NIH Symposium: Linking Disease Model Phenotypes to Human Conditions

September 10-11, 2015

Carol M. Hamilton
PhenX: consensus measures for Phenotypes and eXposures

- PhenX is funded by the National Human Genome Research Institute (NHGRI), Project Scientist, Dr. Erin Ramos with co-funding from the National Institute on Drug Abuse (NIDA)
- NHGRI recognized that including standard measures in genome-wide association studies (GWAS) would have significant impact on biomedical research and released an RFA
- In September 2007, RTI International was awarded a Cooperative Agreement (U01) to select and define high priority measures for GWAS (phase 1)
- In July 2013, RTI International was awarded a Genomics Resource grant (U41) to maintain and expand the Toolkit and extend beyond GWAS (phase 2)
- PhenX uses an established consensus based process, and is driven by the scientific community
- Initially focused on measures for genome-wide association studies, the scope has broadened to translational and clinical research
Why Use Standard Measures?

- Study findings require validation
  - Initial findings need to be replicated, standard measures aid comparisons
- Increased sample size provides greater statistical power
  - For GWAS, to identify moderate associations and more complex interactions
  - For other types of studies, increases statistical confidence in results
- Cross-study analyses increase the impact of individual studies
  - Many diseases and conditions share common risk factors
  - Use of standard (common) measures facilitates cross-study analyses
- What is needed is a common framework (ontology) that supports consistent future development and connects PhenX and other resources, e.g., measures (PROMIS), data repositories, electronic medical records
**PhenX Terminology**

- **DOMAIN**: Topical area with a unifying theme
- **COLLECTION**: A collection of measures with a shared characteristic, target population or topic. The measures included in a Collection may cut across research Domains
- **MEASURE**: A certain characteristic of, or related to, a study subject
- **PROTOCOL**: Standard procedure recommended by a Working Group to collect and record a PhenX measure
Criteria for Selecting PhenX Measures

- Clearly defined
- Well established
- Broadly applicable
- Validated
- Reproducible
- Specific
- Reliable
- Standard measurement protocols exist
PhenX - Research Domains

- Alcohol, Tobacco, and Other Substances
- Anthropometrics
- Cancer
- Cardiovascular
- Demographics
- Diabetes
- Environmental Exposures
- Gastrointestinal
- Infectious Diseases and Immunity
- Neurology
- Nutrition and Dietary Supplements
- Obesity
- Ocular
- Oral Health
- Physical Activity and Physical Fitness
- Psychiatric
- Psychosocial
- Rare Genetic Conditions
- Reproductive Health
- Respiratory
- Skin, Bone, Muscle, and Joint
- Social Environments
- Speech and Hearing
- Pregnancy and Pediatrics
- TBD
Types of PhenX Measures

Smart Query Tool

Search pre-defined search filters listed below
Search by entering your own terms in the box below

Data Collection Mode
- Interviewer-administered questionnaire
- Self-administered questionnaire
- Bioassay
- Clinical Examination
- Physical Measurement
- Medical records abstraction
- Secondary Data Analysis

Lifestage
- Infant
- Toddler
- Child
- Adolescent
- Adult
- Senior
- Pregnancy

Time to Complete
- <=15 minutes
- >15 minutes

Language
- English
- Spanish
- Other

Enter search term or PhenX ID:
Depression

Show 10 results per page

Smart Search  Text Search
Examples of PhenX Measures

- Height and Weight (Anthropometrics)
- Blood pressure (Cardiovascular)
- Stroke (Neurology)
- Ultraviolet light exposure (Environmental Exposures)
- Exposures to violence (Psychosocial)
- Liver function (Gastrointestinal)
- Pain (Type and Intensity) (Gastrointestinal)
Rare Genetic Conditions: New Measures

- Ataxia Rating Scale
- Body Proportions
- Bone Age
- Child Oral Health Pain
- Disability Index
- Disease Progression and Regression
- Disorders of Respiratory Control with Inherent Autonomic Dysregulation
- Echocardiography Phenotypes
- Family Health History
- Growth Charts
- Pediatric Quality of Life
- Scale of Developmental Domains of Early Childhood
- Scoliosis - Physical Assessment
- Scoliosis - Quality of Life
- Sweat Chloride Test
Measures Already in the Toolkit (examples) Applicable to RGC

