

# Involvement with the Criminal Justice System

## Using Existing Administrative/Operational Data to Measure Service System Performance

### OVERVIEW

The Bristol Observatory is currently working with four states to measure levels of criminal justice involvement for recipients of behavioral health services. In each state, this measurement is based on analysis of anonymous extracts from existing administrative/operational databases from two or more state agencies. In each state, The Bristol Observatory is using the technology of Probabilistic Population Estimation to determine rates of criminal justice involvement without reference to personally identifying information.

In this presentation, each state poses a question related to the criminal justice involvement of service recipients, describe the process used to gain access to criminal justice and other data, presents findings that relate to the question at hand, and suggest directions for further analysis. The Bristol Observatory describes its analytical strategy and the method of Probabilistic Population Estimation, a computer intensive method for determining the number of people shared by HIPAA compliant data sets.

### PRESENTERS

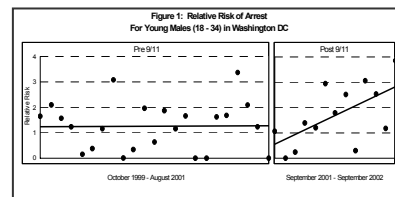
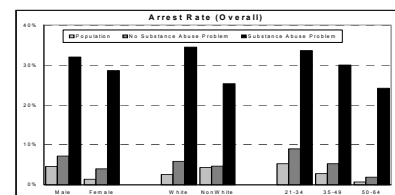
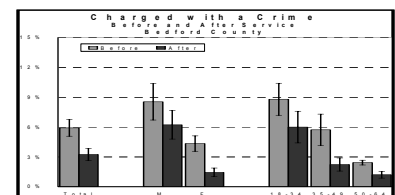
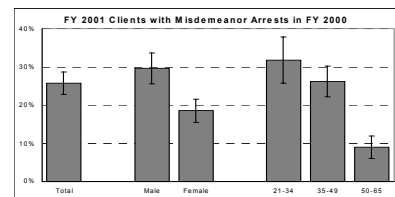
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 May 29, 2003, Marriott Wardman Park Hotel, Washington, D.C.

**The Bristol Observatory** is a contract research firm that specializes in human services program evaluation and service system research with an emphasis on treatment outcomes. Our measurement of treatment outcomes is frequently based on analysis of large administrative/operational databases from multiple public agencies using statistical tools that protect the personal privacy of the individuals represented in those databases.

One of our primary tools in this work is Probabilistic Population Estimation, a statistical data mining tool that uses anonymous data sets to produce the information on caseload size and overlap in complex systems of care. Probabilistic Population Estimation allows our researchers to measure treatment outcomes, levels of access to care, and caseload overlap where the absence of unique person identifiers and/or concerns about personal privacy preclude direct linkage of records.

**Large administrative/operational databases** play an important role in our approach to service systems research and program evaluation. We recognize that the databases our society generates on an ongoing basis can contribute to our understanding of our systems of care. We live in an information-rich society. We believe we have a responsibility to use this resource to promote the advancement of knowledge.

Analysis of administrative/operational databases has a number of advantages over narrowly focused special purpose data collection. First, the data are available now. Program administrators need not wait while instruments are designed and data are collected. Second, the analysis of existing administrative/operational databases is economical. The cost of new data collection is avoided. Third, these databases are comprehensive. They provide information (e.g. arrest rates) about the population at large so that service recipients can be compared to other residents. In addition, treatment outcomes for different groups of service recipients can be compared to help determine treatment effectiveness. Finally, research and evaluation studies that use administrative/operational databases can be easily replicated in different geographical regions and over time. Many of these databases include years of data that can support the evaluation of the impact of changes in systems of care or in the larger society on access to care and treatment outcomes.

**Probabilistic Population Estimation**, one of The Bristol Observatory's primary tools, is a statistical data mining tool that measures the number of people represented in data sets that do not share unique person identifiers (Banks & Pandiani, 2001; Pandiani & Banks, 2002). Probabilistic Population Estimation determines how many people are represented in both databases, without revealing who the people are. For this reason, the personal privacy of individuals and the confidentiality of medical records are assured because Probabilistic Population Estimation does not depend upon information that identifies specific individuals. Probabilistic Population Estimation is not suitable for clinical and case management applications that require the identification of individuals, but is a very powerful tool for services research and program evaluation where the identification of specific individuals is not desirable.

Probabilistic Population Estimation provides estimates (with known confidence intervals) of the number of people shared across data bases by combining information on the distribution of dates of birth in data sets with information on the distribution of dates of birth in the general population. (See the Methodological Note at the end of this document for more mathematical detail.) The Bristol Observatory has used Probabilistic Population Estimation to measure a wide variety of treatment outcomes including mortality, hospitalization, maternity, economic dependency, and criminal justice involvement. Probabilistic Population Estimation has been used to measure caseload overlap among numerous public agencies including mental health, substance abuse, social welfare, child protection, education, medical insurance, and criminal justice. (See the Related Readings at the end of this document for specific examples of this work.)

## **Data Set Specifications For Probabilistic Population Estimation**

**File Definition:** Each data set should include information for one service sector for a specified period of time (usually one year or six months).

**File Format:** Most file formats are acceptable. Our favorites include SPSS, Excel, and tab-delimited text files.

**Records:** May be one record per person or multiple records per person (e.g. event or episode records)

### **Required Data Elements:**

1. Date of Birth
2. Gender

### **Other Data Elements:**

1. Race/ethnicity codes can provide a valuable analytical tool.
2. Geographical indicators provide for regional comparisons and may be required for large populations. Zip codes, FIPS codes, county codes, region codes, etc are acceptable. Tables for conversion among region codes may be needed.
3. Individual service sectors frequently have data elements of special concern that could be useful for analysis and reporting. Examples include diagnosis in mental health, type of offence in criminal justice, etc.

