



Gathering Patient-Centered Outcomes in Rehabilitation

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Outcome Assessment Challenges

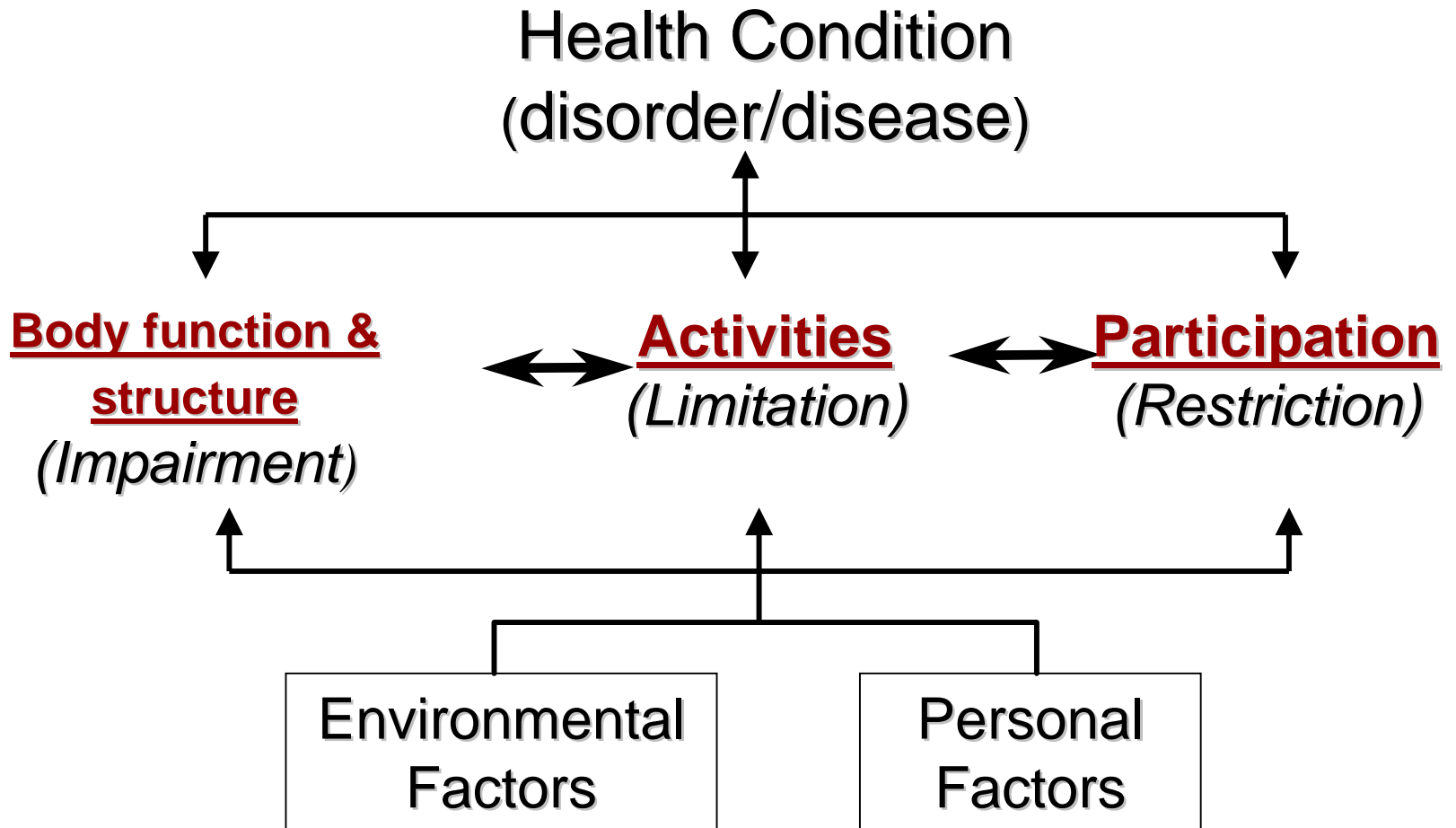
- » **Conceptual:** Clearly defining rehabilitation outcomes
- » **Operational:** Selecting psychometrically adequate measures that are feasible for use in and across settings where rehabilitation care is provided