- Alkaline phosphatase – Paget’s Disease
- Audiogram hearing test – Alport Syndrome
- Chest Computer Tomography (CT) - Congenital Pulmonary Lymphangiectasia
- Exercise Capacity/Six-Minute Walk Test - Duchenne Muscular Dystrophy
- Annotation – but potential for inclusion in a “range of phenotypes” ontology
PhenX Supplements - adding depth to the Toolkit

- PhenX Measures for Sickle Cell Disease Research (funded by NHLBI)
  - Ellen Werner, Project Scientist
  - Sickle Cell Disease Research and Scientific Panel (SRSP)
  - Collaborating with H3Africa (Human Heredity and Health in Africa) on a Sickle Cell Disease ontology

- PhenX Measures for Mental Health Research (funded by NIMH)
  - Greg Farber, Project Scientist
  - Mental Health Research Scientific Panel (MHRP)

- PhenX Measures for Tobacco Regulatory Science (funded by TRSP)
  - Kay Wanke, Project Scientist
  - Tobacco Regulatory Research Scientific Panel (TRRP)

- PhenX Measures for Substance Abuse and Addiction (funded by NIDA)
  - Kevin Conway, Project Scientist
  - Substance Abuse and Addiction Scientific Panel (SSP)
## Summary Table for NIH CDE Initiatives


### Show 50 ▼ entries

<table>
<thead>
<tr>
<th>Link to Homepage</th>
<th>Link to CDEs</th>
<th>Brief Summary</th>
<th>Number of Elements</th>
<th>Studies and Publications</th>
<th>CDE Resource Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standardized Asthma Outcomes for Clinical Research</strong></td>
<td>Asthma CDEs</td>
<td>The standardized asthma outcomes for clinical research represent recommendations for core (required in future studies), supplemental (to be used according to study aims), and emerging (requiring validation and standardization) outcomes for 7 domains of asthma clinical research outcome measures. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>10 (adults), 25 (children)</td>
<td>--</td>
<td>NHLBI, NIATID</td>
</tr>
<tr>
<td><strong>Chronic Low Back Pain CDEs</strong></td>
<td>SLBP</td>
<td>Recommended minimum dataset for research on chronic low back pain. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>40</td>
<td>--</td>
<td>NCCAM</td>
</tr>
<tr>
<td><strong>Early Detection Research Program</strong></td>
<td>EDRN</td>
<td>CDEs for use in describing samples and data collected as part of cancer biomarker research. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>1,600</td>
<td>Publications</td>
<td>NCI</td>
</tr>
<tr>
<td><strong>eyeGENE</strong></td>
<td>eyeGENE</td>
<td>As part of eyeGENE, common data elements have been developed for collecting phenotypic data associated with more than 30 inherited ophthalmic diseases. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>300+</td>
<td>Studies</td>
<td>NEI</td>
</tr>
<tr>
<td><strong>Global Rare Diseases Patient Registry and Data Repository</strong></td>
<td>GRDR</td>
<td>CDEs to facilitate standardized data collection into the GRDR and to assist organizations in establishing rare disease registries that contribute information to GRDR. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>70</td>
<td>Publications</td>
<td>ORIR</td>
</tr>
<tr>
<td><strong>Quality of Life Outcomes in Neurological Disorders</strong></td>
<td>Neuro-QOL</td>
<td>A core set of quality-of-life questions that address chronic neurologic disorders, plus sets of supplemental questions specific to targeted diseases or subgroups of patients. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>300</td>
<td>Publications</td>
<td>NINDS</td>
</tr>
<tr>
<td><strong>NIDA Substance Abuse Electronic Health Record Data Elements</strong></td>
<td>NIDA EHR</td>
<td>A set of brief screening and initial assessment tools for substance use disorders (SUDs) for use in general medical settings. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>80+</td>
<td>--</td>
<td>NIDA</td>
</tr>
<tr>
<td><strong>NIH Toolbox for Assessment of Neurocognitive and Behavioral Function</strong></td>
<td>NIH Toolbox</td>
<td>An integrated set of tools for measuring cognitive, emotional, motor and sensory function. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>4 batteries of tests, each with 5-24 tests</td>
<td>Publications</td>
<td>NIH</td>
</tr>
<tr>
<td><strong>NINDS Common Data Elements</strong></td>
<td>NINDS CDEs</td>
<td>A core set of data elements for use in NINDS-funded studies, including core and supplementary sets of data elements for use in disease-specific studies. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>10,000 unique variables, 500+ instruments</td>
<td>Studies</td>
<td>NINDS</td>
</tr>
<tr>
<td><strong>Consensus Measures for Phenotypes and Exposures</strong></td>
<td>PhenX</td>
<td>Standard measures related to complex diseases, phenotypic traits and environmental exposures for inclusion in genome-wide association studies (GWAS) and other large-scale genomic and epidemiologic research efforts. <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>15,000+ variables, 428 protocols</td>
<td>Publications</td>
<td>NHGRI</td>
</tr>
<tr>
<td><strong>Patient Reported Outcomes Measurement Information System</strong></td>
<td>PROMIS</td>
<td>A system of item banks measuring patient-reported health status for various domains of physical, mental, and social health across clinical populations (i.e. not disease-specific). <a href="https://www.ncbi.nlm.nih.gov">Subject Areas</a></td>
<td>50 item banks</td>
<td>Publications</td>
<td>NIMH</td>
</tr>
</tbody>
</table>