**Code lists** are required for all data elements except dates.

# DELAWARE

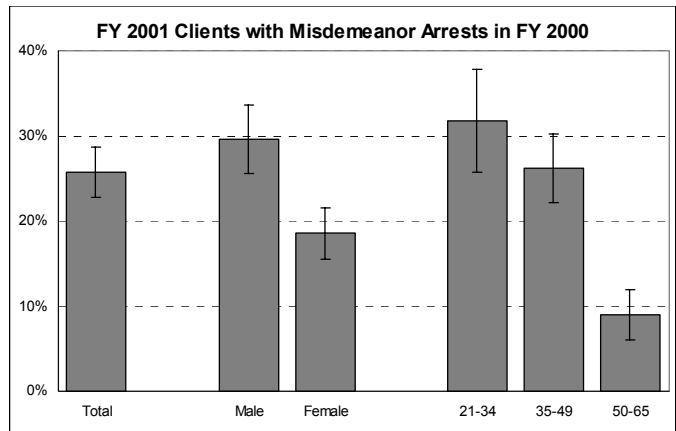
## Arrest Rates Before Treatment

**Question:** “How many of the adults aged 21-65, who received Division of Substance Abuse and Mental Health (DSAMH) services in Delaware during FY2001, had been arrested during FY2000?”

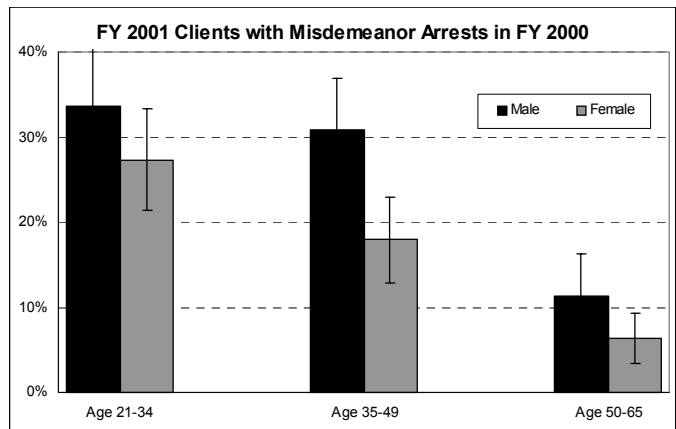
This project was originated in response to a recognized need for valid and reliable measures of criminal justice involvement for recipients of mental health and substance abuse treatment, and in response to the Performance Partnership Grant requirement that this information be reported to the SAMHSA. As a first step, levels of criminal justice involvement prior to treatment (during the year before a specified treatment year) are being examined on a statewide basis.

**Data:** This project involved analysis of data provided by DSAMH and the state’s Executive Branch criminal justice Statistical Analysis Center. In response to initial reluctance to share data with this project, a PPE Oversight Committee was formed to address data sharing issues. In addition to DSAMH staff, this committee includes representatives the state Budget Office, the Division of Labor, the Division of Vocational Rehabilitation, and of the Division of Child Mental Health Services.

Criminal justice data for this project was initially requested during October 2002. The first installment of criminal justice data was received, after the first meeting of the Oversight Committee, during April 2003.



**Findings:** More than 25% of the individuals who received publicly funded behavioral health care services in Delaware during FY2001 had been arrested for a misdemeanor during FY2000. Male service recipients were much more likely to be arrested than female service recipients (30% vs. 19%), and arrest rates decreased with increasing age (from 32% for 21-34 year old service recipients to 9% for service recipients in the 50-65 age group). Women were less likely to be arrested in every age group, but the difference was greatest in the 35-49 age group. Young men had the highest arrest rate (34%) and older women had the lowest (6%).



**Next Questions:** Were misdemeanor arrest rates for these service recipients different during 2002 (after treatment during FY2001) than they had been during FY2000? How many of these service recipients were arrested for felonies, drug-related offences, and other categories of arrest during the period of the study? Were arrest rates for recipients of substance abuse services different from arrest rates for recipients of mental health services? Did rates of arrest before the target treatment year vary among community programs? Do rates of change in arrest rates vary among community programs?

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# PENNSYLVANIA

## Criminal Charges Before and After Treatment

**Question:** “Are recipients of Medicaid behavioral health services less likely to be charged with a crime during the year after they receive services than during the year before services?”

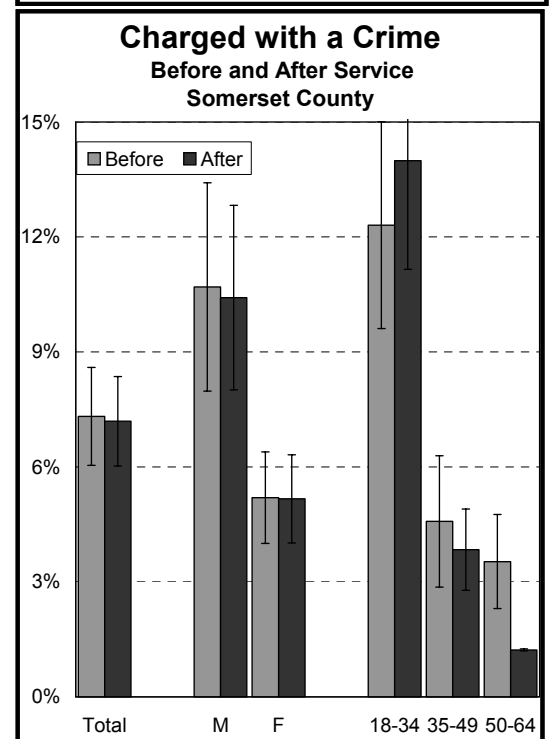
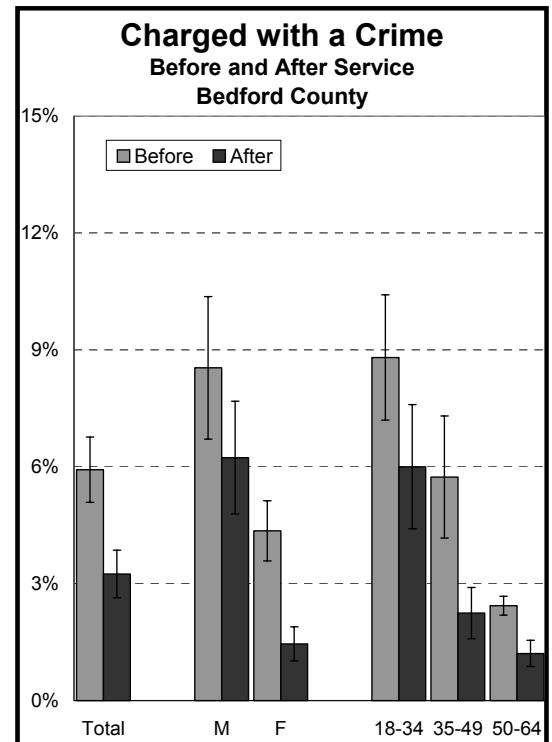
The impact of mental health services on levels of criminal justice involvement is a core measure of mental health program performance. This project compares the rate at which recipients of Medicaid reimbursed behavioral health (mental health and/or substance abuse) services are charged with a crime during the year before and the year after a specified treatment period in two neighboring counties in Pennsylvania.

