



# PhenX Toolkit

consensus measures for Phenotypes and eXposures

<https://www.phenxtoolkit.org>

## Anthropometrics Measures for PhenX Toolkit

	Measure	Description of Measurement Protocol
1	Arm Span	For participants 2 years and older, distance between the extended right and left middle fingers, measured across the back.
2	Birth Weight	
	<i>a. Measured Weight at Birth</i>	Weight measured at time of birth.
	<i>b. Birth Weight Abstracted from Medical Records</i>	Weight at birth as recorded in the birth certificate and extracted from a vital record.
	<i>c. Proxy-Reported Birth Weight</i>	Proxy-Reported weight at birth.
3	Body Composition	Measurement of the participant's lean body mass using Dual-energy X-ray Absorptiometry (DXA) measured at 8 years and older.
4	Body Image	Self-reported image, from a pictogram, most closely reflecting adult participant or their children's body at various ages.
5	Child Head Circumference	Measurement during in-person examination for children birth to 36 months of age.
6	Hand Dominance	Questions to determine which hand the study subject uses for a series of activities for either adults or children.
7	Height	
	<i>a. Knee Height</i>	For participants $\geq 60$ years of age or for an individual who is unable to stand unassisted or who has severe spinal deformities, the distance from below the lateral malleolus of the fibula to the heel is measured.
	b. Recumbent Length	For infants up to 24 months and for children through 47 months who are unable to stand, the distance from top of the head to the heel while lying down.
	c. Standing Height	Collected using a stadiometer on all study participants aged 2 years and older who are able to stand unassisted.
	<i>d. Self-Reported Height</i>	If it is not possible to obtain measured height in a research study, self-reported current height using a questionnaire.*
8	Hip Circumference	For participants 2 years and older, measurement of the hip girth at the level of the maximum protrusion of the gluteal muscles.
9	Maximum Adult Height	Self-reported current height and height at age 25 years.
10	Maximum Adult Weight	Self-reported maximum adult weight and age at that weight.
11	Mid-Upper Arm Circumference	For participants 2 years and older, right arm circumference at the mid-point between the tip of the shoulder and the tip of the elbow.
12	Neck Circumference	Measurement of the circumference of the neck of participants aged 19 years and older.
13	Pregnancy Weight Gain	Self-reported weight gain during current or most recent pregnancy, and gestational age of pregnancy.
14	Waist Circumference	For participants 16 years and older: Measurement of the waist circumference at (a) the crest of ilium, (b) the umbilicus, and (c) the natural waist. For participants 2 to 16 years: Measurement of the waist circumference at (a) the crest of ilium and (d) midpoint between the rib and iliac crest.
15	Weight	
	<i>a. Measured Weight</i>	Collected using a digital scale or beam balance.
	<i>b. Self-Reported Weight</i>	If it is not possible to obtain measured weight in a research study, self-reported current weight using a questionnaire.*
16	Weight Loss/Gain	Self-reported weight one year prior to interview.

\*For genome-wide association or etiologic studies, this self-reported assessment is not an adequate substitute for the measured protocol because of the bias in self-reported measurements.

**NOTE:** Complete protocols and links to common data elements are available through the PhenX Survey at <https://www.phenxtoolkit.org>.

## What Is PhenX?

PhenX is a collaborative, consensus project between RTI International, the National Human Genome Research Institute (NHGRI) of the National Institutes of Health, and the larger research community. The objective of PhenX is to recommend measures with specified measurement protocols that have a high priority for inclusion in genome-wide association studies (GWAS). The consistent use of some measurement protocols across studies will facilitate cross-study comparisons. High-priority measures are, therefore, those measures that are broadly relevant to multiple health outcomes or assessments of health outcomes, although the measures are not focused on differential diagnosis.

## Research Domains

The PhenX Steering Committee (SC) chose 21 research domains. A research domain is a field of research with a unifying theme and easily enumerated quantitative and qualitative measures. Working Groups (WGs) of experts in a specific domain were constituted, and they:

- Evaluated the scope of the domain and the broad elements of that scope, and then
- Recommended potential high-priority measures with specific measurement protocols.

These measures were vetted with the larger research community, and final recommendations from the WGs were reviewed by the SC. The primary goal of the project is to collect these recommendations in a Toolkit that will enable scientists to select measures and implement those measures in studies.

For more information on the PhenX project, please visit the project's website at <https://www.phenx.org/>.

Research Area (Domain)	Status	WG Chair(s)	SC Liaison
Alcohol, Tobacco and Other Substances	In Toolkit	Deborah S Hasin	Erin M Ramos
Anthropometrics	In Toolkit	Michele Forman	Michelle Williams
Cancer	In Toolkit	Neil Caporaso and Christine B Ambrosone	Margaret R Spitz
Cardiovascular	In Toolkit	Thomas A Pearson	William R Harlan
Demographics	In Toolkit	Myles Cockburn	Peter Kraft
Diabetes	In Toolkit	Craig L Hanis	William R Harlan
Environmental Exposures	In Toolkit	Lynn R Goldman	Diane Wagener
Gastrointestinal	In Toolkit	David Whitcomb	William R Harlan
Infectious Diseases and Immunity	In Toolkit	Richard Kaslow	Jonathan Haines
Neurology	In Toolkit	Jeffery M Vance	Lindsay A Farrer
Nutrition and Dietary Supplements	In Toolkit	Patrick J Stover	Jose M Ordovas
Ocular	In Toolkit	Janey L Wiggs	Jonathan Haines
Oral Health	In Toolkit	James Beck and Bryan Michalowicz	Mary L Marazita
Physical Activity and Physical Fitness	In Toolkit	Bill Haskell and Rick Troiano	Jose M Ordovas
Psychiatric	In Toolkit	Jordan Smoller and Kenneth Kendler	Carlos N Pato
Psychosocial	In Toolkit	Bernice Pescosolido	Carlos N Pato
Reproductive Health	In Toolkit	Carol Hogue	Michelle Williams
Respiratory	In Toolkit	Edwin K Silverman	Terri H Beaty
Skin, Bone, Muscle and Joint	In Toolkit	Douglas P Kiel	Lindsay A Farrer
Social Environments	In Toolkit	Barbara Entwisle	Peter Kraft
Speech and Hearing	In Toolkit	Cynthia Morton and Mabel Rice	Mary L Marazita