Showing 1 to 11 of 11 entries

[Previous](#)  [Next](#)
Welcome to the PhenX Toolkit

The Toolkit provides standard measures related to complex diseases, phenotypic traits and environmental exposures. Use of PhenX measures facilitates combining data from a variety of studies, and makes it easy for investigators to expand a study design beyond the primary research focus. All Toolkit content is available to the public at no cost.

Information about the project is available at www.phenx.org

More »

Please Read Toolkit Guidance

How to cite use of PhenX measures:
Measures incorporated in this study were selected from the PhenX Toolkit version August 12, 2015, Ver 11.0. More »

How to cite the PhenX Toolkit:

PhenX is funded by a Genomic Resource Grant, U41 HG007050, from NHGRI with co-funding from NIDA.
Sickle Cell Disease Research Project
Sickle Cell Disease Research Collections

**COLLECTION:** Sickle Cell Disease Research
- Release Date: August 12, 2015
- View Supplemental Information

Core Collection
- View Sickle Cell Disease Research and Scientific Panel Roster
  - Core: Tier 1
  - Core: Tier 2

Specialty Collections
- Sickle Cell Disease Research Working Group 1: Cardiovascular, Pulmonary, and Renal Specialty Collection - View Roster
- Cardiovascular, Pulmonary, and Renal Specialty Collection
  - View Cardiovascular, Pulmonary, and Renal Specialty Collection Supplemental Information

- Sickle Cell Disease Research Working Group 2: Neurology, Quality of Life, and Health Services Specialty Collection - View Roster
- Neurology, Quality of Life, and Health Services Specialty Collection
  - View Neurology, Quality of Life, and Health Service Specialty Collection Supplemental Information
Review Measure

Show Tree □

Browse » Domains » Diabetes » Urinary Creatinine Assay for Kidney Function

Measure: Urinary Creatinine Assay for Kidney Function  #141600

Definition: A bioassay to measure urine concentration of creatinine, a muscle metabolite that is filtered out of blood by the kidneys.

Purpose: The urinary creatinine measure should be done in conjunction with urinary microalbumin to determine ratio of urine albumin to urine creatinine which can predict the risk of nephropathy (National Health and Nutrition Examination Survey and University of Minnesota Laboratory Procedure Manual for Urinary Creatinine, 2008).

Protocols:

Add to My Toolkit  #141601  Urinary Creatinine Assay for Kidney Function »

<table>
<thead>
<tr>
<th>Essential Measures</th>
<th>Related Measures</th>
<th>Collections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood Pressure (Adult/Primary)</td>
<td>Organ Function</td>
</tr>
<tr>
<td></td>
<td>Personal History of Kidney Failure</td>
<td>Kidney Failure</td>
</tr>
<tr>
<td>Current Age Gender</td>
<td>Serum Creatinine Assay for Kidney Function</td>
<td>Maternal Complications</td>
</tr>
<tr>
<td></td>
<td>Urinary Microalbumin Assay for Kidney Function</td>
<td>Sickel Cell Disease: Cardiovascular, Pulmonary, and Renal Specialty Collection</td>
</tr>
</tbody>
</table>