Challenge #1: Conceptual

**Measurement protocols
must focus on distinct
rehabilitation outcomes**

The WHO's ICF Classification



Impairment-centered Outcomes

Body Function & Structure -

impairments at the level of organs or body systems

- › Hemiparesis
- › Muscle tone
- › Joint ROM



Activity Limitation Outcomes

Limitations an individual may have in executing tasks or functional tasks

- › Walking
- › Stair climbing
- › Lifting objects



Participation Restriction Outcomes

The nature and extent of a person's involvement in life situations

- » Sports
- » Employment
- » Home management





**Challenge #2:
Operational**

**Overcoming Challenges
in Measuring Patient
Outcomes**

BU's Health & Disability Research Institute (HDR)

Focus is on Patient-centered Outcomes

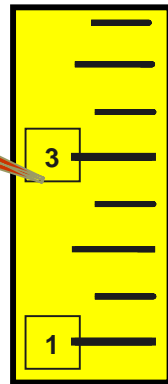
Developing contemporary outcome instruments that can be used within & across care settings



Existing Instruments are Limited

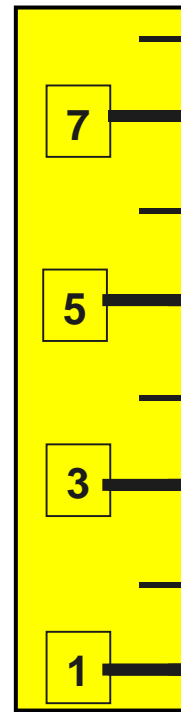
**Too
Low- Ceiling
Effect**

Example: FIM

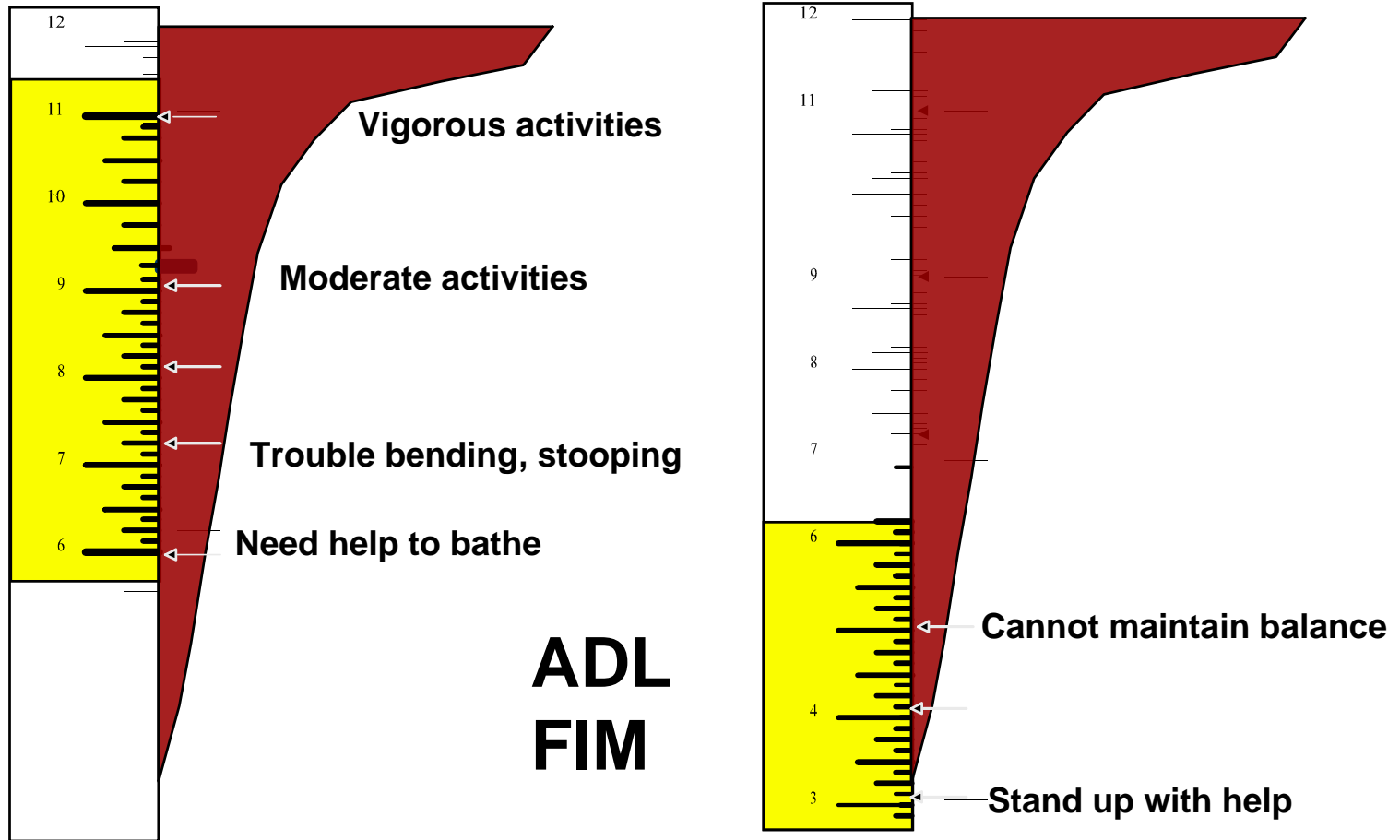


**Not Enough
Marks –
Too Noisy**

Example: SF-36



Combining Measures Increases the Range and the Measurement Burden



PF-10

**ADL
FIM**

The “Ideal” Outcome Instrument is Impractical



Ideal Ruler

Solving the Measurement Dilemma:

- » **Need many items to cover important patient-centered activities & roles across a broad continuum**
- » **Administering all items to each person is burdensome and not practical**



How to Make The Ideal Ruler Practical?

Match Questions to the Respondent

Patient scores here



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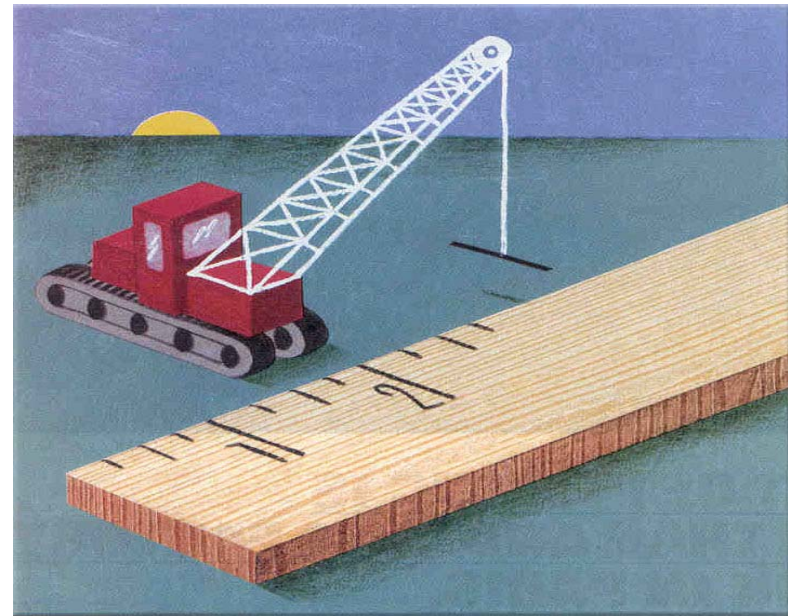


First Major Advance:

**Item Response Theory
Measurement (IRT)**

(IRT) Item Response Theory Measurement.....

