



**Travel Distance to HIV Medical Care: A  
Geographic Analysis of Weighted Survey  
Data from the Medical Monitoring Project in  
Philadelphia, PA.**

**Michael G. Eberhart, MPH  
ECHPP Annual Meeting 2012  
Washington, D.C.**



# Background

- Collaboration bet/ UPenn CFAR and PDPH
- Capacity Building
  - GIS Training
    - School of Policy and Planning
    - 2 days
    - Map Basics
    - Choropleth
    - Geocoding
    - Data types
    - Map elements

# Background

- Capacity Building
  - Advanced Training
    - Distance Calculation
    - Animation
    - Spatial Analysis
      - Statistical methods
      - Practical applications
      - School of Engineering and Applied Sciences
  - Working with Raster Data
    - Spatial modeling
    - Smoothing techniques
      - » Protect confidentiality

# Background

- Access to quality medical care
- Barriers
  - Travel distance
  - Insurance
  - Socio-economic factors
- Resource allocation
- Medical Monitoring Project (MMP)

# Methods

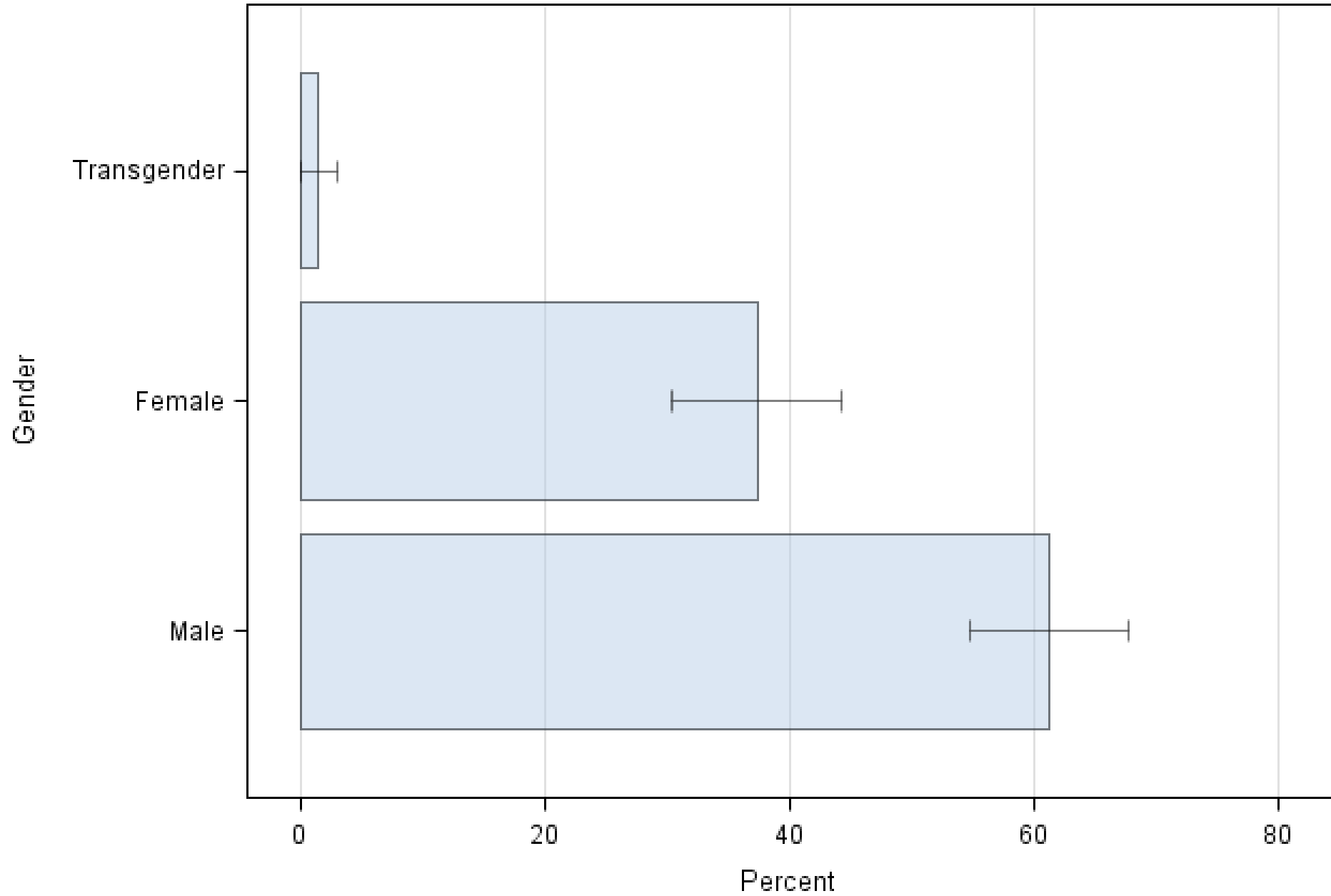
- Multi-stage sampling design
- Philadelphia data
  - 400 patients sampled
  - 24 facilities
  - Recruitment at subsequent medical visit
  - Interviews between June 2009 and April 2010
  - 260 interviews (260/400=65%)
  - Data weighted to represent in-care population and account for non-response bias

# Methods

- Current Residence
  - Cross-streets
- Facility address
  - Current
  - Closest
- Distance calculated
  - Euclidean (straight line)
  - Network (traffic rules)
- ArcGIS 10.0