**Data:** This project relied exclusively on analysis of anonymous extracts from databases maintained by Pennsylvania state agencies. One data set includes all recipients of Medicaid fee-for-service behavioral health services during October through December 2001. The second data set includes all individuals charged with a crime during October 2000 through September 2001, the year before the treatment period. The third data set includes all individuals charged with a crime during January through December 2002, the year after the treatment period.

The PA Office of Mental Health and Substance Abuse Services has direct access to the Medicaid paid claims database. Data for criminal charges was obtained from the state Office of the Court Administrator in response to a formal request from the PA project director. Identifying the right person to ask for the criminal justice data was a key step in gaining access to the data. Once the location of the criminal charging database was identified, data was available to the project in less than one month. Two additional data submissions have been received since that time. Other criminal justice data have been more difficult to obtain, however. Sources of and access to arrest data and incarceration data are currently being pursued.

**Findings:** Results of this analysis indicate that there was a substantial decrease in rates of criminal charges in one county during the study period, but there was no change in the other county. In both counties, men were significantly more likely than women to be charged with a crime, and the likelihood of being charged with a crime decreased with increasing age.

**Next Questions:** How do other counties compare in terms of rates in criminal charging and in change in rates of criminal charging? How do behavioral health service recipients compare to the general population in terms of criminal charging? Do different clinical groups have different rates of criminal charging?



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# CONNECTICUT

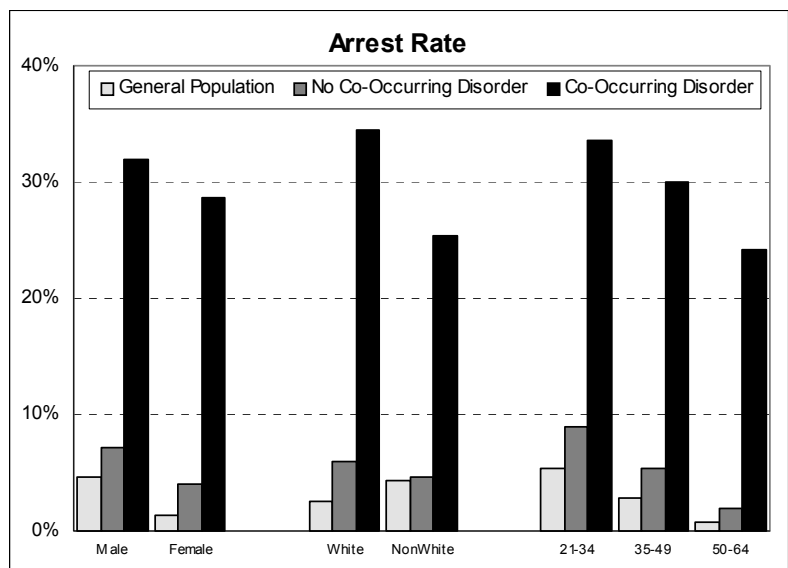
## Arrest Rates for People with Co-occurring (MH/SA) Disorders

**Question:** “Are adults with co-occurring (mental health and substance abuse) disorders arrested for offences not related to substance abuse at a different rate than adults with a mental health but no substance abuse disorder?”

The rate at which consumers of mental health services get into trouble with the law is an important concern of program administrators, advocates, and the general public. Most research regarding co-occurring MH/SA disorders relies on client self reports, clinical evaluations, and/or evidence of treatment in the two service systems to identify the presence of substance abuse disorders among mental health service recipients. There is widespread belief that this approach leads to substantial underestimation of the scope and the consequences of co-occurring disorders.

**Data:** This project used data from multiple state programs/agencies to build three data sets. One data set included information about individuals with evidence of substance abuse including a drug-related arrest (from the Dept. of Public Safety), driving while intoxicated (Dept. of Motor Vehicles), a substance abuse related probation (Judicial Branch), or participation in substance abuse treatment (Dept. Mental Health & Addiction Services – DMHAS). The second data set included data regarding all individuals who received mental health treatment from a DMHAS treatment program. The third data set included information about all individuals with non-substance abuse arrest. Non substance abuse arrest rates were determined for individuals with co-occurring disorders, for mental health service recipients without co-occurring disorders, and for adults in the general population of the state of Connecticut.

Access to data from multiple state agencies was facilitated by a pre-existing legislatively mandated Interagency Data Sharing Initiative that included a Policy Steering Committee and an Operational Work Group. The use of Probabilistic Population Estimation in this project help address privacy concerns that had impeded interagency data sharing by a number of the agencies involved.



**Findings:** Mental health service recipients with indications of a co-occurring disorder were much more likely than service recipients without a co-occurring disorder to get into trouble with the law. This was true for men and women, white and non-white service recipients, and all age groups. The relative risk of getting into trouble with the law (compared to the general population), was greater for women than for men, was greater for whites than non-whites, and increased with increasing age.

**Next Questions:** Do arrest rates for adults with co-occurring disorders vary among regions of the state? Do these arrest rates change over time? Are some treatment approaches more successful than others at reducing arrest rates for adults with co-occurring disorders?

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# THE DISTRICT OF COLUMBIA

## Relative Risk of Arrest Before and After September 11, 2001

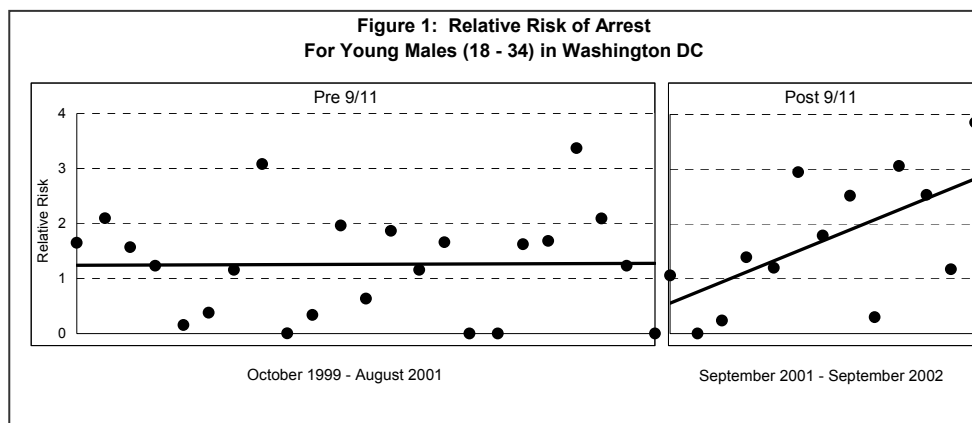
**Question:** “Did the events of September 11, 2001, change the relative risk of arrest for recipients of public mental health services in Washington, DC?”