- › Instrument items are selected to cover the entire continuum of an outcome.
- › Items in the pool provide different information about the outcome across the continuum.
- › Scores are calibrated to an equal interval score.
- › Reliability & precision are estimated across the continuum
- › Provides the foundation for Computer Adaptive Testing





Second Major Advance:

**Computer Adaptive
Testing (CAT)**

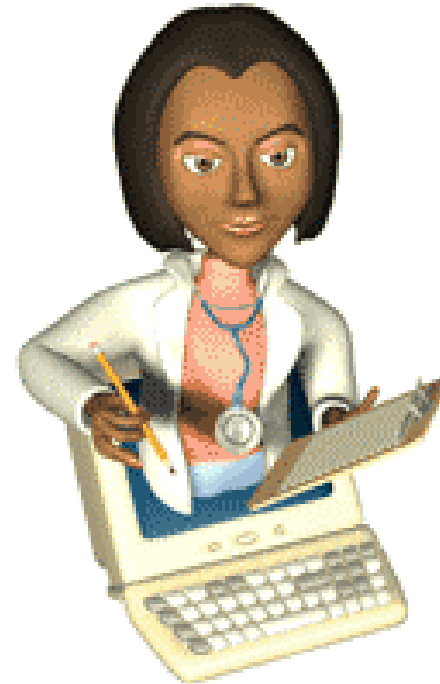
Principles of Computer Adaptive Testing (CAT)

- Individualized item selection
- The items that are administered are chosen based on how a person responds to previous items
- Items selected from a large IRT calibrated 'item bank'
- Testing stops when the patient's outcome ability is estimated to the required precision
- Automatic test scoring method



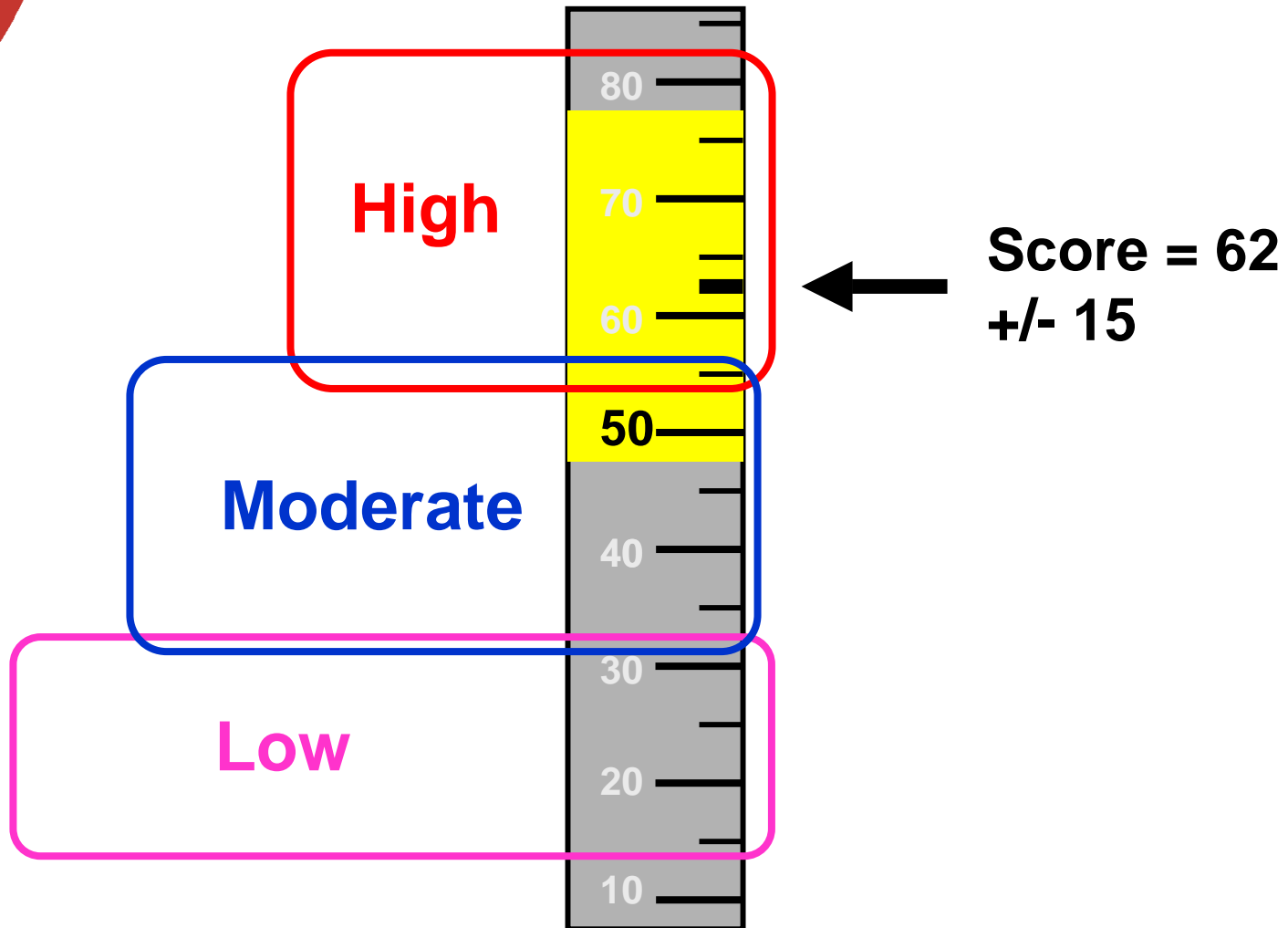
CAT Outcome Measurement ...