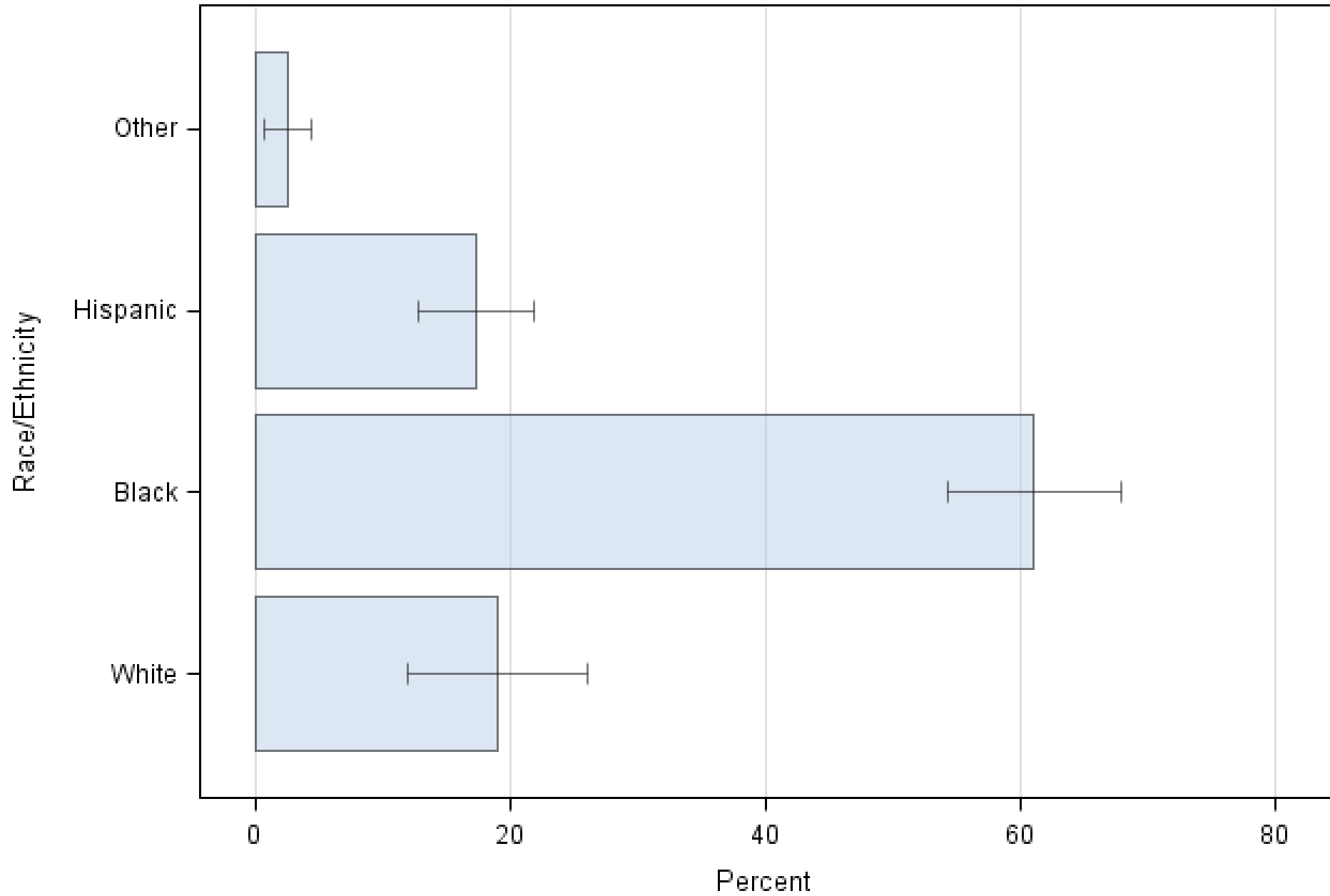
# Distribution of Gender

With 95% Confidence Limits



# Distribution of Race/Ethnicity

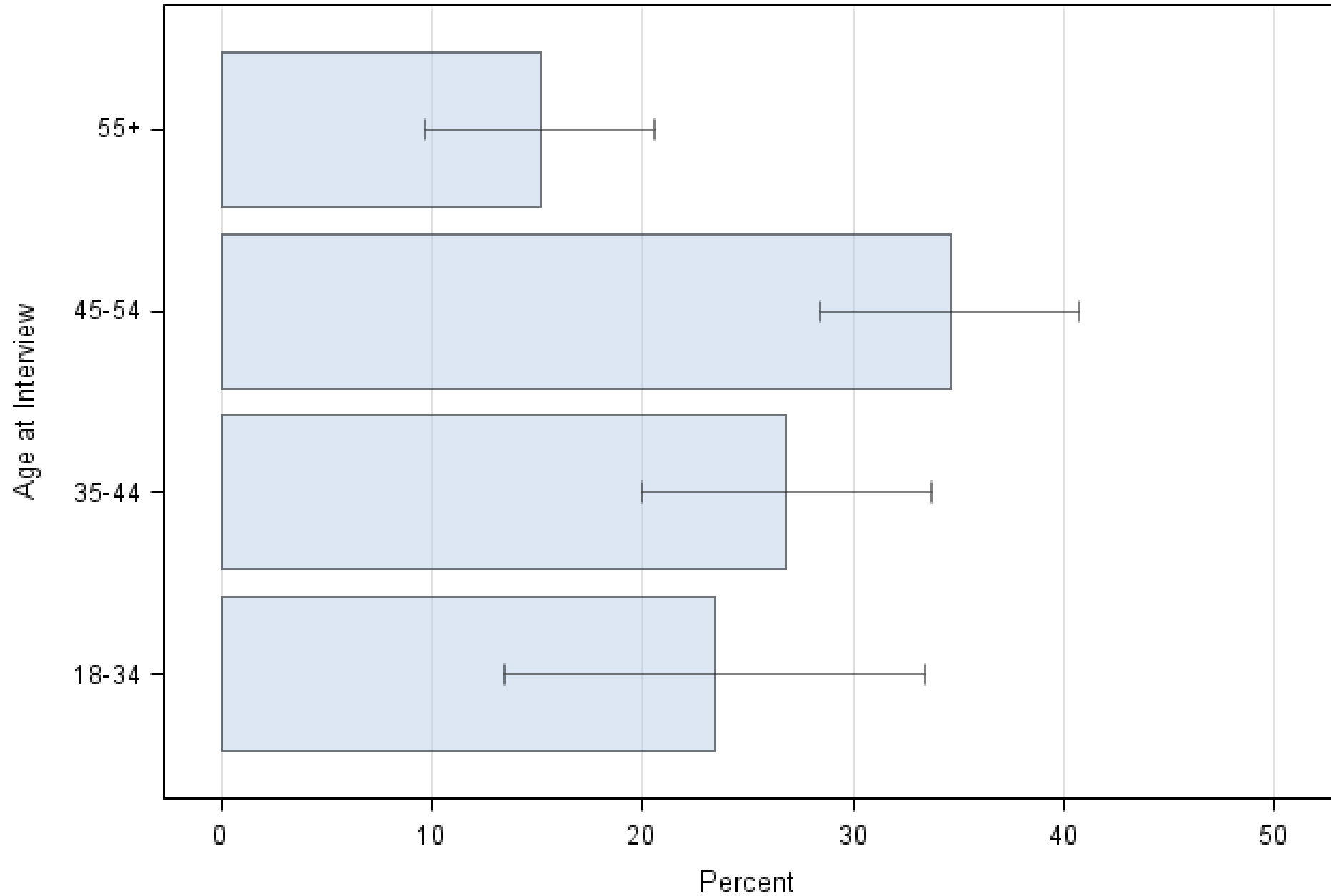
With 95% Confidence Limits





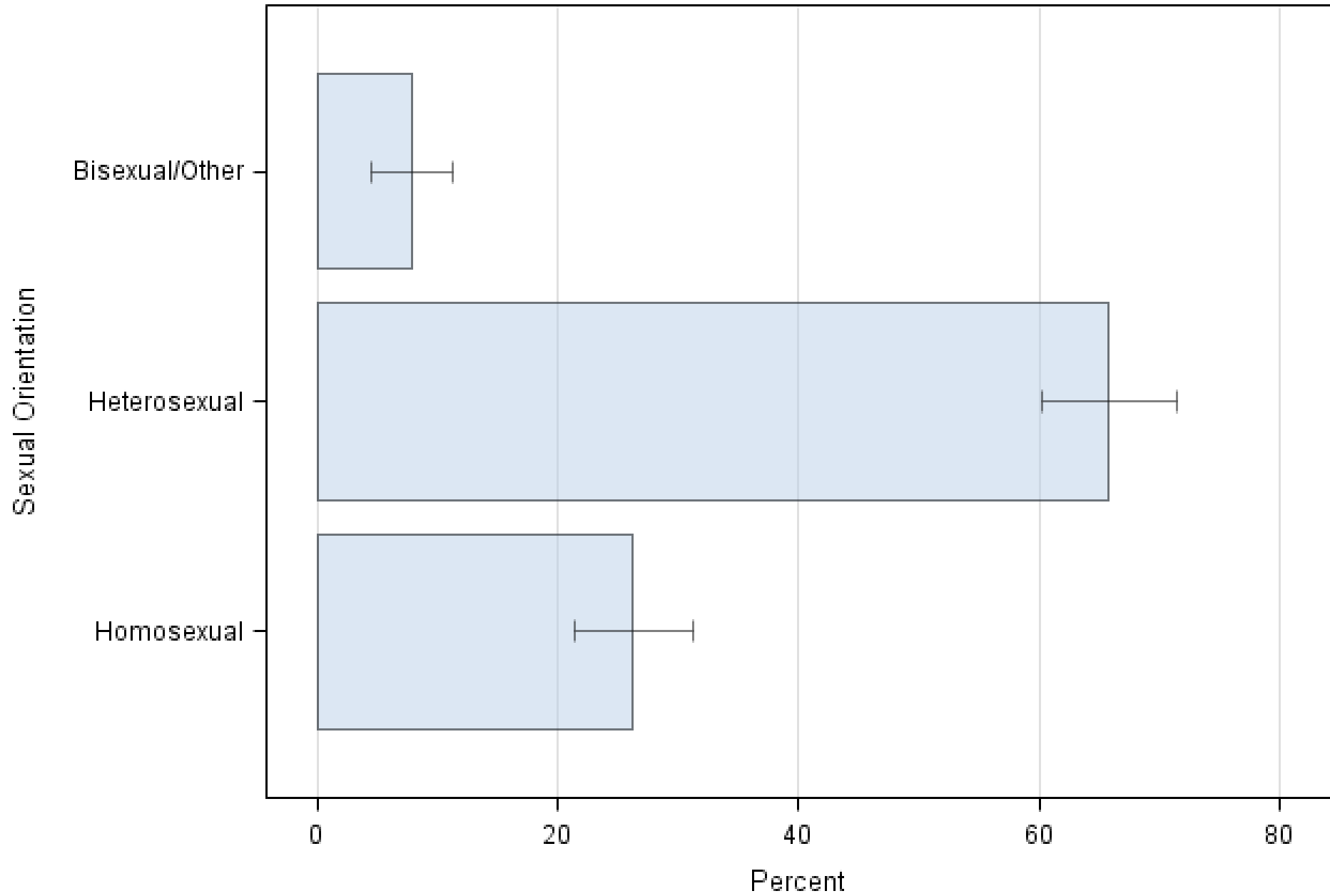
# Distribution of Age at Interview

With 95% Confidence Limits



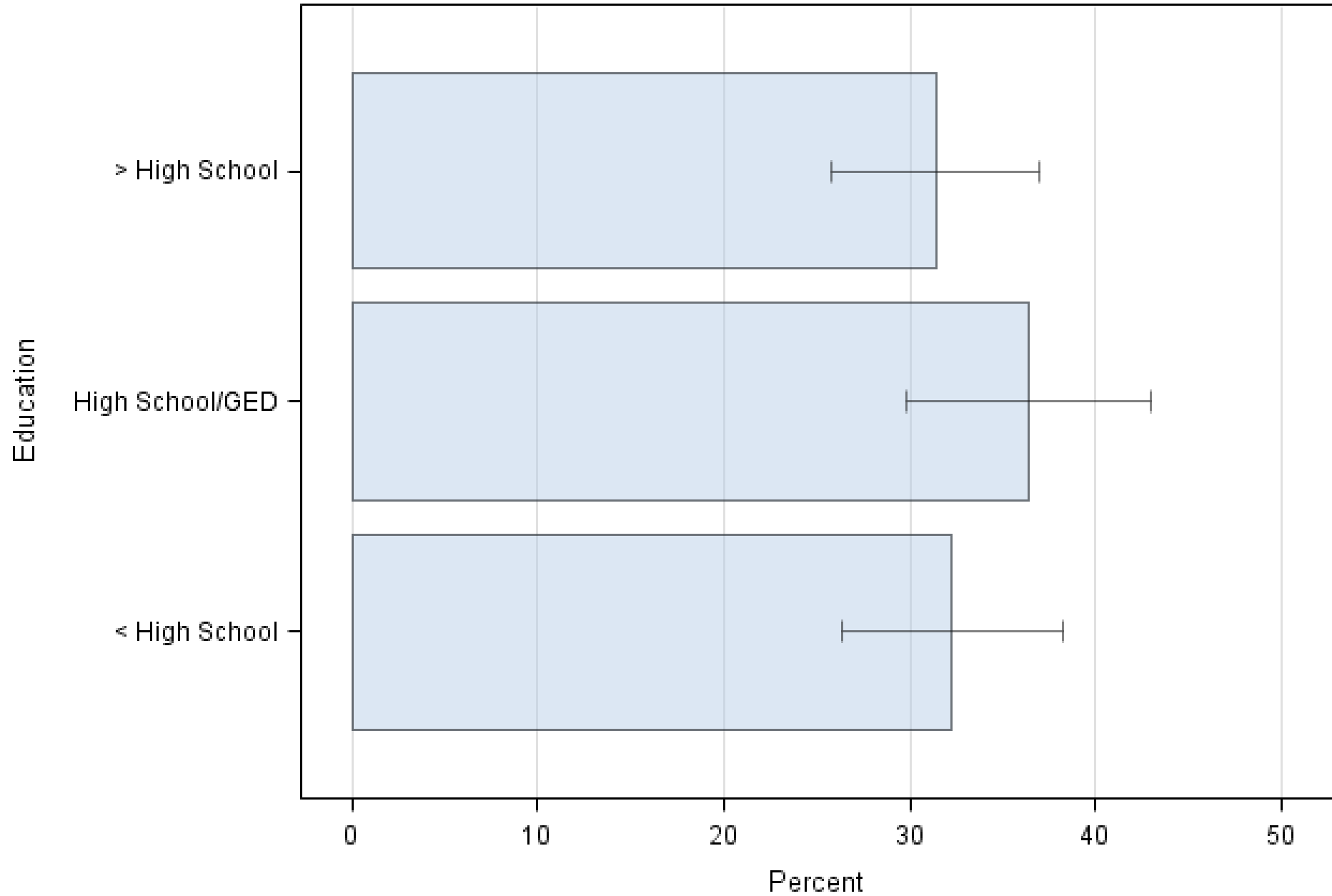
# Distribution of Sexual Orientation

With 95% Confidence Limits



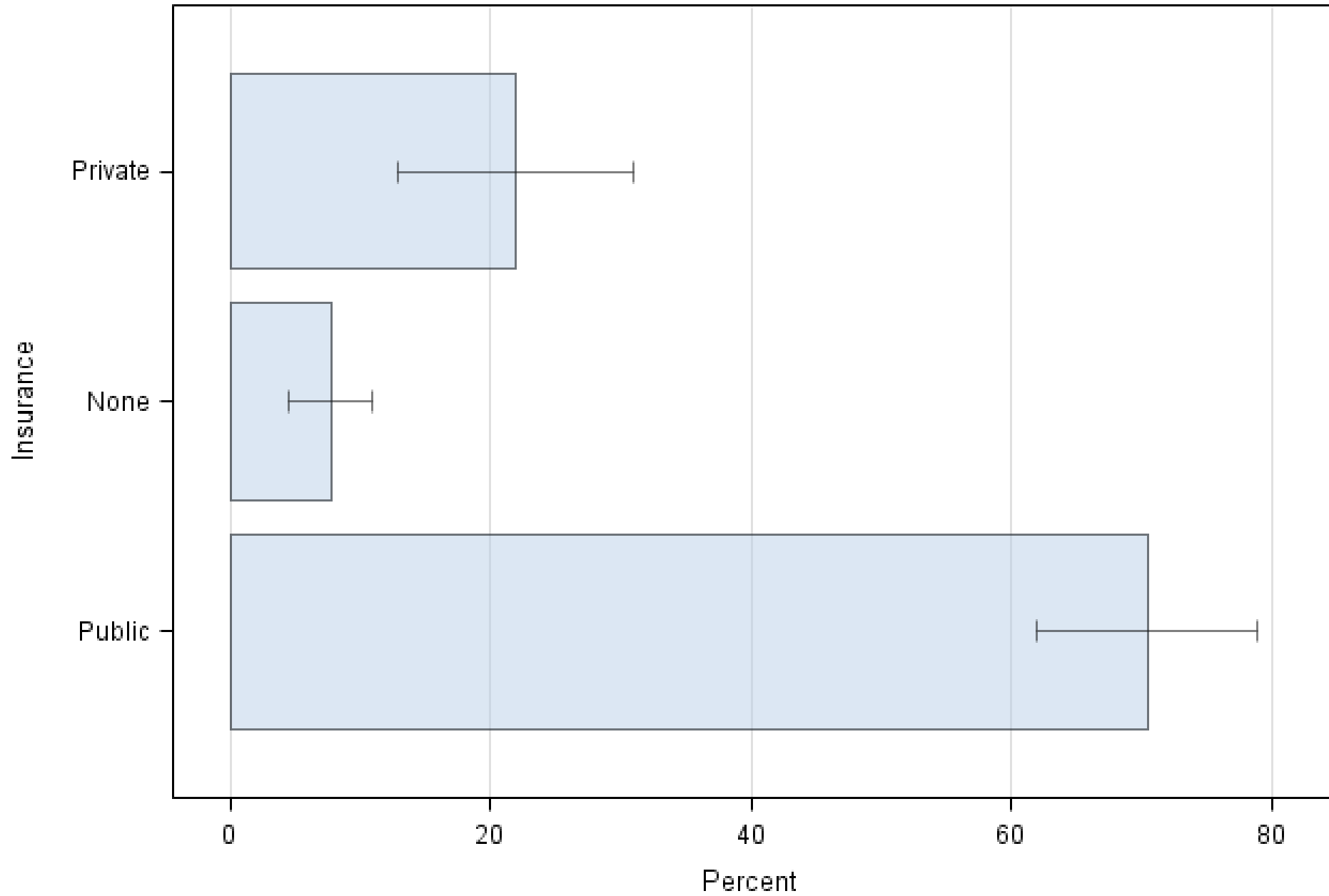
# Distribution of Education

With 95% Confidence Limits



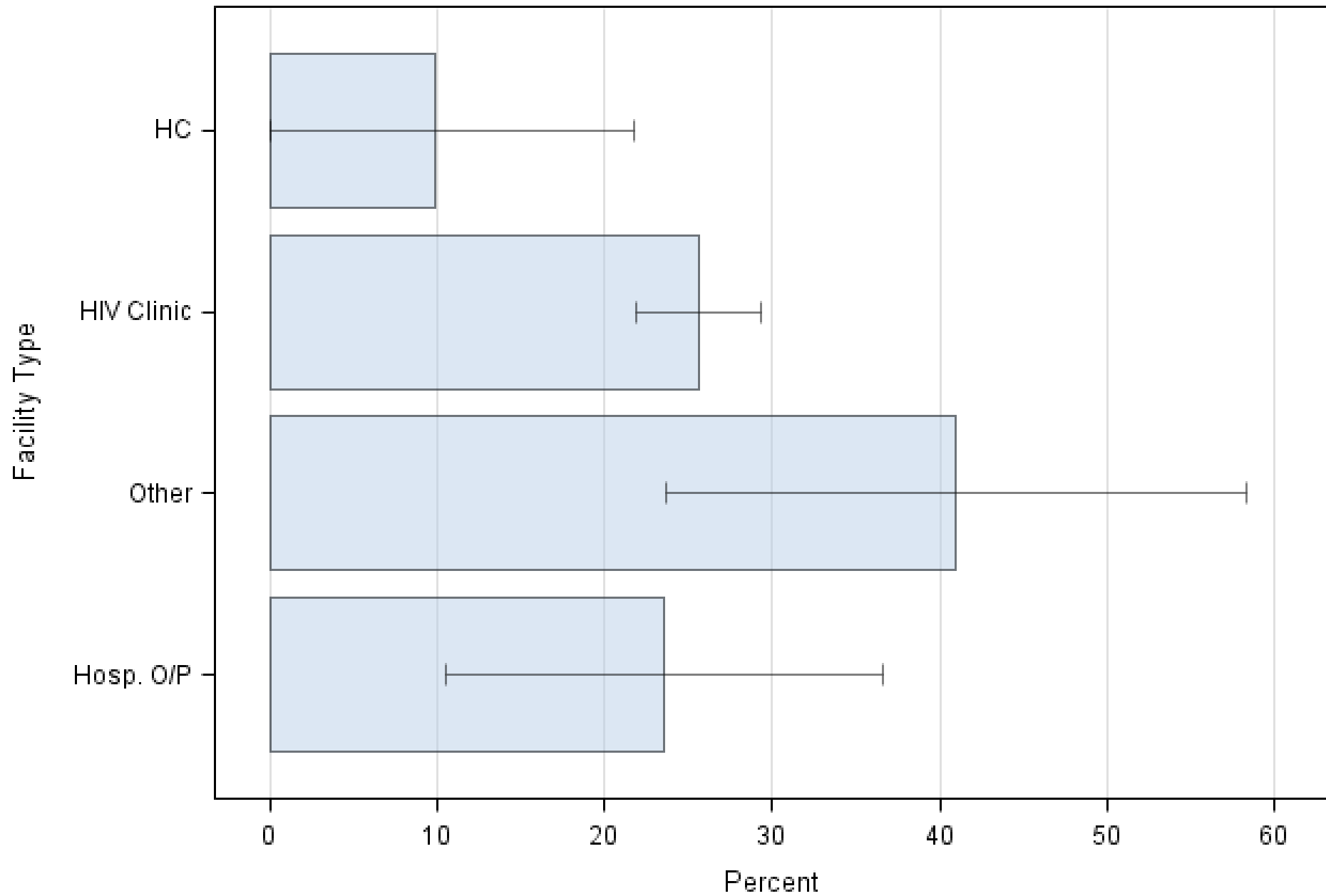
# Distribution of Insurance

With 95% Confidence Limits



# Distribution of Facility Type

With 95% Confidence Limits



# Results

- Overall Travel Distance
