

# The Science (in 2016-17) of Common Disease Genomics

How to get value-added from a typical case-control study?

---

Quality Phenotypes and Genotypes (including SVs)

Family Designs

Case-control studies

Endophenotypes

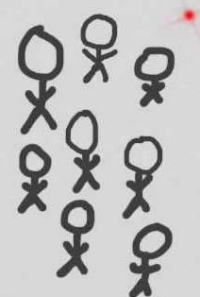
Annotation

cases

controls

Diverse populations

WGS vs WES



Shared controls  
(with deep phenotyping)

“Mendelianize”

Sample size

Improved Analysis Strategies (including an analysis commons)

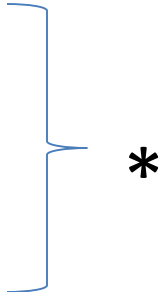
# Phenotype/Disease Selection

---

- Important Condition (e.g. frequency)
- Need
- Availability of diverse consented samples
- Engaged community
- Likely different genetic architectures
- Clear phenotype definition
- Interest in risk ↑ and protection
- Committed partner

# Approved/Planned Projects

---

- Early onset CVD \*
  - Hemorrhagic Stroke
  - Autism Spectrum Disorder \*
  - Epilepsy \*
  - Inflammatory Bowel Disease
  - Type I Diabetes
  - Asthma
  - Bone Mineral Density and Osteoporosis
- 

\* Exemplars with more details in the following slides

# Early Onset CAD

---

- Working group name – Cardiometabolic
- Design: Case – Controls (Deeply Phenotyped)
- Number of cases: ~12,000
- Number of controls: ~14,000
- Ethnic diversity: African Americans>European Americans>East Asians>Hispanics>South Asians
- Partner: NHLBI
- Indication that sample movement to the sequencing centers has begun? Yes; sequencing begun.
- Plans for expansion, including an inventory of studies and samples: Yes; multiple opportunities
- Special note: There is a dearth of Hispanic cases

# Autism Spectrum Disorders

---

- Working group name – Neuropsychiatric
- Design: Families (mostly quads or trios)
- Number of samples: ~7,000 individuals
- Ethnic diversity: Mostly European Americans
- Partner: The Simons Foundation
- Plans for expansion, including an inventory of studies and samples: Yes, multiple opportunities
- Indication that sample movement to the sequencing centers has begun? Yes, at NYGC.

# Epilepsy

---

- Working group name – Neuropsychiatric
- Design: Case – Control
- Special note: Exomes
- Number of cases: ~7,500
- Number of controls: ~3,500
- Ethnic diversity: European American>African American>Asian>Hispanic
- Plans for expansion, including an inventory of studies and samples? Yes, Epi25K consortium
- Indication that sample movement to the sequencing centers has begun? Not yet.

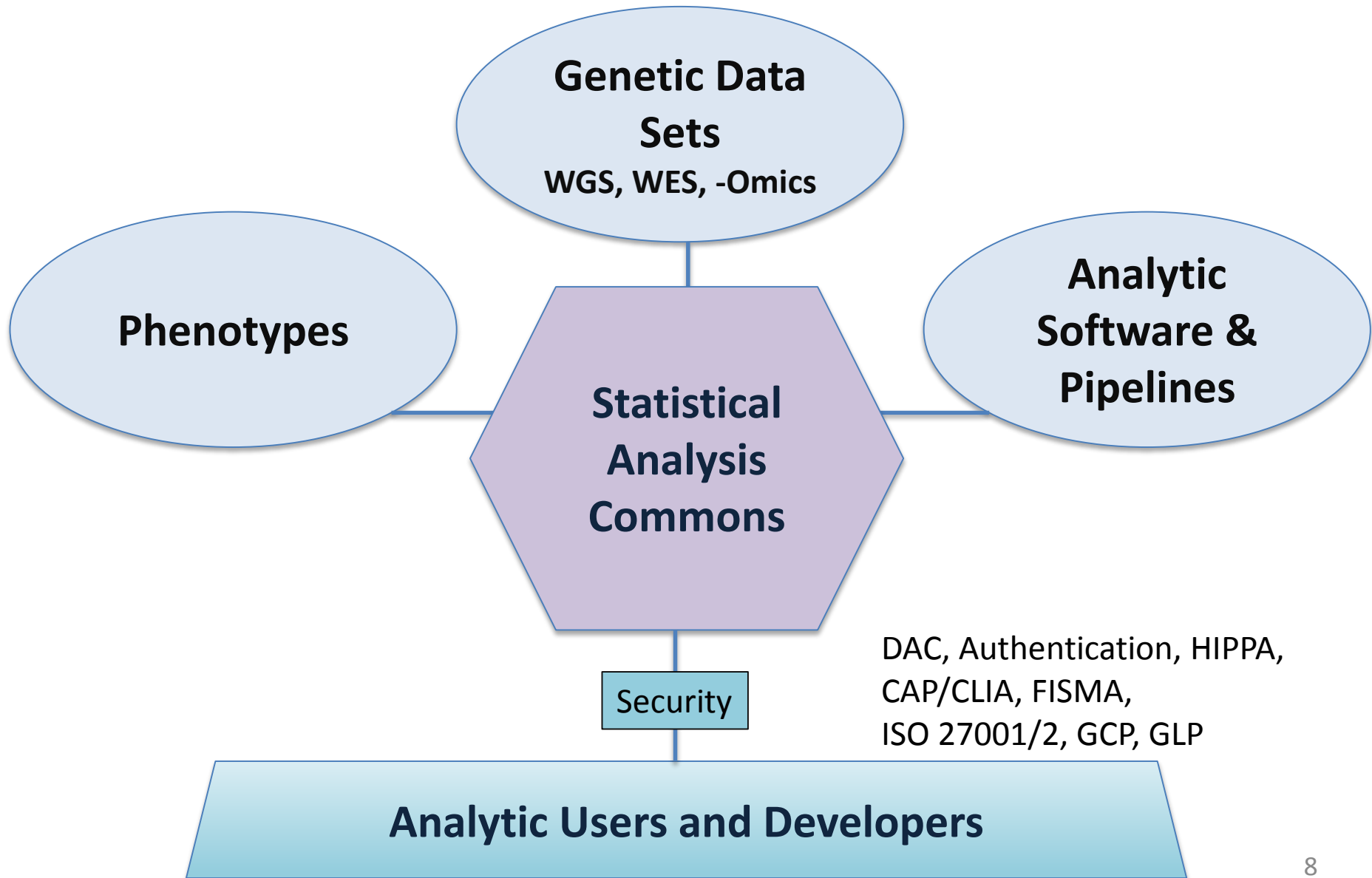
# T1D, Asthma, IBD

---

- Working group name – Autoimmune
- Design: Cases only
- Special note: Planning on using shared controls
- Number of cases: ~5,000 for each condition
- Ethnic diversity: European American>African American>Asian>Hispanic
- Plans for expansion, including an inventory of studies and samples? No, but suggest other conditions
- Indication that sample movement to the sequencing centers has begun? Yes, for IBD.

# Thesis 1: A Community Resource

---





# Thesis 2: Endophenotypes

