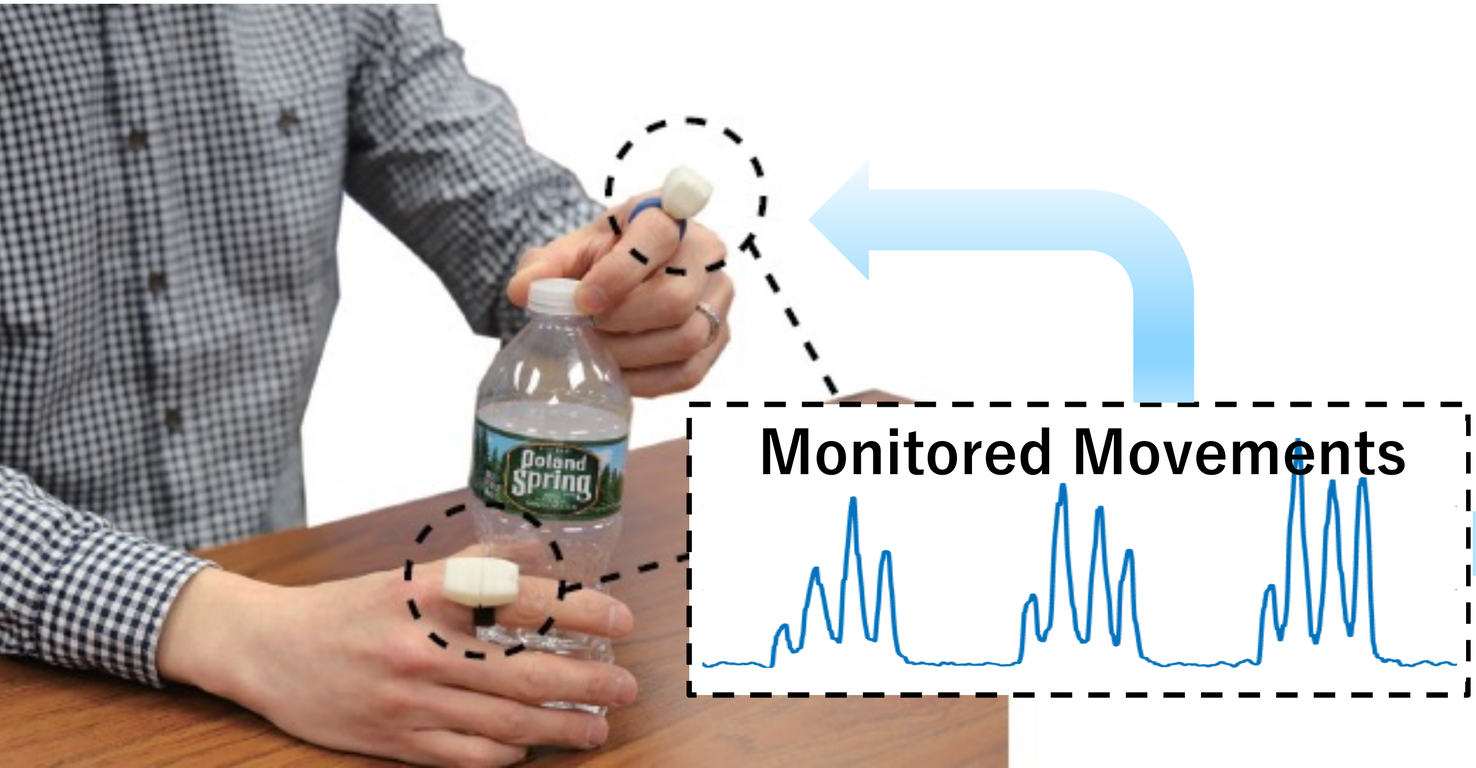
Patients

Use Their Arms

Outside Hospitals?

What Does Our Research Aim?

Encourage **Patients** to use their affected arm during activities of daily living



Monitored Movements

Help **Therapists** Monitor Patients and Personalize Therapy

Ring Sensors

What Does Our Research Aim?