  - 3.7 miles (95% CI [3.2-4.3]) – straight line
  - 4.4 miles (95% CI [3.7-5.0]) – network
- Avg distance to nearest care site
  - 1.03 miles
  - 46.3% travel > 3 miles beyond nearest care
  - Proximity not a predictor of care choice

# Gender and Race

<b>Category</b>		<b>Euclidean (Miles)</b>	<b>95% CI</b>	<b>Network (Miles)</b>	<b>95% CI</b>
<b>Gender</b>	<b>Male</b>	<b>3.9</b>	<b>[3.3-4.4]</b>	<b>4.5</b>	<b>[3.8-5.1]</b>
	<b>Female</b>	<b>3.4</b>	<b>[2.8-4.0]</b>	<b>4.0</b>	<b>[3.3-4.7]</b>
	<b>Transgender</b>	<b>7.2</b>	<b>[1.3-13.1]</b>	<b>8.4</b>	<b>[1.4-15.4]</b>
<b>Race</b>	<b>White</b>	<b>4.7</b>	<b>[3.1-6.4]</b>	<b>5.4</b>	<b>[3.6-7.3]</b>
	<b>Black</b>	<b>3.6</b>	<b>[3.1-4.1]</b>	<b>4.3</b>	<b>[3.7-4.9]</b>
	<b>Hispanic</b>	<b>3.1</b>	<b>[2.2-4.0]</b>	<b>3.6</b>	<b>[2.6-4.6]</b>
	<b>Other</b>	<b>3.8</b>	<b>[-0.7-8.2]</b>	<b>4.1</b>	<b>[-0.6-8.9]</b>

# Insurance, Education and Sexual Orientation

Category		Euclidean (Miles)	95% CI	Network (Miles)	95% CI
Insurance	Public	3.3	[2.9-3.6]	3.8	[3.4-4.2]
	None	6.9	[3.9-9.8]	7.7	[4.4-11.0]
	Private	4.4	[2.8-6.0]	5.2	[3.3-7.2]
Education	< High School	3.3	[2.6-4.1]	3.8	[3.0-4.7]
	High School/GED	3.4	[2.8-4.0]	4.0	[3.3-4.7]
	> High School	4.6	[3.3-5.8]	5.4	[3.9-6.8]
Sexual Orientation	Homosexual	3.6	[2.7-4.5]	4.2	[3.2-5.2]
	Heterosexual	3.9	[3.1-4.6]	4.5	[3.6-5.5]
	Bisexual/Other	3.3	[2.0-4.6]	3.9	[2.4-5.3]



