

Opportunities for Broader Research

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Stored DBS offer an unparalleled resource

- Nearly complete population ascertainment
- Integration with existing/expanding public health registries
- Whole blood contains a very wide range of biomarkers

What can be measured?

- DNA
- RNA
- Proteins
- Metabolites
- Environmental Exposures
- Infectious Agents

Multiplexing Opportunities

- Are comprehensive, versatile, effective...
 - Whole genome amplification (36 ng goes to 50 µg)
(Hollengard 2003)
 - cDNA array measurement of 3,000-4,000 gene transcripts In DBS 3-20 yrs
 - Protein bead arrays
 - Tandem mass spectrometry

Dried Blood Spots Used in Other Venues

- Pharmaceutical companies have developed DBS assays for >50 compounds
- Vaccine trials in developing countries use DBS for monitoring
- Some epidemiological researchers are moving to DBS for monitoring environmental exposures

Public Health Registries

- Birth records
- Childhood Death
- Immunization
- Hearing
- WIC programs
- Cancer
- Medicaid
- Death records
- Water quality
- Air quality
- Environmental hazards
- Outbreaks
- Hospital Discharge

What kinds of things can be done?

Case studies of the ultra rare

Cross-sectional studies of prevalence

Case-Control Studies

Birth Cohort Studies

Cross-Sectional Studies

- Assessing patterns of important genetic variations geographically
- Assessing patterns of environmental exposure geographically
- Assessing trends over time in an area

Case-Control Studies

- There are hundreds/thousands of low frequency diseases and health outcomes that could be served by utilizing the DBS
 - Cerebral Palsy
 - Hearing Loss
 - Severe Combined Immunodeficiency
 - Sudden Cardiac Death
 - Drug Allergies
 - Childhood cancers

Birth Cohort Studies

- Typically a tremendously expensive, highly powerful investigation of a population's health
 - Allows the long term investigation of environmental accidents and hazards
 - Effects of health policies on health outcome
 - Gene-by-environment interaction
 - Could further motivate integration of public health registries with EHR through HIE (e.g. maternal PKU and sickle cell patient databases)

...So what is holding me back from this dream job?

Opportunities for Broader Research on how to do this kind of population research

Research Ethics – a vital part of the research

The relationship with the participants and the department of health

The translation highway is about helping people.

An example of what the researcher sees...

The people

- Who owns the spots?
- Who is going to make money off this?
- Why didn't you ask me?
- What will we get in return?
- Will this stop community-based research networks?

The Department of Health

- ...We own the spots..
- ...We are going to make money off of this...the whole state will benefit
- ...We didn't need to and you've said 'Research is good'
- ...Better population health
- ...Don't think so

The broader opportunities for research

A whole new world...
AND
deep paradoxical feelings
about unintended consequences