Encourage **Patients** to use
arm during activities of dail

Help **Therapists**
Monitor Patients
and Personalize
Therapy

Research Goal

What Is This Study For?

- Typical practices of outpatient therapy session
- How you make use of the sensor-generated patient movement information
- How such usage affects therapy practices and their quality

Warm Up

What Is Your Typical Therapy Practice When Seeing Outpatients?

A Number of therapy sessions or patients

B Assessment of patients' function in therapy sessions (standardized tools)

C Remote follow-ups between therapy sessions

Warm Up

What Is Your Typical Therapy Practice When Seeing Outpatients?

Rehabilitation Therapy Routine

A Assess patients' motor status/recovery

B Evaluate adherence

C Identify attainable therapeutic goal

D Administer in-person rehabilitation therapy

E Prescribe home-exercise

5 Types of Movements Data

What Information Can We Provide Using Sensor Data?

Ratio —— Ratio of Affected Limb Use

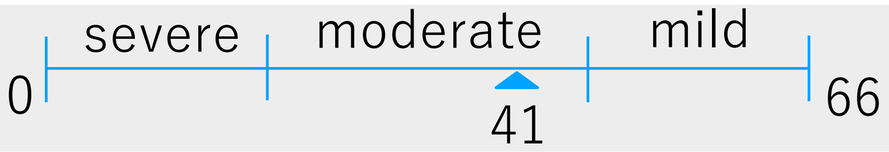
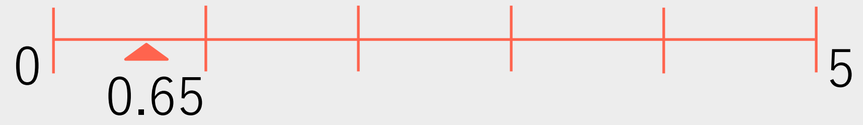
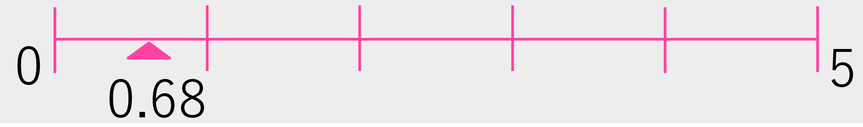
A-Duration —— Duration of Affected Limb Use

B-Duration —— Duration of Bilateral Limb Use

Patient Profile

Meet James, Our Stroke Patient

James (74)

FMA Total (Capacity)	
FMA Distal | Proximal	**19** / 42 points | **22** / 24 points
MAL Quantity (Performance)	
MAL Quality (Performance)	
Dominant & Affected Side	• Right-handed • Right hemiparesis for **11 years**
Living Patterns	• Lives with his wife • Ambulates with an ankle-foot orthosis • Driving a shuttle for living
Hobby	• Web-surfing

