

Reproductive Health Measures for the PhenX Toolkit

	Measure	Description of Measurement Protocol
1	Assessment of Pubertal Development	Self-assessment of stage of puberty for both males and females using Tanner staging.
2	Causes and Treatments of Known Infertility	Interviewer-administered questions used to determine the cause of the participant's or his/her partner's infertility and the treatments that they may have sought.
3	Contraceptive Methods	Questions to determine the type of contraceptive methods used by both female and male participants. Certain methods, such as hormonal contraceptives, may be associated with gene/environment factors. Contraceptive methods might also be of interest because they relate to risk of sexually transmitted diseases.
	a. Female	Questions to assess the types of birth control females have used in the past and are currently using.
	b. Male	Questions to assess the types of contraception males have used in the last 12 months.
4	Difficulty in Conceiving	Questions to assess whether a person and his/her partner are trying to become pregnant and how long they have been trying. Difficulty in conceiving may have genetic or epigenetic origins.
5	Female Reproductive Organ Surgical Procedures	Questions to assess the occurrence of hysterectomies with or without ovary removal. This measure identifies the impact of surgery on a woman's hormonal system and is important in any gene/environmental studies of hormones or hormonal-related diseases.
6	History of Prepubertal Development	Questions to determine age at which male and female participants reached puberty. It is important to measure because it is linked to sexual development and maturity.
7	Hormonal Therapy	Questions to determine whether a female has ever taken hormonal therapy. Hormonal therapy is known to affect risk of cardiovascular disease and cancer.
8	Human Papillomavirus Vaccine Use	Interviewer-administered questions to ascertain if a woman received the human papillomavirus vaccine and, if so, the number of doses received. Use of the vaccine impacts a woman's risk of developing cervical cancer and the overall incidence rate of cervical cancer.
9	Male Reproductive Tract Birth Defects	Questions to determine whether the participant had ever had the following abnormalities that developed in utero: cryptorchidism, hypospadias, and/or other related conditions. These conditions are suspected of being hereditary and/or influenced by environmental factors, may reflect abnormalities of androgen production, and may be passed to offspring.
10	Male Sexual Function	Questions to determine whether the participant ever had sexual difficulties regarding erection and/or performance.
11	Menstrual History	Questions to assess the frequency and regularity of female participants' menstrual cycle, whether any irregularities were due to breastfeeding, and whether their periods have stopped.
12	Prostate Health	Interviewer-administered questions to a male participant regarding how often he urinates at night, whether he has difficulty urinating, and whether he has had surgery for prostate enlargement and/or prostate cancer.
13	Reproductive History	Questions to assess both males' and females' pregnancy history. This measure assesses the demonstrated fecundity and fertility of the individual and can be used for estimating certain in utero exposures if the research subject is an infant.
	a. Female	Females are asked about the number of pregnancies they have had and for descriptions of these pregnancies; they are also asked about smoking during pregnancy.
	b. Male	Males are asked whether they have ever fathered a pregnancy and, if so, the description of the pregnancy.
14	Sexual History	These questions determine a participant's sexual history. Sexual history information can help determine risk factors for sexually transmitted diseases. Chromosomal differences may affect sexual behavior and orientation and may be differentially expressed as a result of environmental factors (e.g., endocrine disruptors).
15	Testes Development	The purpose of the orchidometer is to measure testes size. Because testicular growth correlates with the onset of puberty and the initiation of spermatogenesis, this measure is used to confirm pubertal onset and the presence of sperm production. Small testes may indicate either primary or secondary hypogonadism, and large testes (macroorchidism) may indicate fragile X syndrome, a common cause of mental retardation.

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