- › Provides for efficient data capture without loss of precision
- › Data immediately available to clinicians
- › Put data to use to relate care provided to patient-centered outcomes
- › Data can be easily shared across providers & care settings



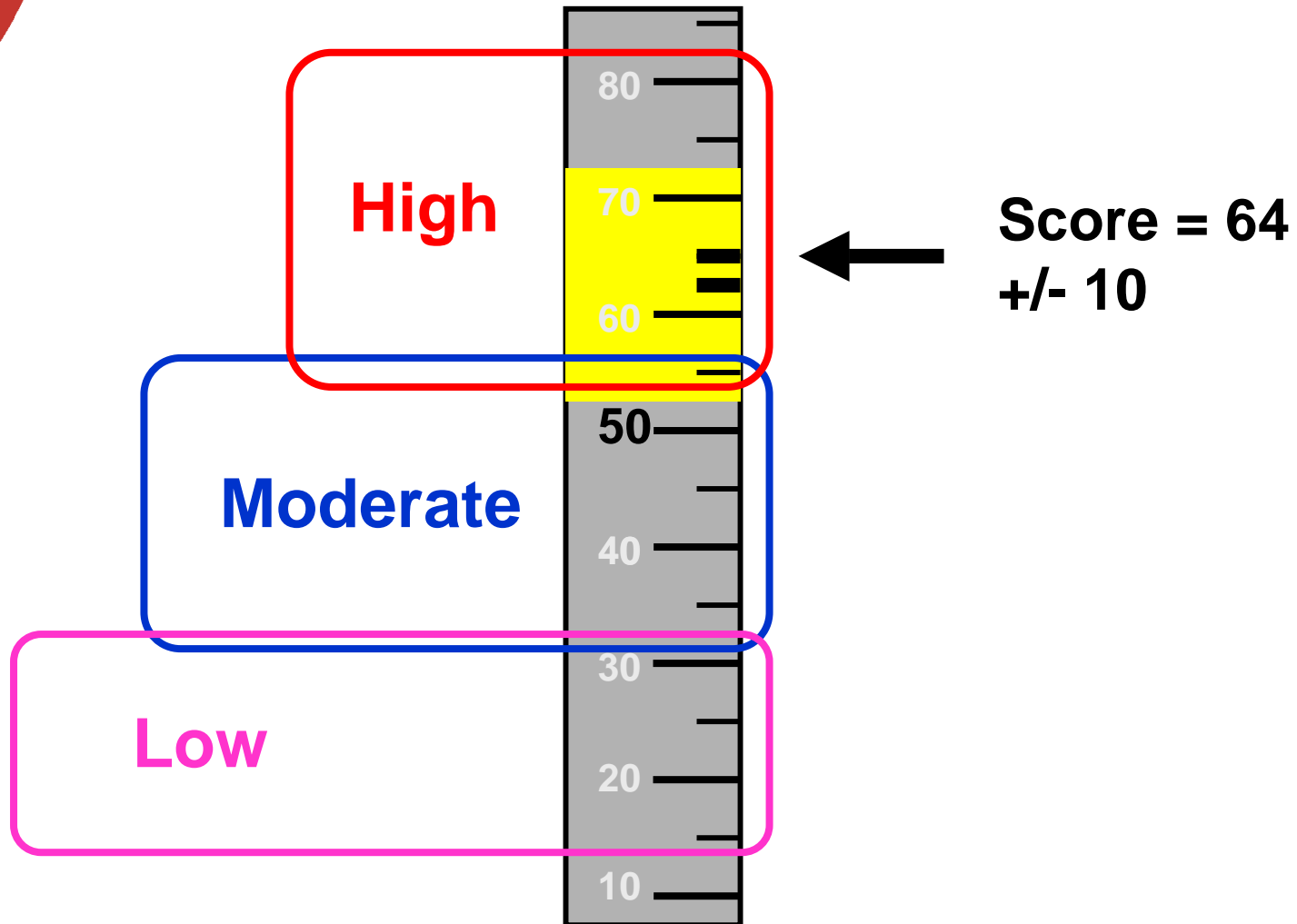
First Question: *Sit at side of bed?*

Answer: No Difficulty



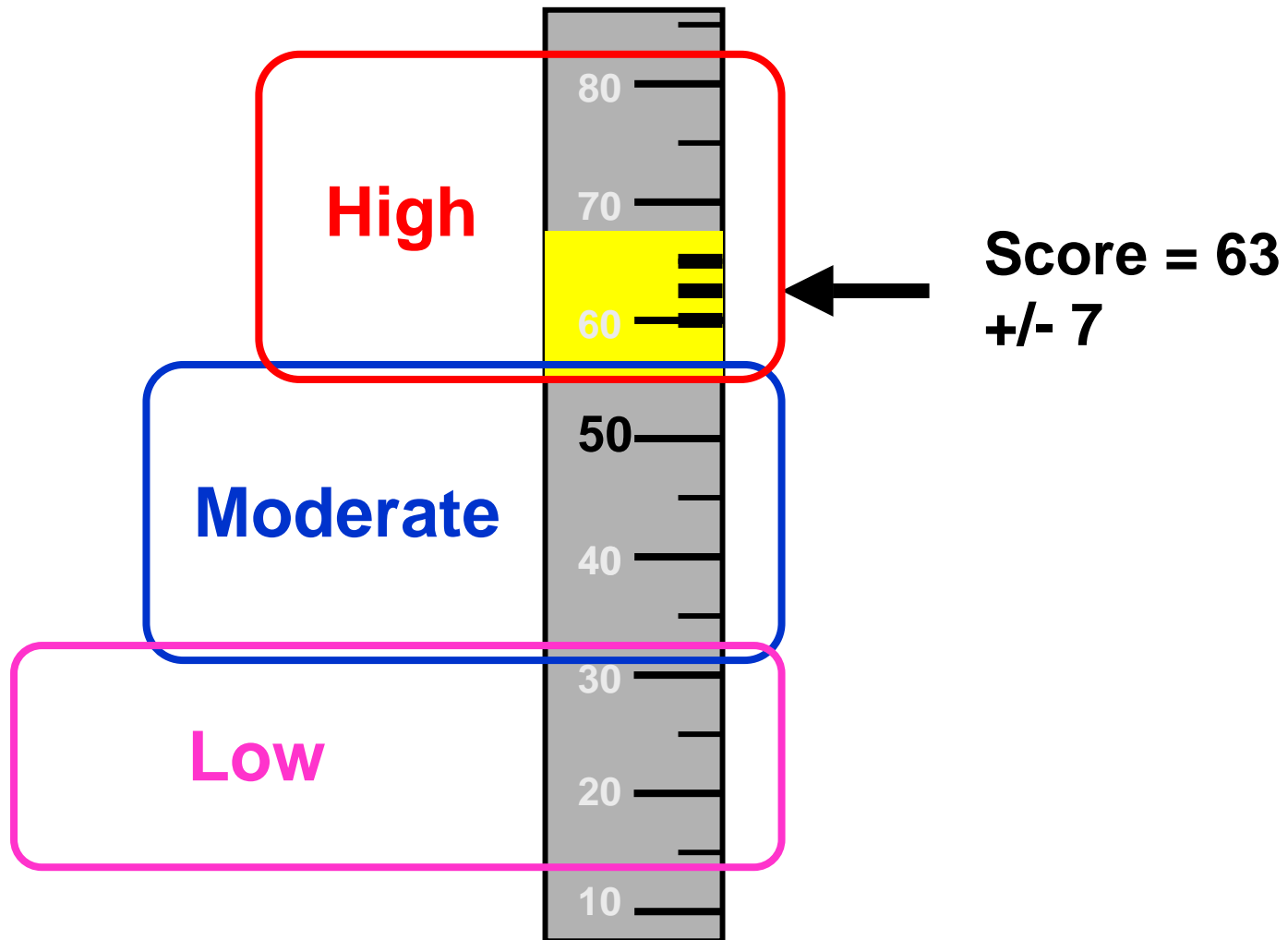
Second Question: *walking indoors?*

Answer: No difficulty



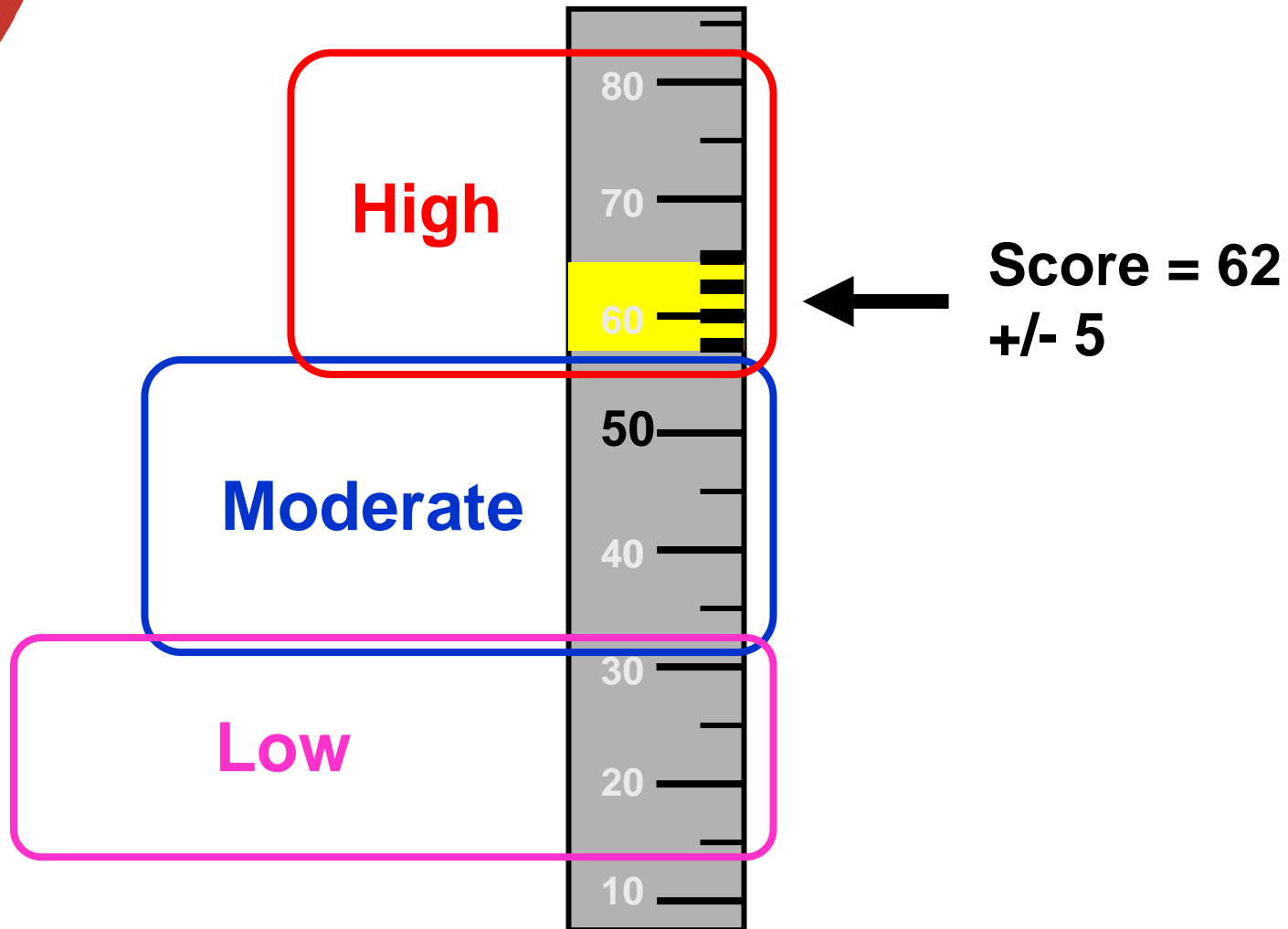
Third Question: *run to catch a bus?*

Answer: some difficulty