Ratio of Affected Limb Use

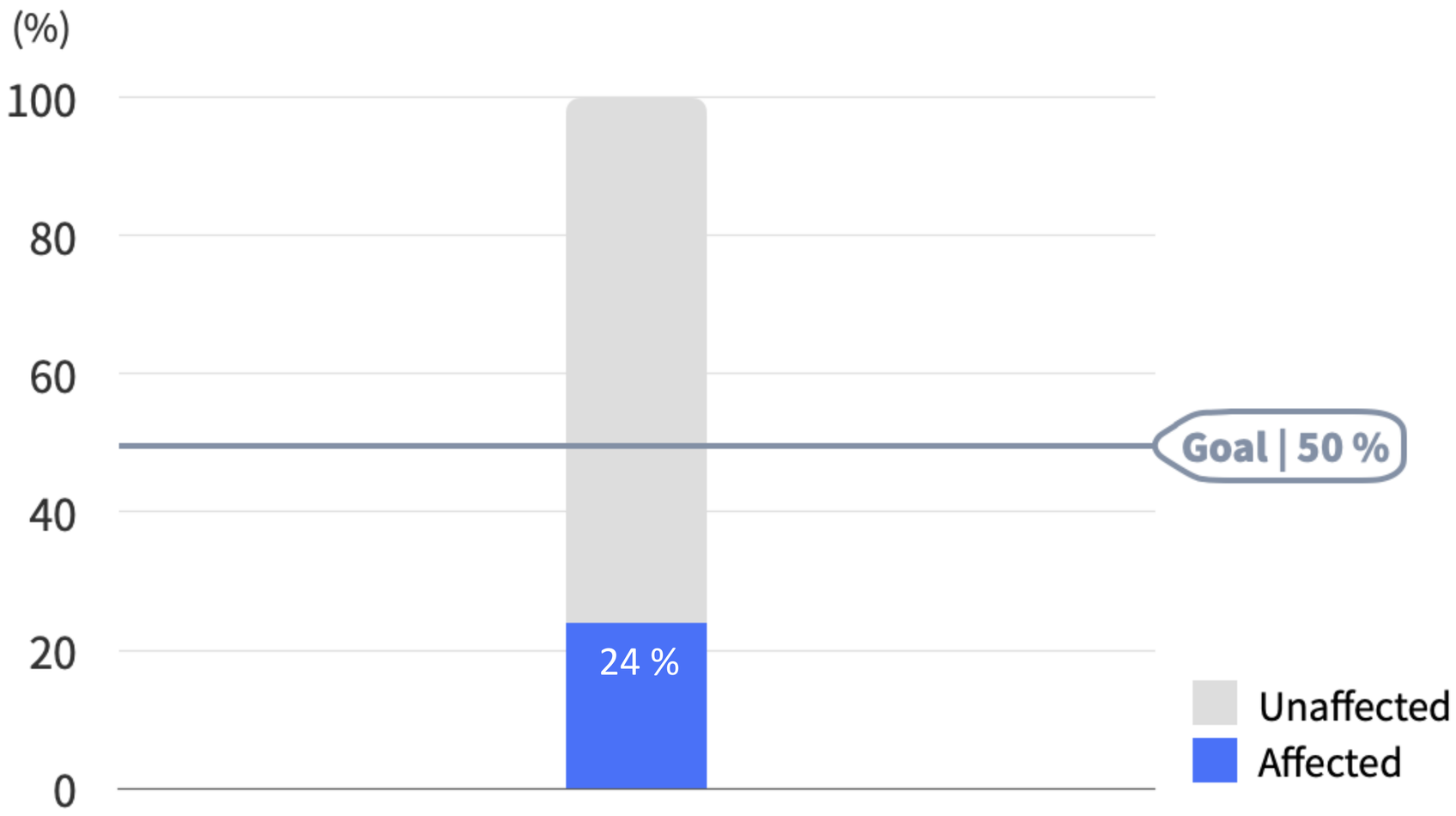
Ratio —— Ratio of Affected Limb Use

A-Duration —— Duration of Affected Limb Use

B-Duration —— Duration of Bilateral Limb Use

Ratio

Average Ratio for 2 Days

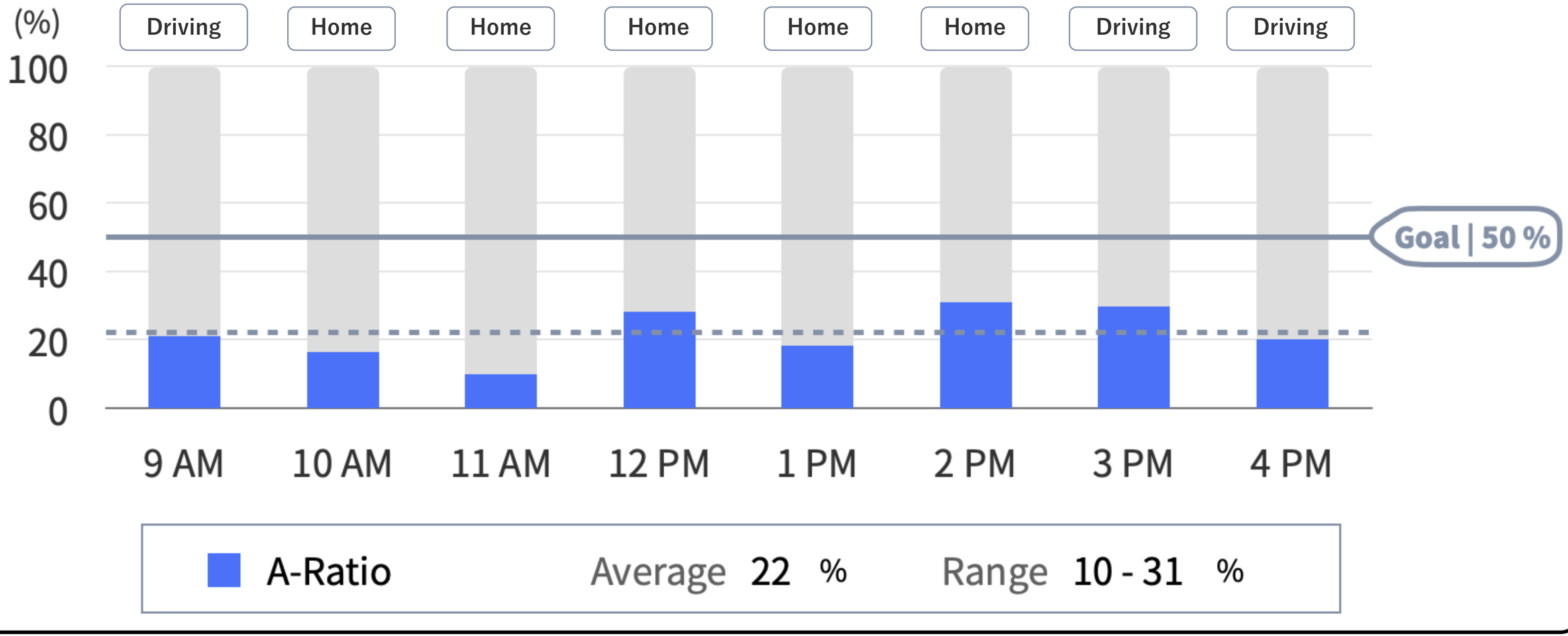


Ratio

Different Range and Granularity of Information Available