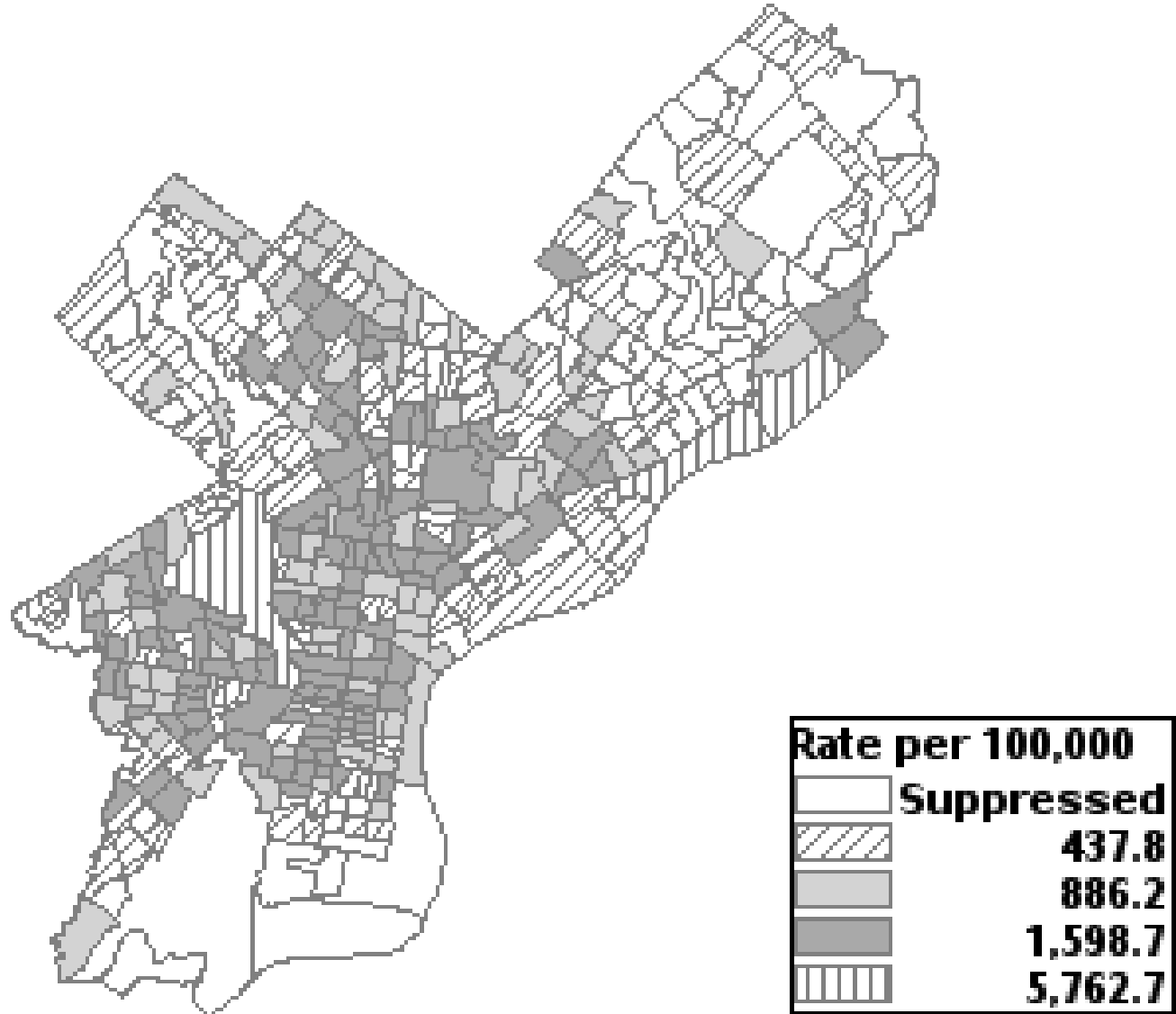
# Age and Facility Type

<b>Category</b>		<b>Euclidean (Miles)</b>	<b>95% CI</b>	<b>Network (Miles)</b>	<b>95% CI</b>
<b>Age Category</b>	<b>18-34</b>	<b>4.0</b>	<b>[3.3-4.7]</b>	<b>4.6</b>	<b>[3.8-5.5]</b>
	<b>35-44</b>	<b>4.3</b>	<b>[3.2-5.3]</b>	<b>4.9</b>	<b>[3.7-6.1]</b>
	<b>45-54</b>	<b>3.0</b>	<b>[1.7-4.4]</b>	<b>3.6</b>	<b>[2.1-5.2]</b>
	<b>55+</b>	<b>3.8</b>	<b>[2.8-4.7]</b>	<b>4.4</b>	<b>[3.3-5.5]</b>
<b>Facility Type</b>	<b>Hosp. O/P</b>	<b>4.3</b>	<b>[3.4-5.1]</b>	<b>4.9</b>	<b>[4.0-5.8]</b>
	<b>Other</b>	<b>3.6</b>	<b>[2.6-4.6]</b>	<b>4.3</b>	<b>[3.1-5.5]</b>
	<b>HIV Clinic</b>	<b>4.0</b>	<b>[3.2-4.9]</b>	<b>4.5</b>	<b>[3.7-5.4]</b>
	<b>HC</b>	<b>2.7</b>	<b>[0.9-4.6]</b>	<b>3.2</b>	<b>[1.1-5.3]</b>

# Regression Model

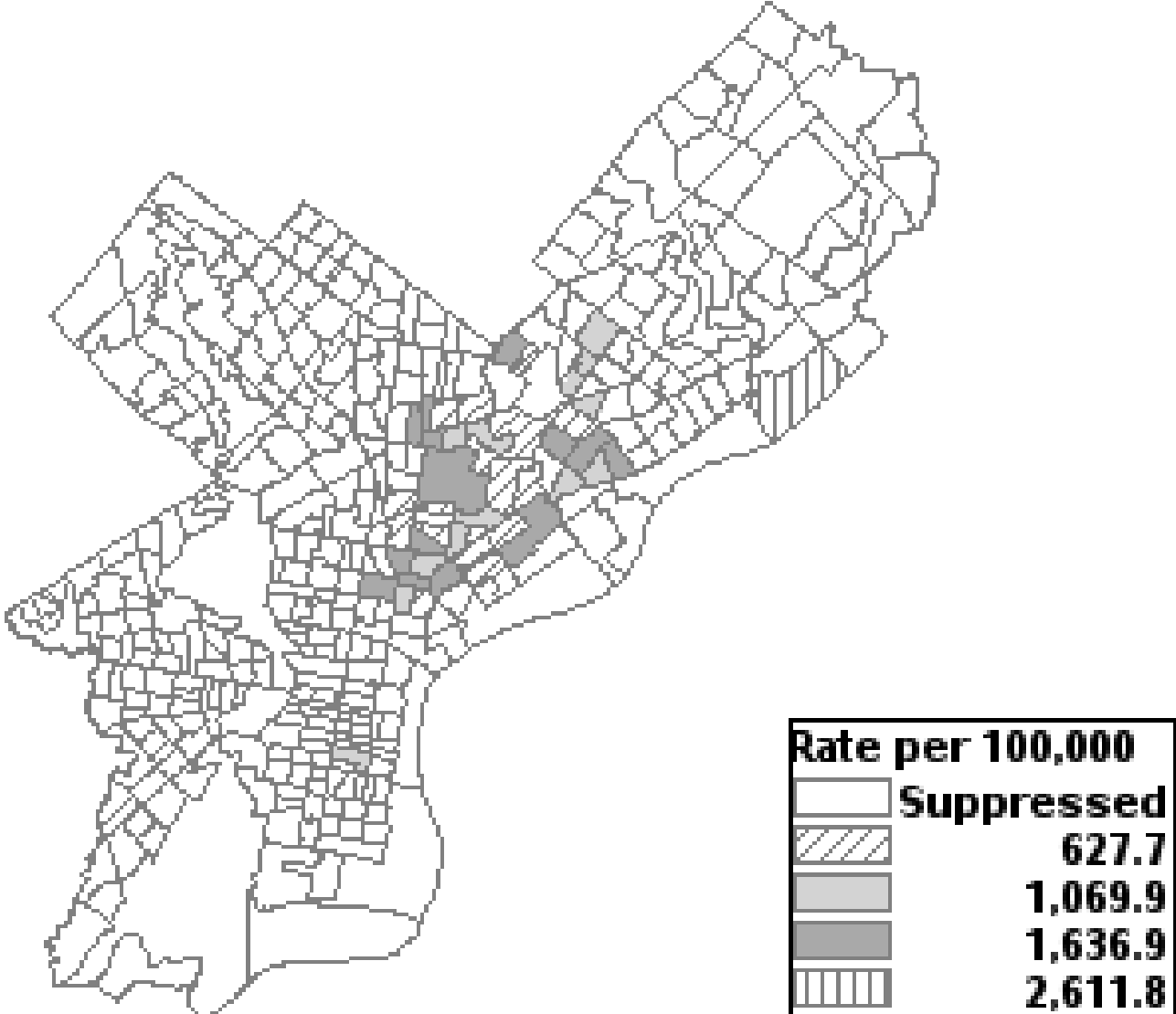
- Predictors of Travel Distance
  - Lack of Insurance vs Public Insurance
    - AOR 3.7 (p=.0005)
  - Hispanic Race vs White Race
    - AOR -1.6 (p=0.046)