Previous behavioral health research on the consequences of these events has focused almost entirely on the impact of terror on the general public, and on government responses to terror. Little attention had been devoted to the impact of terror on people with a pre-existing mental illness.

**Data:** Anonymous data describing mental health service recipients were extracted from Department of Mental Health databases. Information on the general population of the District was downloaded from United States Census web site. Anonymous records of all District of Columbia arrests were obtained from the Metropolitan Police Department.

DMH staff at various levels helped establish the contacts that led to the data used in this project. The Director of DMH, with the support of the Deputy Mayor of Public Safety, gave the green light to proceed with the project. DMH program managers helped by identifying the appropriate contact people, in the police and other departments. Arrest data was available to the project within two months of the original request. The formal report of findings was completed nine months after receipt of a formal proposal from The Bristol Observatory.

**Findings:** Results indicate that mental health service recipients in eight of our twelve age/gender and age/race categories experienced changes in relative risk of arrest that were associated with September 11, 2001. The most substantial changes were evident for young adult service recipients (aged 18-34). Relative risk of arrest for young male service recipients increased at an annualized rate of more than 400% during the thirteen months after September 11. Relative risk of arrest for young non-white service recipients increased by almost 200% during this same time period. Change in relative risk of arrest in the 35–49 age group was less substantial. Women in this age group experienced a greater than 50% increase in relative risk of arrest at the time of September 11 that was followed by a 50% decrease during the months after September 11. Men and non-white adults in this age group both experienced a 70 - 80% decrease in relative risk of arrest during the months after September 11 after both experienced insignificant increases at the time of September 11.



**Next Questions:** Did recipients of substance abuse services experience a similar change in arrest rates after September 11, 2001? Did the Washington Area Sniper episode of October – December 2002 have a similar impact on the relative risk of arrest for recipients of public mental health services in the District of Columbia, Maryland, and Virginia? What are the implications for these findings for disaster planning in Washington, DC and in other regions of the country?

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# METHODOLOGICAL NOTE

## PROBABILISTIC POPULATION ESTIMATION

Probabilistic Population Estimation is a statistical procedure that determines the number of people (with known confidence intervals) who are represented in data sets that do not contain unique person identifiers. Probabilistic Population Estimation uses information on the distribution of birth dates in a data set to determine the number of people represented in the data set. The number of people necessary to produce the number of birthdays observed in a single birth year cohort, for instance, would be calculated using the following formula:

$$P_j(l_j) = \sum_{i=1}^l \frac{365}{365-i}$$

where “P<sub>j</sub>” is the number of people and “i” is the number of birth dates observed. Similar logic is used to determine the number of people who appear in more than one data set. The table below provides illustrative results of Probabilistic Population Estimation for populations of specified size.

### Population Estimates for Specified Numbers of Birth Dates within a Year

Birth Dates	Number of People	Birth Dates	Number of People
1	1.003 ± 0.103	180	249 ± 20
10	10.15 ± 0.776	250	423 ± 38
20	20.6 ± 1.54	300	632 ± 64
50	54 ± 4	330	860 ± 101
100	117 ± 9	360	1603 ± 325

## POPULATION OVERLAP

In order to probabilistically determine the number of people shared across data sets that do not include a common person identifier, the sizes of three populations are determined and the results are compared. The number of people in each of the original data sets are the first two populations. The number of people in a data set that is formed by combining the two original data sets is the third data set.

The number of people who are shared by the two data sets is the difference between the sum of the numbers of people represented in the two original data sets and the number of people represented in the combined data set. This occurs because the sum of the number of people represented in the two original data sets includes a double count of every person who is represented in both data sets. The number of people represented in the combined data set does not include this duplication. The difference between these two numbers is the size of the duplication between the two original data sets, the size of the caseload overlap. In terms of mathematical set theory, the intersection of two sets is the difference between the sum of the sizes of the two sets (A+B) and the union of the two sets (A∪B):

$$(A \cap B) = (A + B) - (A \cup B).$$

## RELATED READINGS

### Probabilistic Population Estimation

Probabilistic Population Estimation of the Size and Overlap of Data Sets Based on Date of Birth. *Statistics in Medicine*, May 2001 (Banks and Pandiani).

Personal Privacy vs. Public Accountability: A Technological Solution to an Ethical Dilemma. *Journal of Behavioral Health Services and Research*, November 1998. (Pandiani, Banks, and Schacht)

Large Data Sets Are Powerful. (Pandiani and Banks) *Psychiatric Services*, May 2003, Vol. 54 No. 5 p. 745

### Criminal Justice Involvement of Mental Health Service Recipients

Using Incarceration Rates to Measure Mental Health Program Performance. *Journal of Behavioral Health Services and Research*, August 1999. (Pandiani, Banks, and Schacht)

Elevated Risk of Being Charged with a Crime for People with a Severe and Persistent Mental Illness. *Justice Research and Policy*, Fall 2000 (Pandiani, Banks, Clements, and Schacht)

Terrorism and People with Mental Illness. *Psychiatric Services*. Vol. 52 (2002) No. 11 p. 1475. (Pandiani, and Banks).

Elevated Risk of Arrest for Veteran's Administration Behavioral Health Service Recipients in Four Florida Counties. *Law and Human Behavior*. Vol. 27, (2003) No. 3, pp.289-298. (Pandiani, Rosenheck, and Banks)

The Impact of "New-Generation" Anti-Psychotic Medication on Criminal Justice Outcomes (Pandiani, Banks, Pomeroy) in Fisher W. (Ed.)2003 Community-Based Interventions for Criminal Offenders with Severe Mental Illness. Elsevier Science Ltd. p.p. 73-98.