Day | Week | Month | Year

Aug 27, 2019 - Jul 31, 2020



Duration of Affected Limb Use

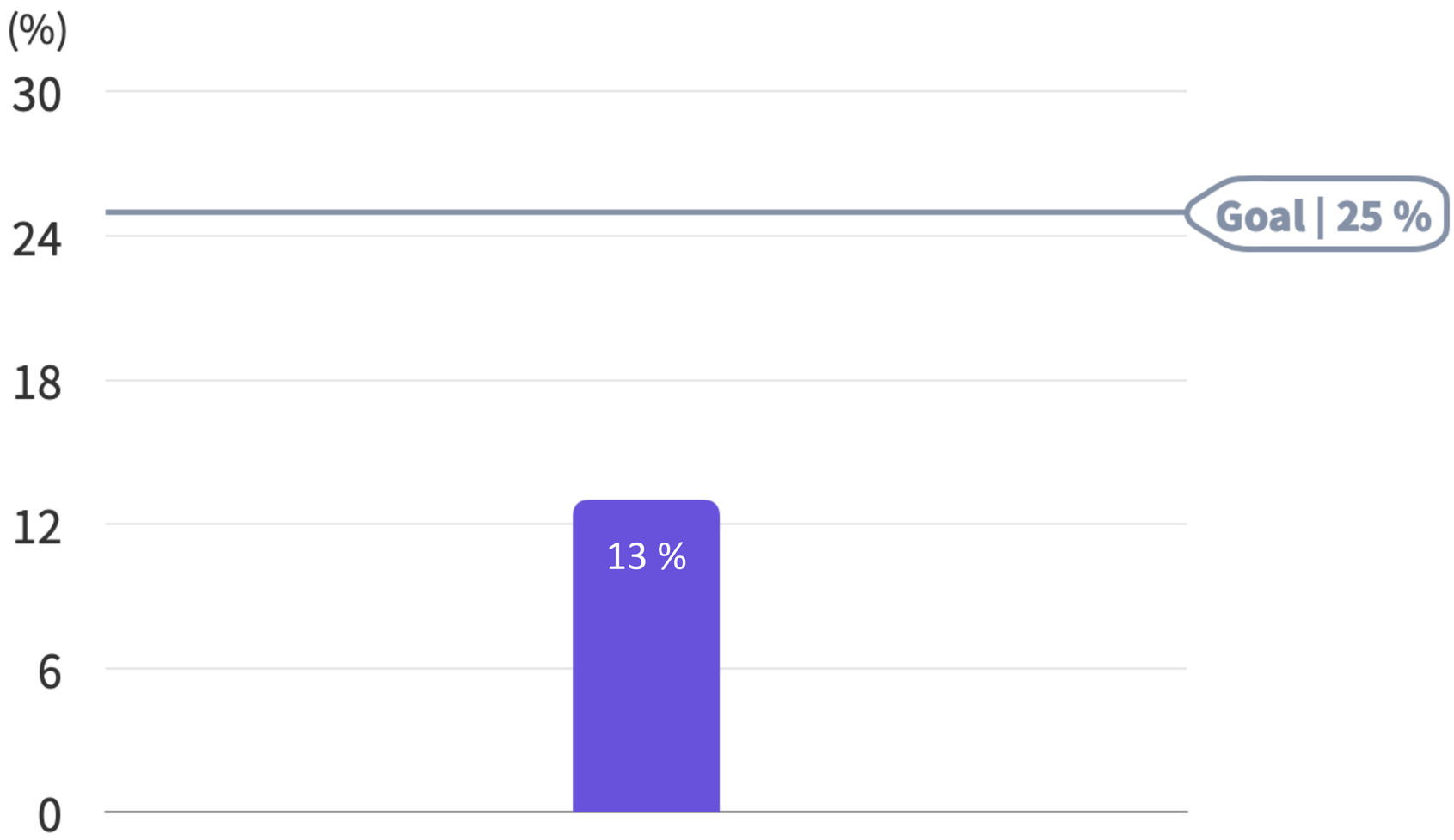
Ratio —— Ratio of Affected Limb Use

A-Duration —— Duration of Affected Limb Use

B-Duration —— Duration of Bilateral Limb Use

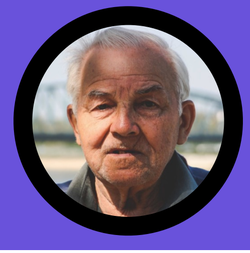