Keywords: Centers for Disease Control and Prevention, CDC, National Center for Health Statistics, NCHS, National Health and Nutrition Examination Survey Questionnaire, NHANES, University of Minnesota, Fairview University Medical Center, Nephropathy, diabetic nephropathy, kidney, kidney disease, kidney failure, Cardiovascular disease, Microalbuminaria, Macroalbuminaria, Diabetes

Measure Release Date: May 12, 2010

Add this Measure* to My Toolkit
Add this Measure* and all Essential Measures to My Toolkit
Toolkit Features

- **Browse or Search entire Toolkit**
  - Browse by “Domain”, “Measure,” or “Collection”
  - Search using “Smart Query Tool”

- **Add measures to “My Toolkit”**
  - Identifies “Essential Measures”
  - Recommends “Related Measures”
  - Registration allows users to save and share multiple Toolkits

- **Download information about selected measures**
  - Custom Reports
  - Custom Data Collection Worksheets (DCW)
  - Data Dictionaries (DD) support data submission to dbGaP
  - REDCap zip instrument files to upload to studies in REDCap
Register Studies

Back to Registered Studies

Name of Funded Study *

Enter PhenX protocols used in your study.
1) start typing the protocol name or ID
2) select the full protocol name and ID from the auto-complete dropdown list
3) click on the "Add" button

Selected PhenX Protocols *

Study Acronym

Principal Investigator *

Primary Contact Name *

Primary Contact Email *

Number Participants *

Select One

Grant Number *
The grant number you would include in a research publication
<table>
<thead>
<tr>
<th>Study Name</th>
<th>Principal Investigator</th>
<th>Research Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Collaborative Center for Microbiome and Genomics Research</td>
<td>Clement Adebamowo</td>
<td>HPV, cervical cancer and genomics</td>
</tr>
<tr>
<td>Aqueous Humor Dynamic Components that Determine Intracocular Pressure</td>
<td>Dr. Sayoko Moroi</td>
<td>Glaucoma is a major cause of blindness. The inability to predict a patient’s IOP response to medications is a critical barrier for the clinician to consistently provide highly effective IOP-based treatments. Current trial-and-error approaches to glaucoma management are inefficient and have not addressed this barrier as there are no predictive factors for drug response. Our long-term goal is to improve outcomes by identifying biomarkers and environmental factors that profile a patient at risk for glaucoma by age-of-onset, rate of disease progression, “poor response” to treatment, and large IOP fluctuation. Our purpose of this research project is to address this critical barrier by focusing on physiological factors that predict IOP response to drugs.</td>
</tr>
<tr>
<td>Asian Indian Diabetic Heart Study/SIKH Diabetes Study</td>
<td>Dharambir Sanghera, PhD</td>
<td>The goals of AIDHS/SDS are to discover unique genetic markers associated with type 2 diabetes (T2D) and related metabolic and lipid traits by performing genome-wide association scans (GWAS) and validation studies.</td>
</tr>
<tr>
<td>Chinese Longitudinal Healthy Longevity Survey</td>
<td>Yi Zeng, PhD</td>
<td>The goal of this study is to search for a better understanding of the determinants of healthy longevity. In the 2011-2012 wave of survey, 13 PhenX measures were applied in our CLHLS data collection, which were adapted to the context of Chinese culture and language.</td>
</tr>
<tr>
<td>Daily Experiences with Smoking Cessation</td>
<td>Jayo L. Derrick</td>
<td>Partner Influence, self-control, and smoking cessation: A study using EMA</td>
</tr>
<tr>
<td>Utilizing Interaction to Identify Novel Genetic Factors for Nicotine Dependence</td>
<td>Dana Hancock, PhD</td>
<td>This study aims to identify new genetic variants associated with nicotine dependence, by leveraging interactions with well-established variants from nicotinic acetylcholine receptor genes. We conducted this study, we have assembled &gt;19,000 Caucasians and &gt;4,000 African Americans, who all have genome-wide genotypes and Fagerstrom Test for Nicotine Dependence data, from our own cohorts and others from the database of Genotypes and Phenotypes (dbGaP). Results of this study may be used to better understand the genetic risk factors for nicotine dependence and smoking cessation and ultimately reduce the burden of smoking health consequences.</td>
</tr>
</tbody>
</table>
REDCap "Instrument ZIP" files

REDCap 6.5.0 and later provides a way to easily add new data collection instruments to a REDCap project by uploading an "Instrument ZIP" file. These Instrument ZIP files may be downloaded from an external instrument library (e.g., PhenX Toolkit, Medical Data-Models) or from another REDCap project or user, and then uploaded on the Online Designer page in a REDCap project so that they get added as a new data collection instrument. These ZIP files can contain attachment files for "descriptive" fields, which makes it very easy to obtain or share an instrument containing several attachment files.