Consumer Satisfaction and Treatment Outcomes: Dissatisfaction with Mental Health Services and Incarceration after Treatment. *Administration and Policy in Mental Health*. Vol. 29, No. 2, November 2001 pp. 145-155 (Pandiani, Schacht, Banks)

Approaches to Risk Adjusting Outcome Measures Applied to Criminal Justice Involvement after Community Service. *Journal of Behavioral Health Services and Research*. 2001 (Banks, Pandiani, and Bramley)

Utilization of Local Jails and General Hospitals by State Psychiatric Center Patients. *Journal of Behavioral Health Services and Research*, November 2000 (Banks, Stone, Pandiani, Cox, and Morchauser)

Bed Closures and Incarceration Among Users of VA Behavioral Health Services in Upstate New York. *Psychiatric Services*, October 2000 (Rosenheck, Banks, Pandiani, Hoff)

Measuring Access to Mental Health Care: A Multi-indicator Approach to Program Evaluation. *Program Planning and Evaluation*. Vol. 25 (2002) pp. 271-285. (Pandiani, Banks, Bramley, Pomeroy, Simon).

After Children's Services: A Longitudinal Study of Significant Life Events. *Journal of Emotional and Behavioral Disorders*, Vol. 9 No. 2, Summer 2001, pp. 131-138 (Banks, Pandiani, and Schacht)

Caseload Segregation/Integration and Treatment Outcomes for Children and Adolescents. *Journal of Emotional and Behavioral Disorders*. Vol. 9, No. 4, Winter 2001, pp. 232-238, 247(Banks, Pandiani, and Schacht)