# Overall HIV Rates by Census Tract, Philadelphia, PA 2009



Rates suppressed for counts <5 and/or population <500

# Hispanic HIV Rates by Census Tract, Philadelphia, PA 2009



Rates suppressed for counts <5 and/or population <500

# Question/Comments

- Questions?
- Acknowledgements
  - Philadelphia MMP Staff
  - Dr. David Metzger and Dr. Michael Blank (UPenn)
  - Chelsea Voytek and Danielle Fiore (UPenn)
  - Dr. Amy Hillier (UPenn)
  - Brad Shannon (PDPH ECHPP)
  - Dr. Kathleen A. Brady (PDPH)
- Contact information
- [michael.eberhart@phila.gov](mailto:michael.eberhart@phila.gov)



# Penn Center for AIDS Research

## ECHPP: GIS for access to and retention in care

**UPENN**

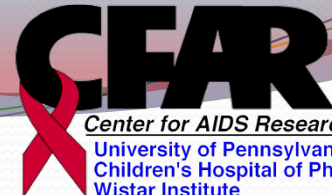
**David Metzger, Michael Blank, Amy Hillier, Chelsea Voytek,  
Danielle Fiore**

**AACO**

**Kathleen Brady, Michael Eberhart**



Penn  
UNIVERSITY OF PENNSYLVANIA



Center for AIDS Research  
University of Pennsylvania  
Children's Hospital of Philadelphia  
Wistar Institute

Home - Contact

# The Penn Center for AIDS Research

The University of Pennsylvania

Children's Hospital of Philadelphia

The Wistar Institute

- About Penn CFAR
- Research Programs
- Core Resources
- Members
- Seminars & Events
- Funding Opportunities
- HIV/AIDS I

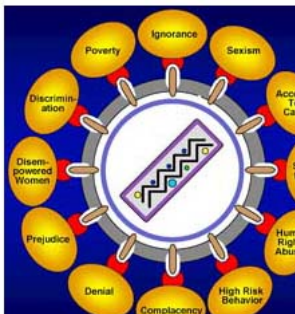
- CFAR Cores
- Behavioral Services
- Publications
- Tools
- Events
- Core Newsletter
- Core Contacts

- CFAR Community
- Advisory Board
- Members
- Activities
- Past Activities
- CAB News
- CAB Broch

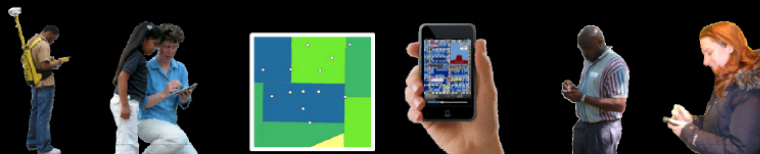
## Behavioral and Social Sciences Core

**Director:** David Metzger, Ph.D.  
**Co-Director:** Michael Blank, Ph.D.  
**Coordinator:** Tiffany B. Dominique, B.A.

The Behavioral and Social Sciences Core devotes its resources to the expansion of existing services and the developmental of new services to facilitate intellectual and operational linkages between behavioral, clinical, and basic sciences investigators. Given the extensive linkages of program members to the community, the Core will continue to lead the CFAR in fostering the developmental of meaningful community partnerships through its support



# Using GIS Data in Health-related Research



Amy Hillier, MSW, PhD



University of Pennsylvania  
School of Design



Cartographic Modeling Lab



Michael A. Nutter, Mayor  
 Donald F. Schwarz, MD, MPH, Deputy Mayor, Health and Opportunity, Health Commissioner  
 Nan Feyler, JD, MPH, Chief of Staff  
 Jane Baker, AACO Director



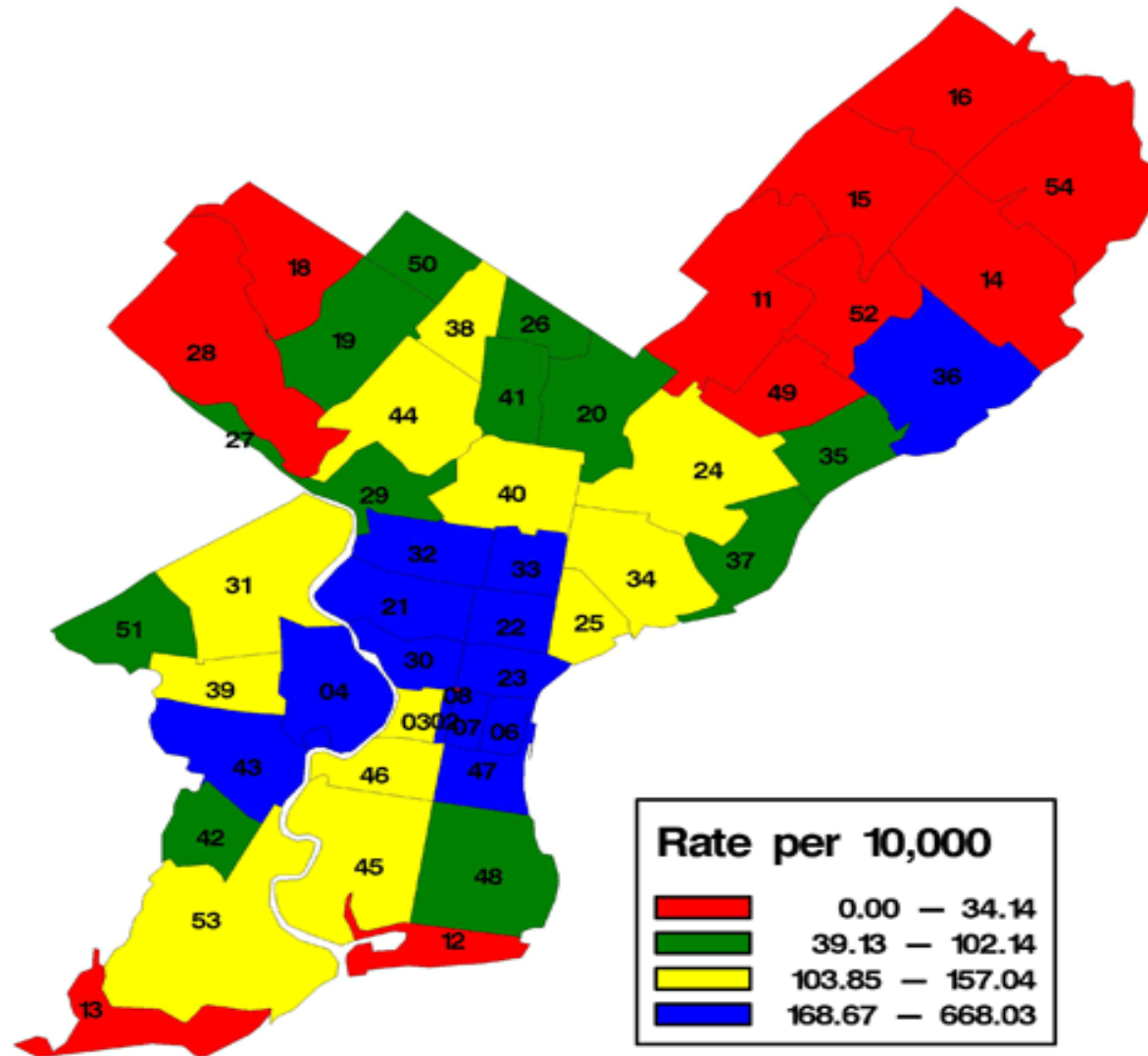
## AIDS Activities Coordinating Office (AACO) Surveillance Report 2010