A-Duration

Average A-Duration for 2 Days



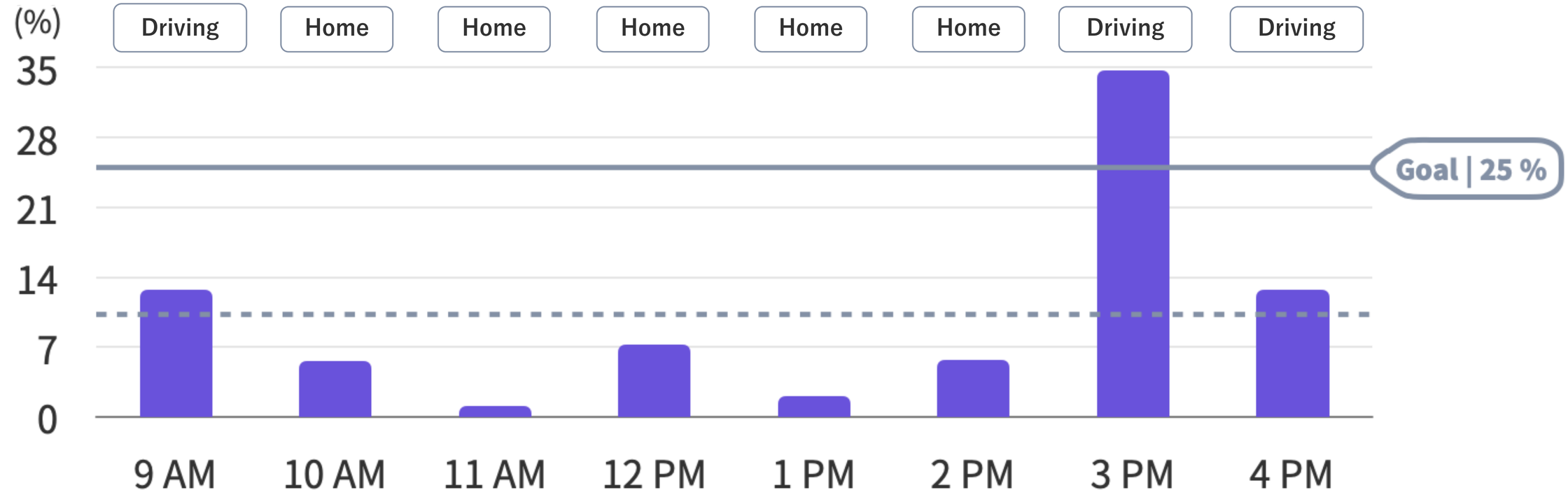
A-Duration

Different Range and Granularity of Information Available



Day | Week | Month | Year

Aug. 27 - Jul. 3, 2020



Duration of Bilateral Limb Use

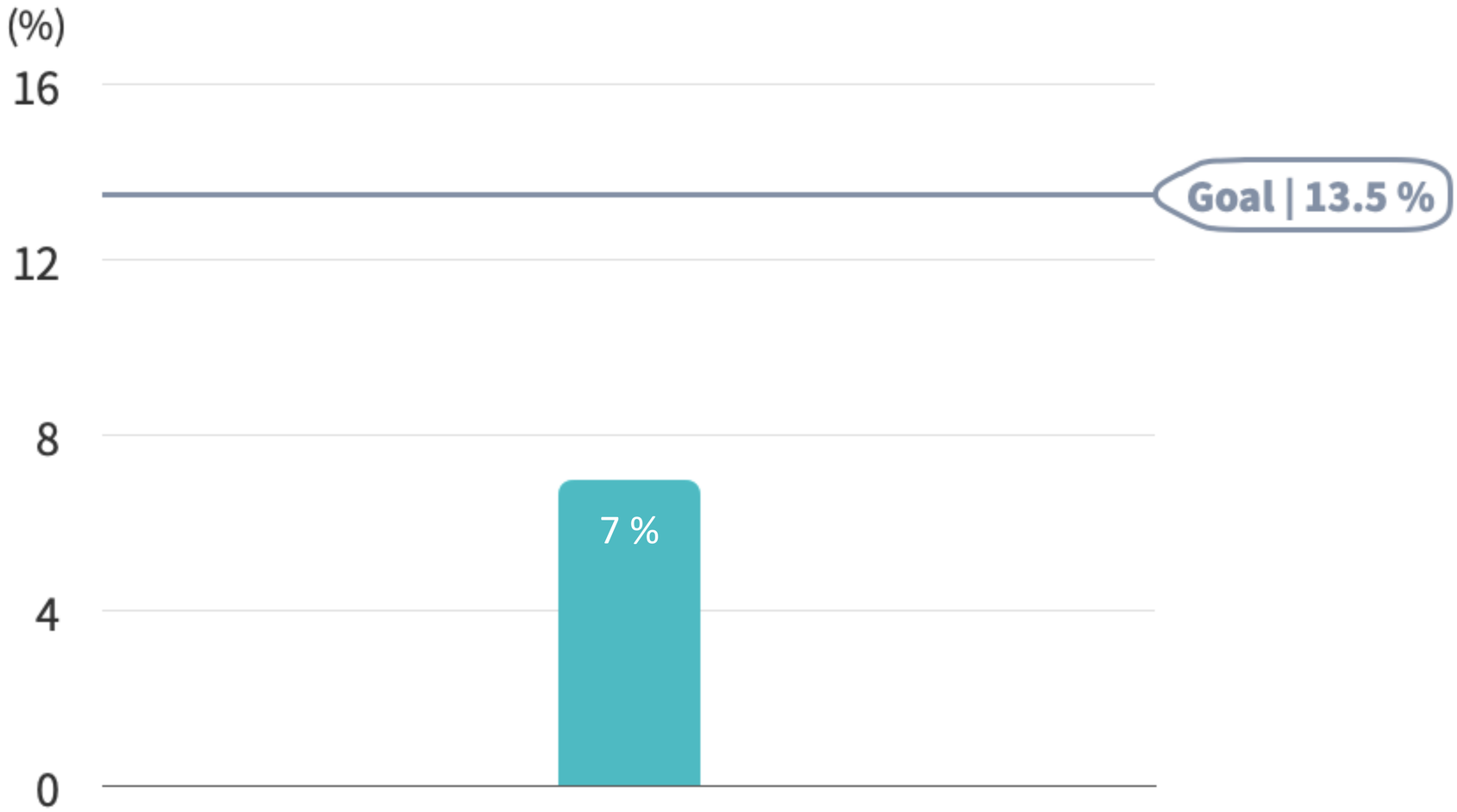
Ratio —— Ratio of Affected Limb Use