**Measuring**

**Mental Health Consumers'**

**Criminal Justice Involvement**

**Using Existing Data**

# **The Bristol Observatory**

**Large A/O Data Sets**

**Data Integration**

# **Delaware**

Maurice Tippet

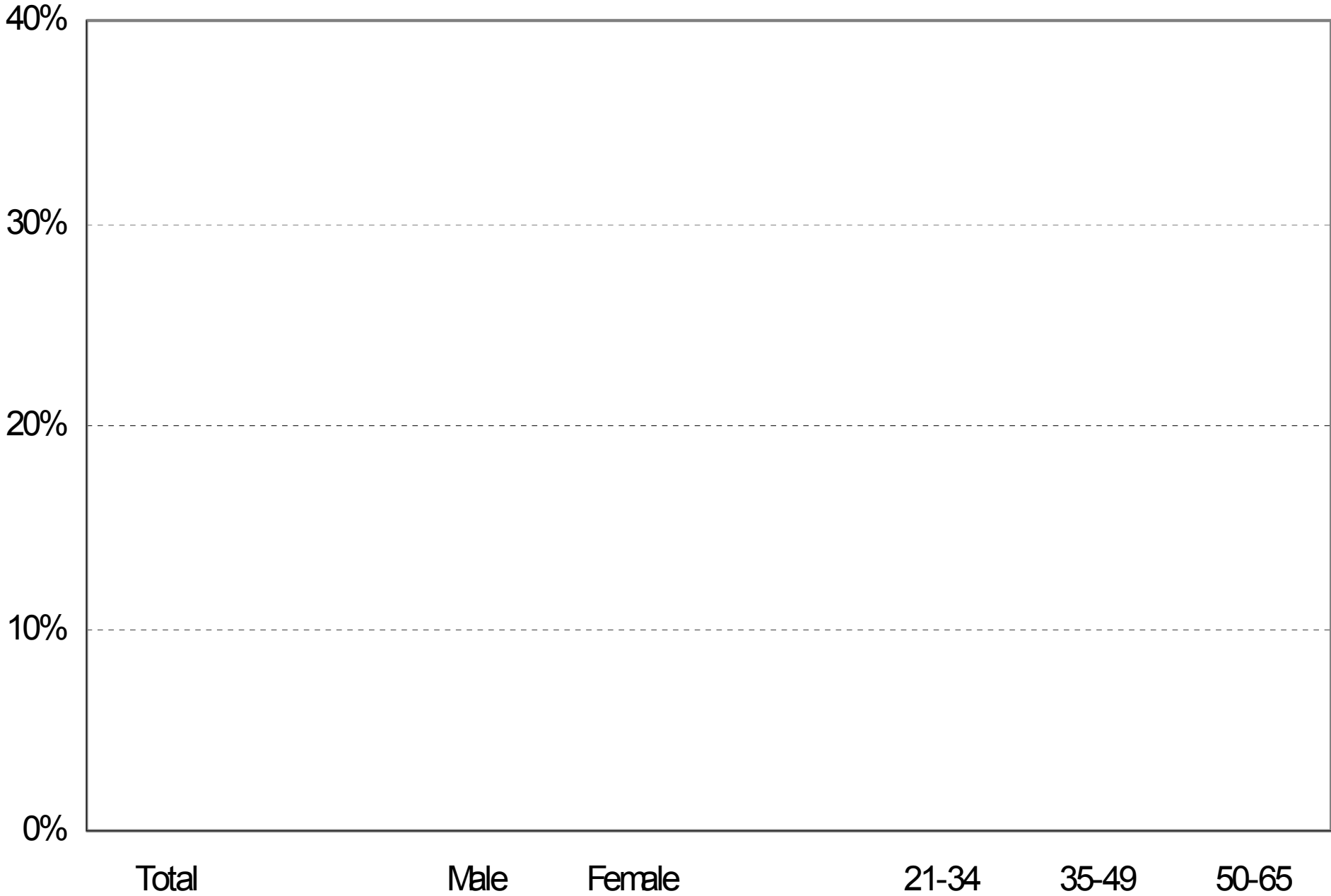
# **Question/Issues**

**Arrest Rates Before Treatment**

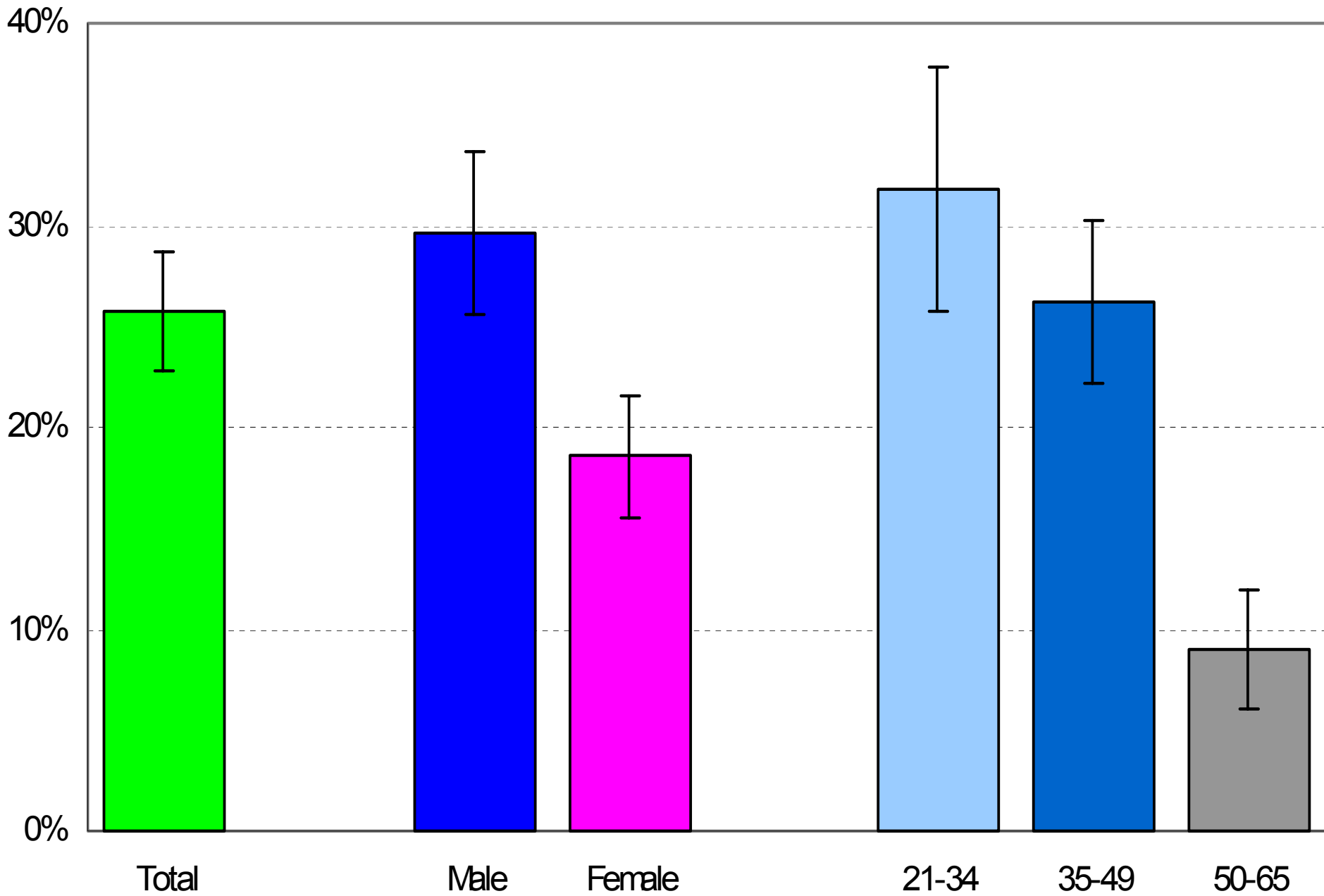
**Data Access**

**PPE Oversight Committee**

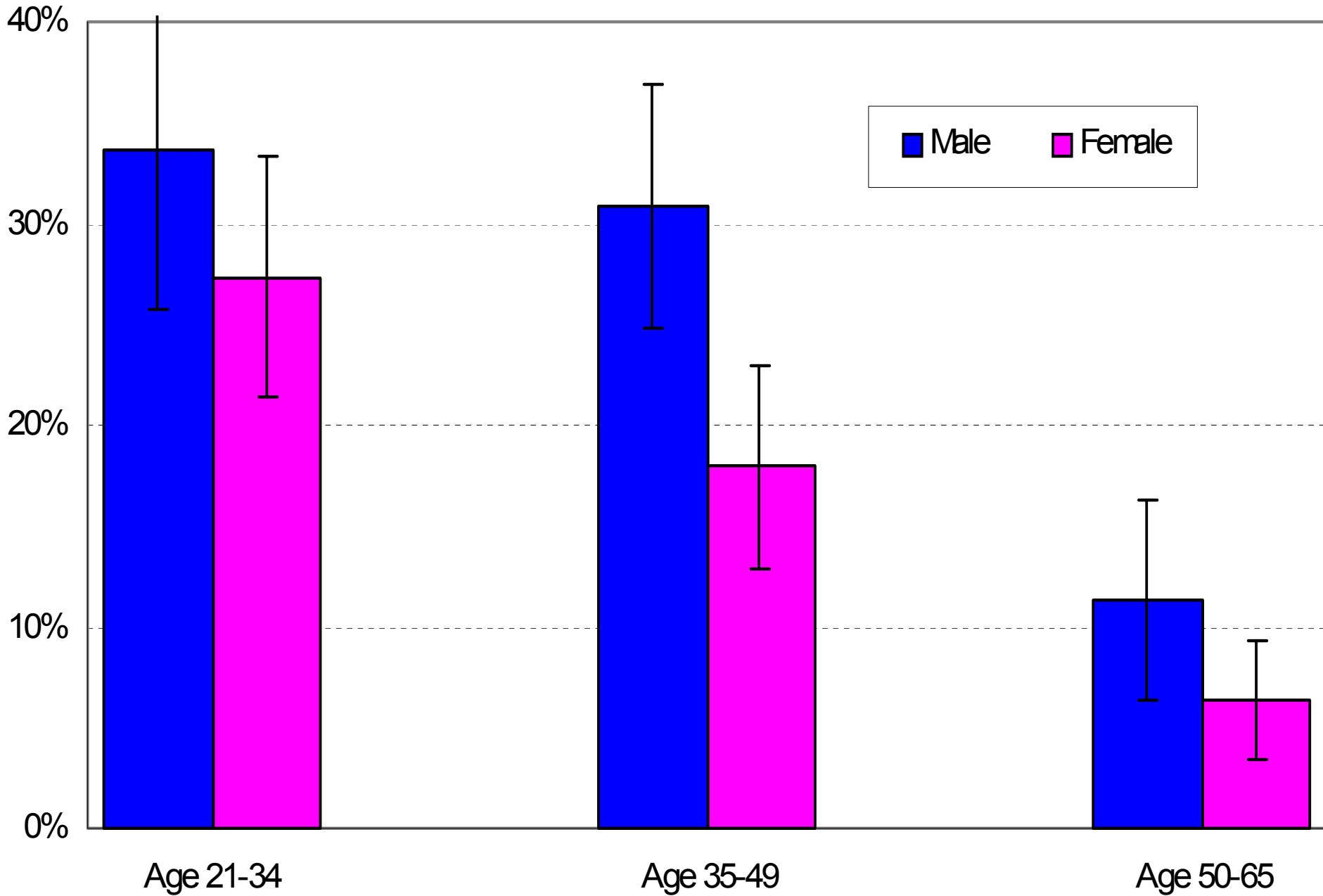
# FY 2001 Clients with Misdemeanor Arrests in FY 2000



# FY 2001 Clients with Misdemeanor Arrests in FY 2000



# FY 2001 Clients with Misdemeanor Arrests in FY 2000



# Next Questions

Before and After Treatment?