NOTE: An instrument ZIP file contains only one instrument that gets "added" to a project, whereas a REDCap data dictionary CSV file contains ALL the instruments in a project and would thus "replace all" instruments in the project when uploaded.
PhenX is collaborating with REDCap to make PhenX protocols available as REDCap instruments zip files that can be uploaded directly to REDCap. More, coming soon. Click on a protocol name below to download the REDCap Zip File. Click here for REDCap "Instrument ZIP" feature.

- Abdominal Aortic Aneurysm
- Acculturation
- Acute Subjective Response to Substances - Current - General
  Acute Subjective Response to Substances - Current - Specific - Alcohol
  Acute Subjective Response to Substances - Current - Specific - Drugs
- Acute Subjective Response to Substances - Current - Specific - Tobacco
- Acute Subjective Responses to Substances - Retrospective - Alcohol
- Acute Subjective Responses to Substances - Retrospective - Tobacco
- Air Contaminants in the Home Environment
- Alcohol - 30-Day Quantity and Frequency
- Alcohol - Age of First Use
- Alcohol - Lifetime Use
- Alcohol - Maximum Drinks in 24 Hours
- Alcohol Breathalyzer
- Alkaline Phosphatase
- Angina
- Annual Family Income
- Anxiety Disorders Screener - Adult
- Anxiety Disorders Screener - Child
- Arm Span
- Arrhythmia (Atrial and Ventricular)
REDCap Shared Library

The REDCap Shared Library is a repository for REDCap data collection instruments and forms that can be downloaded and used by researchers at REDCap partner institutions. Curated instruments have been approved for inclusion by the REDCap Library Oversight Committee (REDLOC) after review for research relevance, accuracy in function and coding (see guidelines), and copyright issues.

You may search below for any available data collection instruments. If you got to this site directly, you will be able to view the shared instruments as they would appear in REDCap or view a PDF version that can be downloaded and/or printed. Otherwise, if you arrived here from the REDCap application, you will have the additional option of importing the form directly into REDCap. If you wish, you may download a list of all library instruments in Excel/CSV format. If you download and utilize an instrument from the REDCap Shared Library, please cite the RSL manuscript. If you have questions or are experiencing issues, please contact redcap@vanderbilt.edu.

Keyword search: PhenX

Search options:
- Minimum downloads: 0
- Recent additions: show all

Found 1 results matching your search

<table>
<thead>
<tr>
<th>Title</th>
<th>Downloads</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhenX Toolkit</td>
<td>[External Instrument Library]</td>
</tr>
</tbody>
</table>
- NIH funded genome-wide association studies are required to deposit their data in dbGaP
- Pilot - investigators can search dbGaP and find studies that included measures comparable or related to PhenX measures
- In the future, investigators submitting data to dbGaP will be asked to self-identify PhenX measures
PhenX has a relatively small number of variables compared to dbGaP, so it is a good starting point for identifying comparable variable, and ways to standardize naming variables.

- Standard set of rules for mapping to dbGaP study variables
- Standard set of rules for naming PhenX variables
- No standard set of rules for naming variables in dbGaP studies – thus, mapping requires some manual curation
- Plan for semantic normalization of variables names, potentially to add to dbGaP
- Need standard vocabulary – and ontology
- Ontology should be relevant / portable for use by other resources – and developed collaboratively
### dbGaP variable search results

**dbGaP**

```
2[s_discriminator] AND "px030701 first cigarette smoking age"[PhenX]
```

**Search results:**
- **1 Variables, 0 Analyses, 0 Documents, and 0 Datasets in 1 Studies**

<table>
<thead>
<tr>
<th>Clinical Variable</th>
<th>Dataset</th>
<th>Variable Description</th>
<th>Variable ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>age first use tob</td>
<td>AlcoholDepAdd_Data</td>
<td>Age onset of any tobacco use</td>
<td>phv00022940.v1.p1</td>
</tr>
</tbody>
</table>