HIV/AIDS in Philadelphia

~Cases Reported through June 2011~

Mark Shpaner, MD, Surveillance Program Manager  
 Kathleen A. Brady, MD, Medical Epidemiologist  
 Michael Eberhart, MPH, Epidemiologist

# People Living With HIV/AIDS in Philadelphia: 2011





# Demographic Details for Zipcode 19124

## Gender of HIV/AIDS Cases

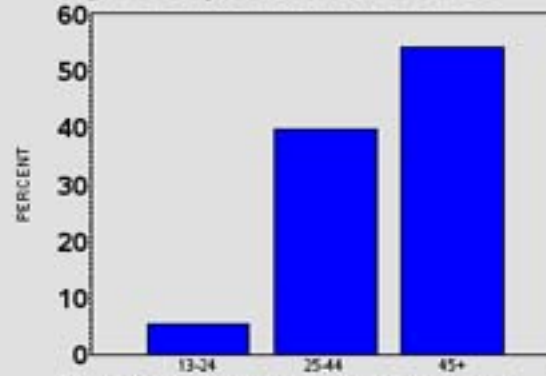


## Race/Ethnicity of HIV/AIDS Cases

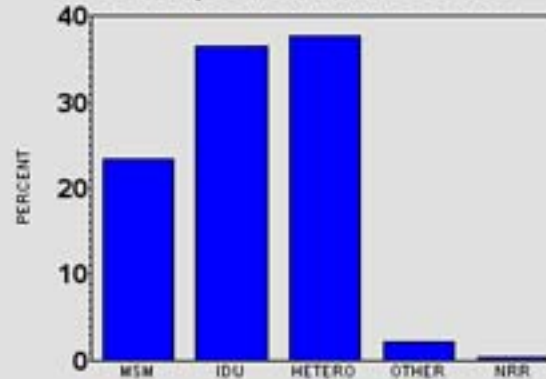


■ Black    ■ White    ■ Hispanic

## Age Group of HIV/AIDS Cases



## Mode of Exposure of HIV/AIDS Cases





# Importance of geography and GIS in 2012

- **Shift from focus on individual risk behaviors**
- **HIV is not randomly distributed geographically**
- **Incident infections, access to and retention in care are likely to be impacted by geography**
- **Accessible, acceptable, and affordable**
- **Community concern about distribution of services**



**Penn**  
UNIVERSITY OF PENNSYLVANIA



# UPENN CFAR ECHPP: Year 01

- **Complete basic and advanced Geographic Information System (GIS) Training to staff of the AIDS Activities Coordinating Office**
- **Developed resources for using GIS in HIV – meaningful geographic questions, annotated bibliography, databases, projects**
- **Establish GIS web site for CFAR ECHPP**
- **Design and conduct analyses for examining distance to care among MMP participants (Eberhart)**
- **Provide mapping support to HIV investigators**



Philadelphia CFAR ECHPP Supplement

hivprevres.wordpress.com

About Us Projects Publications Related Links Resources Services

Search

## About Us

In Philadelphia, the Behavioral and Social Science Core of the University of Pennsylvania Center for AIDS Research (UPENN CFAR) is working collaboratively with the AIDS Activities Coordinating Office (AACO) of the Philadelphia Department of Public Health to strengthen AAACO's capacity to employ Geographic Information Systems (GIS) technology – combining geographic, behavioral, and biological data – to provide policy-relevant information regarding HIV/AIDS in the City of Philadelphia.

This project is a supplement to the Enhanced Comprehensive HIV Prevention Planning and Implementation for Metropolitan Statistical Areas Most Affected by HIV/AIDS (ECHPP) initiative for the 12 municipalities with the highest number of people living with AIDS in the United States, funded by the U.S. Centers for Disease Control and Prevention (CDC) Division of HIV/AIDS Prevention (DHAP).

This supplemental project was developed to allow the Penn CFAR to help develop the capacity within the AIDS Activities Coordinating Office (AACO) of the Philadelphia Department of Public Health in the use of geographic data and cartographic methods, and how to combine those with other data sets to provide policy relevant information regarding HIV/AIDS in the City. This type of technical assistance was meant to further develop AAACO's expertise in the use of the most current software and strategies required to link behavioral data, biological data, and geographic data.

HIV and AIDS case rates in Philadelphia are quite variable across ZIP codes and neighborhoods. This highlights the need to use social network, neighborhood, and other approaches utilizing an ecological approach to prevention and treatment. Since the Health Department is charged with regularly addressing important issues related to the distribution and accessibility of services around Philadelphia, this type of information is critical.

Clearly, geographic characteristics of the epidemic (the neighborhoods most severely impacted and the location of service delivery and providers) are very important aspects of service accessibility and acceptability. While many assume that having services located close to the client's residence is desirable, accessibility and acceptability must also be considered in light of other forces such as stigma, perceived quality of services, access to transportation, and cost of transportation. Additionally, integration of geospatial data with other secondary data sources can provide useful and heretofore unavailable information for program planning and resource distribution purposes.

**To Contact Us:**

Center for AIDS Research  
University of Pennsylvania  
3535 Market Street, Suite 4000  
Philadelphia, PA 19104