Regional Variation?

MH vs. SA?

**P**ROBABILISTIC

**P**OPULATION

**E**STIMATION

$$P_j(l_j) = \sum_{i=1}^{l_j} \frac{365}{365 - i}$$

# Probabilistic Population Estimates

for Specified Numbers of Birth Dates Within a Given Year

## Birth Dates

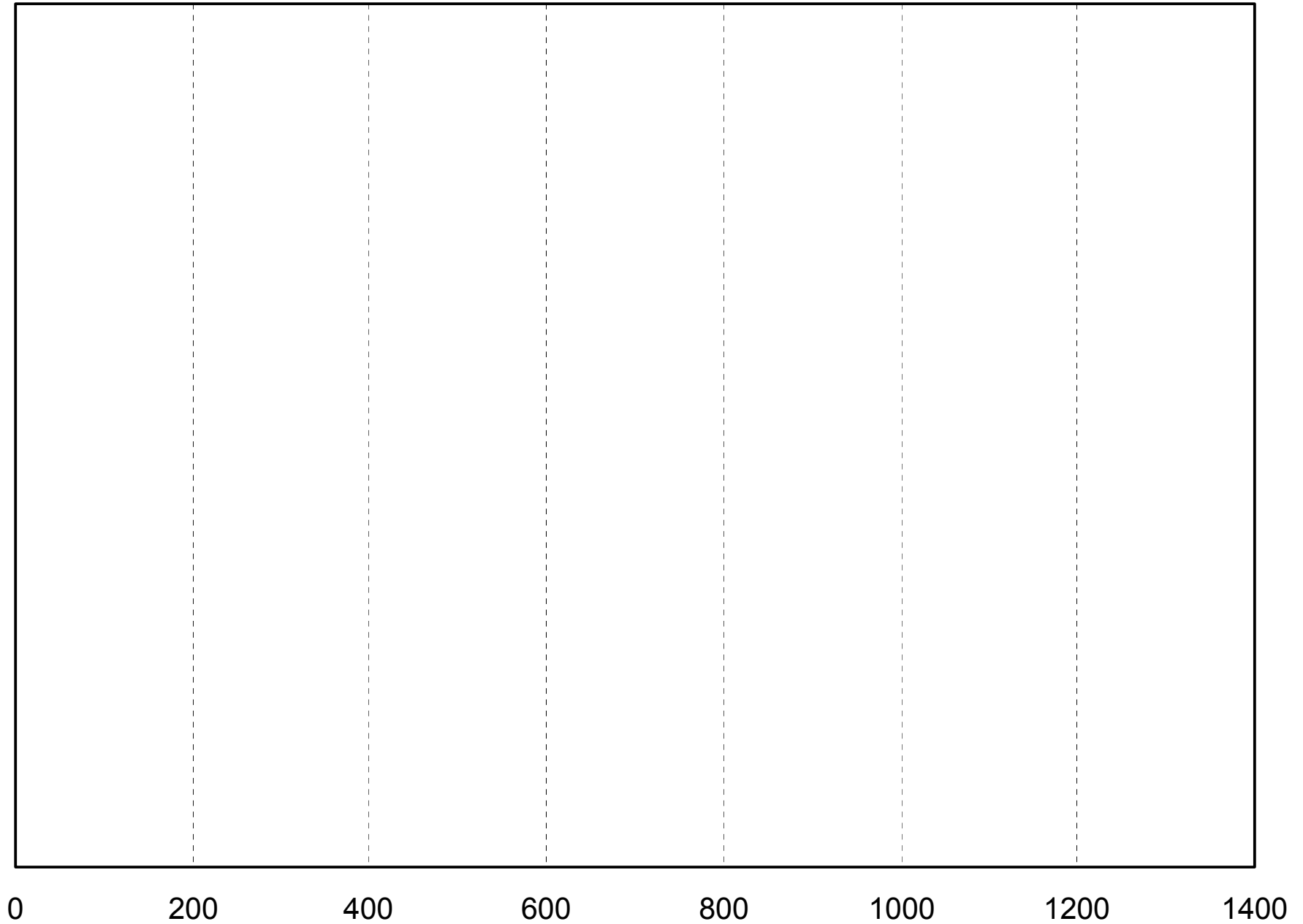
## Number of People

1	1.003	±	.103
10	10.15	±	.776
100	117	±	9
200	290	±	22
300	632	±	64
350	1177	±	171
360	1603	±	325