**Study:**
- **Study of Addiction: Genetics and Environment (SAGE)**
**Cross-reference table for PhenX measures and variables**

<table>
<thead>
<tr>
<th>PhenX variable</th>
<th>PhenX ID</th>
<th>dbGaP variable</th>
<th>LOINC code</th>
<th>P3G variable*</th>
<th>eMERGE variable</th>
<th>caDSR CDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Age</td>
<td>PXV010101020000</td>
<td>phv00023938.v1, phv00024004.v1</td>
<td>21612-7</td>
<td>Age</td>
<td>Age</td>
<td>2423393</td>
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<tr>
<td>Ethnicity</td>
<td>PXV010501010000</td>
<td>phv00023941.v1, phv00024007.v1</td>
<td>56050-8</td>
<td>Ethnicity</td>
<td>Ethnicity</td>
<td>2200284</td>
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<tr>
<td>Gender</td>
<td>PXV010701010000</td>
<td>phv00023939.v1, phv00024005.v1</td>
<td>46607-8</td>
<td>Gender</td>
<td>Gender</td>
<td>2179640</td>
</tr>
</tbody>
</table>

* P3G DataShaPER doesn’t distinguish between “exact” and “similar” mappings to PhenX measures
Some PhenX measures are identified for use in common, complex diseases are also relevant to rare disorders

With help from Sharon Terry, Genetic Alliance (and PhenX Steering Committee member) – launching a crowdsourcing effort to engage the Rare Genetic Conditions community
Contribute to the PhenX Toolkit by providing information about measures you use for specific rare genetic conditions

Purpose: To invite clinicians to share the protocols they use for specific rare genetic conditions and help PhenX investigators annotate PhenX measures.

Please choose a rare genetic condition from the list below.

Choose a rare genetic condition from the list: duch[enter]

Duchenne muscular dystrophy

1. Click here to see the full list: begin typing the rare condition name and then select from suggested auto-fill. If your rare genetic condition of interest is not on the list, please enter it in the box to the right.
2. Click on each PhenX domain name below to browse and mark measures that you think are useful to study this rare genetic condition. Or enter a keyword to search the PhenX measure using PhenX Smart Query Tool.
3. Provide a citation for using this protocol to study this rare genetic condition.
4. Add comments about the usefulness of the measure.

Hitting the SUBMIT button in the bottom left corner will allow us to capture the information you have entered.

If you want to be able to return to the form and see your previous work, please provide your email address:

Email: 

Alcohol, Tobacco and Other Substances
Resources

- www.phenxtoolkit.org
  - Find PhenX measures for inclusion in your study
  - Quick Start guide
  - Tutorial

- www.phenx.org
  - Provides general information about the PhenX project
  - Register to receive periodic updates via e-mail of the PhenX Newsletter and notification of new surveys

- www.genome.gov/gwastudies/
  - A catalog of published Genome-Wide Association Studies
    (Hindorff et al. PNAS 2009)

  - NIH Common Data Element (CDE) Resource Portal
Acknowledgements

- NHGRI
  - Erin Ramos (Project Scientist)
  - Brenda Iglesias (Program Analyst)
- PhenX Steering Committee
  - Mary Marazita, Co-Chair
  - Cathy McCarty, Co-Chair
- WG Chairs / Members
- NIH Liaisons
- Other Liaisons, HHS, DoD, CDC, FDA, VA
- NIDA lead – Kevin Conway
- TRSP lead – Kay Wanke
- NIMH lead – Greg Farber
- NHLBI lead – Ellen Werner

- RTI Team
  - Carol Hamilton (Principal Investigator)
  - Tabitha Hendershot (Co-Investigator)
  - Amanda Riley (Project Manager)
  - Darigg Brown
  - Wayne Huggins
  - Debbie Maiese
  - Destiney Nettles
  - Helen Pan
  - Mike Phillips
  - Toolkit team
  - Communications team
  - Logistics team
  - Collaborators
Questions?
“You call that mowin' the lawn? ... Bad dog! ...
No biscuit! ... Bad dog!”