Fourth Question: *doing heavy housework?*

Answer: little difficulty



CATs: A New Breed of Outcome Assessment



Neuro-QOL

Quality of Life in Neurological Disorders

Boston University
AM-PAC





Activity Measure for Post-Acute Care (AM-PAC)

- » 259 core items in the AM-PAC Item Bank

Basic Mobility
Daily Activities
Applied Cognitive

How much difficulty do you currently have....

How much assistance do you currently use...

- » **CAT** version designed for use in and across rehabilitation settings with neurologic, orthopedic and complex medical patients needing rehabilitation
- » Available in >20 languages



AM-PAC's 3 Activity Domains

Applied Cognitive	Daily Activities	Basic Mobility
Communication	Grooming and Hygiene	Bend/Stand/ Carry
Print Information	Feeding and Meal Prep	Ambulation
New Learning	Dressing	Transfers
Social	Instrumental	WC Skills



Potential CAT Applications



Potential CAT Applications

- » Rehabilitation Research
- » Tracking Patient Outcomes across Care Settings
- » Generating Patient Prognoses
- » Continuous Quality Improvement
- » Regulation & Reimbursement



Challenges to Dissemination

- » Requires IT platforms unavailable in some rehabilitation settings
- » Legacy instruments are required by regulation
- » Improve interpretation of CAT scores
- » Overcome discomfort in asking different items over time and across patients
- » Create vehicles for clinician training & support
- » Create an system allowing access to item banks and CATs



In Summary...

IRT and CAT technologies are transforming outcome assessment in health care

Contemporary outcomes measures have great potential for outcome assessment in rehabilitation

Can be used in research and clinical practice applications