



# The NIH Toolbox – Assessment of Neurological and Behavioral Function

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## BACKGROUND

The NIH Toolbox for Assessment of Neurological and Behavioral Function is a five-year project to identify, create and validate brief comprehensive assessment tools to measure outcomes in longitudinal, epidemiological and intervention studies across the life span in the areas of cognition, emotion, motor and sensory function. The project is one of the initiatives in the NIH Blueprint for Neuroscience Research.

## OBJECTIVES

- Provide a form of “common currency” across diverse study designs and populations
- Maximize yield from large, expensive studies with minimal increment in subject burden and cost
- Four domain level batteries
- Individual instruments fully normed for ages 3-85 years
- Provide tool “shed” of additional instruments

## DOMAIN FRAMEWORK

### COGNITIVE FUNCTION

Executive Function, Episodic Memory, Working Memory, Processing Speed, Language, Attention

### MOTOR FUNCTION

Locomotion, Strength, Non-Vestibular Balance, Endurance, Dexterity

### EMOTIONAL HEALTH

Negative Affect, Positive Affect, Social Relationships, Stress & Self-Efficacy

### SENSORY FUNCTION

Vision, Audition, Vestibular Balance, Somatosensation, Taste, Olfaction

## METHODS

Conducted in two phases:

- **Phase I** (2 years)- identification of content area, expert interviews, research on instrumentation, and development of draft instruments
- **Phase II** (3 years)-field testing, refinement, general population **NORMING** , delivery of final product and procedure manual
  - **Phase IIA** -final instrument selection, Spanish translations, development of a single technology platform, materials production, calibration of items for computerized adapted testing (CAT) instruments, validation testing of new instruments, concurrent validation with legacy instruments
  - **Phase IIB** -general population **NORMING** :
    - National random sample with N = 5,800
    - 50% Spanish-speaking, 50% English-speaking
    - Ages 3-85
    - All primary batteries administered to entire sample
  - **Phase IIC** (2011)-calculate scoring crosswalks with legacy instruments, development of technical manual, delivery of final Toolbox at a public conference

## TOOLBOX IS...

- Multidimensional
- Versatile
- Brief
- Methodologically sound
- State-of-the-art
- Diverse
- Dynamic

## TOOLBOX IS NOT...

- A diagnostic tool
- Targeted for disease outcomes
- A substitute for the in-depth assessment of a domain or subdomain

## THE IMPACT OF TOOLBOX

PRE-TOOLBOX	POST-TOOLBOX
Custom endpoints are not easily compared across studies.	Standardized measures easily compared across studies. Crosswalks to “gold standard” instruments.
Assessments typically limited to looking at cognitive variables	Easily incorporate multiple areas of neurological functioning ( <b>COGNITIVE</b> , motor, emotional and sensory).
Expensive equipment and per subject royalties.	Inexpensive equipment, no royalties, low per subject costs limited to taste and olfaction.
Time consuming measures often require highly trained test administrators.	Cutting edge short measures (often with greater reliability than their lengthier counterparts), can be administered with <b>MODEST</b> training.

## CURRENT STATUS

- The calibration and validation phases of the project have been completed and final measures selected.
- Spanish translations are currently underway.
- Subsequent goals include establishing norms, evaluating psychometric properties FURTHER, and developing a user manual and training materials

**Funded in whole or in part with Federal funds from the Blueprint for Neuroscience Research, National Institutes of Health, under Contract HHS-N-260-2006 00007-C.**

• For more on the Toolbox, please go to [www.nihtoolbox.org](http://www.nihtoolbox.org)