Phone: 215-746-3711  
Fax: 215-746-7377  
E-mail: chelseav@mail.med.upenn.edu

Rate per 10,000

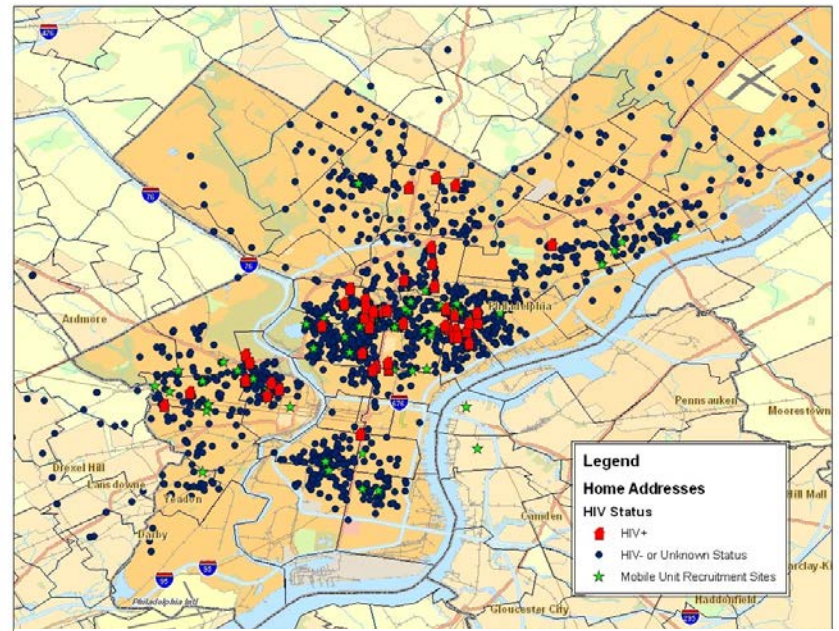
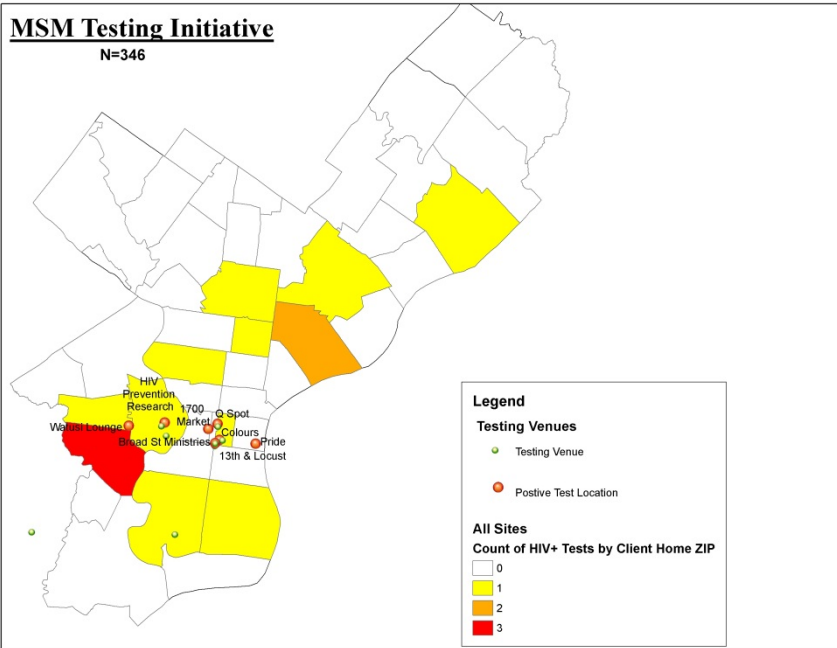
- 0.00 – 34.54
- 35.00 – 102.54
- 103.00 – 157.54
- 158.00 – 658.00

Follow

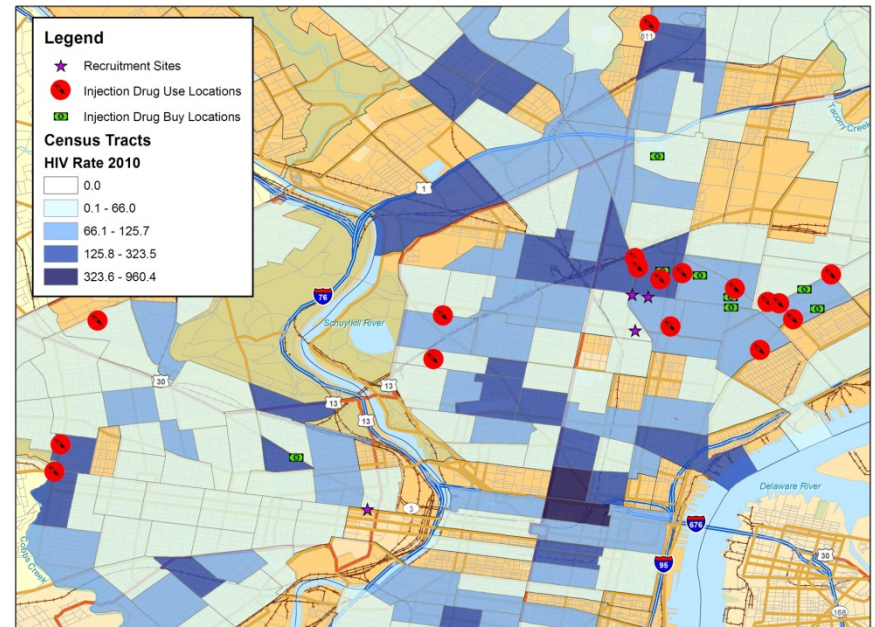


# MSM Testing Initiative

N=346

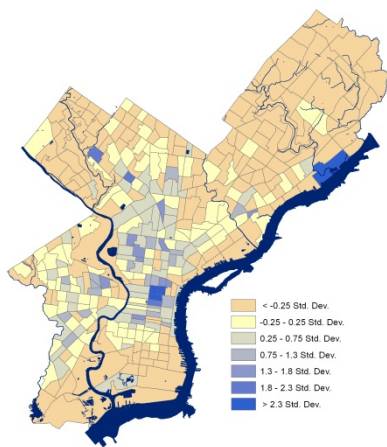


Enrolled Participant Drug Buy and Use Locations

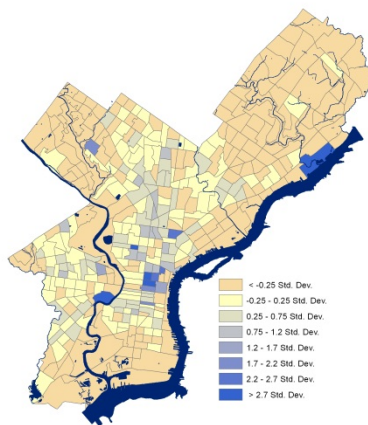




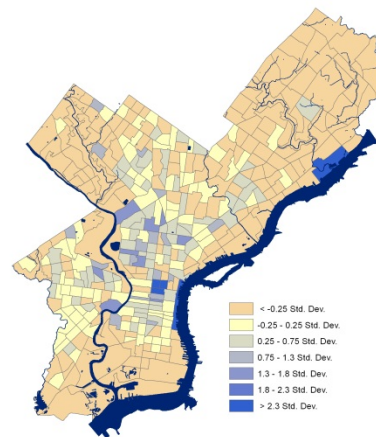
HIV Rate 2006



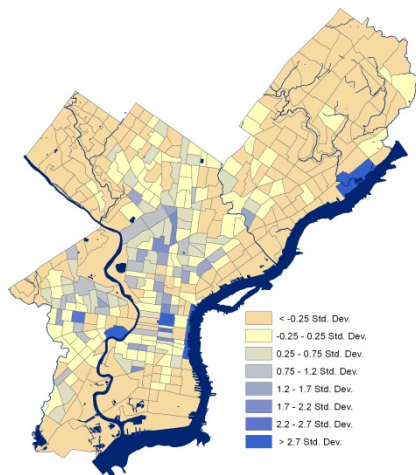
HIV Rate 2007



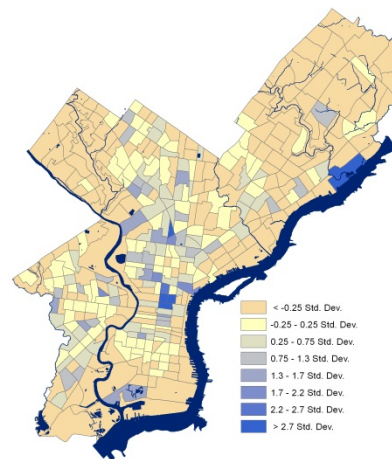
HIV Rate 2008



HIV Rate 2009



HIV Rate 2010



# Analytic strategies