A-Duration —— Duration of Affected Limb Use

B-Duration —— Duration of Bilateral Limb Use

B-Duration

Average B-Duration for 2 Days



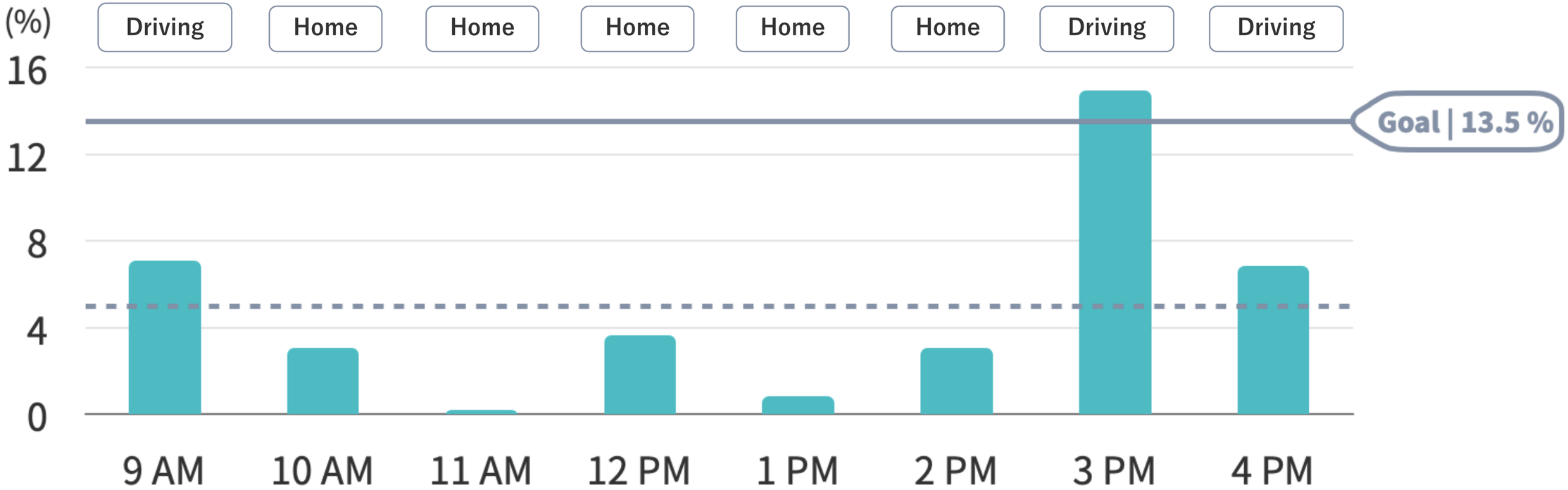
B-Duration

Different Range and Granularity of Information Available

Day | Week | Month | Year

Aug 2019 – Jul 3, 2020

Jun 27 – Jul 3, 2020



Three Different Types of Information

Ratio —— Ratio of Affected Limb Use

A-Duration —— Duration of Affected Limb Use

B-Duration —— Duration of Bilateral Limb Use

Questions

How Can Sensor-based Information Change Your Practice?

A Anticipated effects to your therapy practice

B Recommended use for patients

Appendix