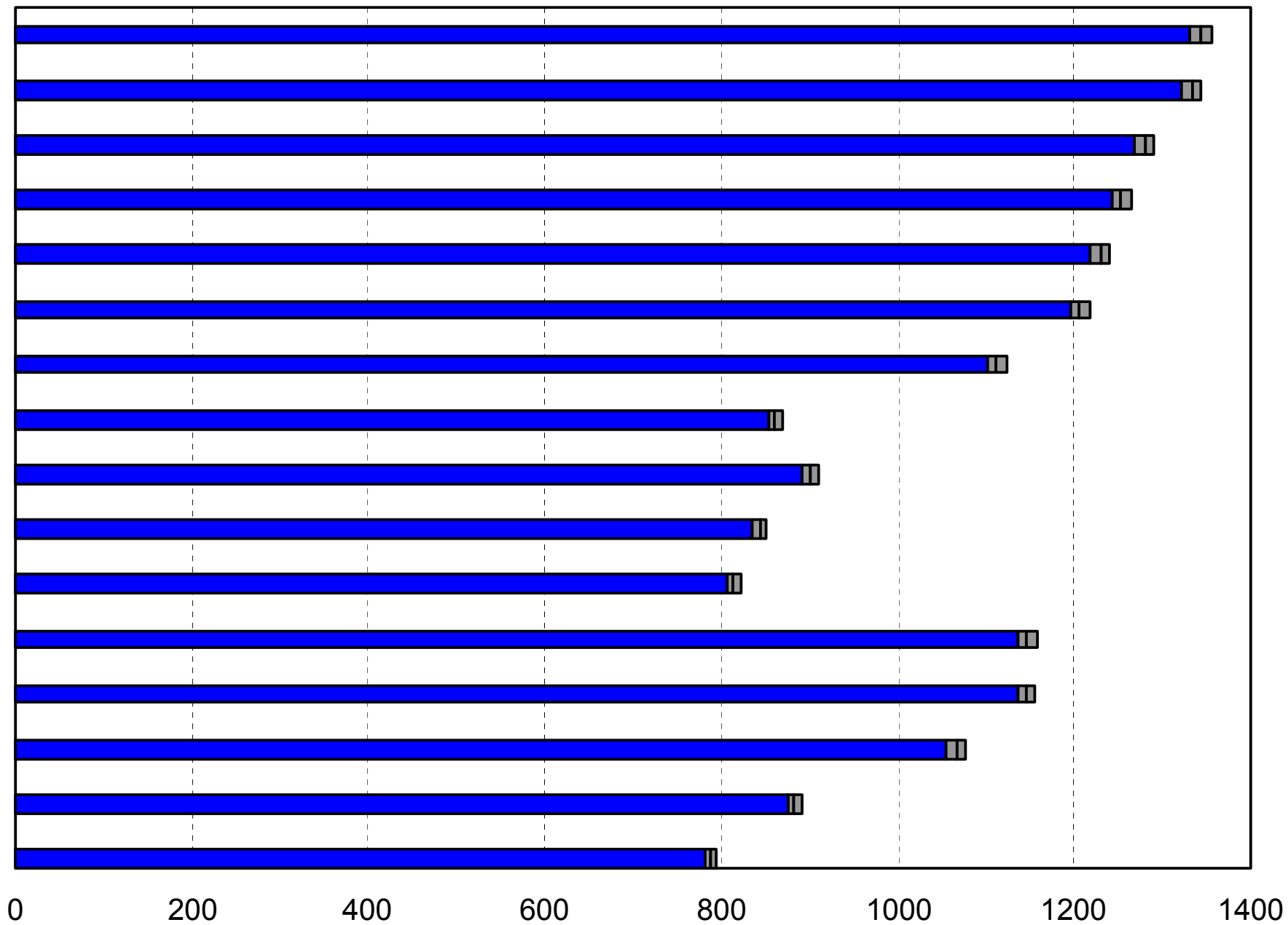
**VERIFICATION**

**CASELOAD SIZE**

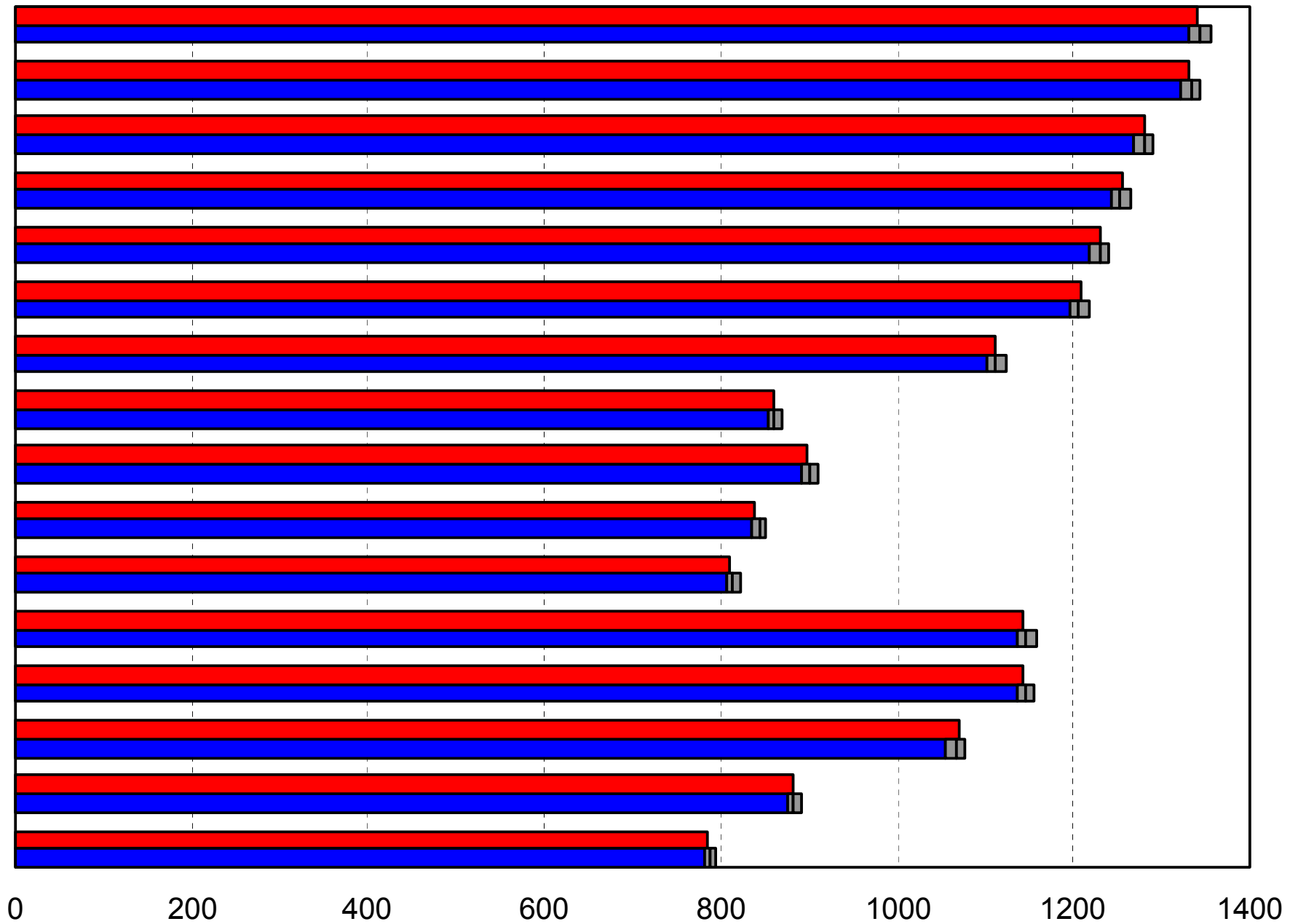
# Estimated and Actual Number of CRT Clients



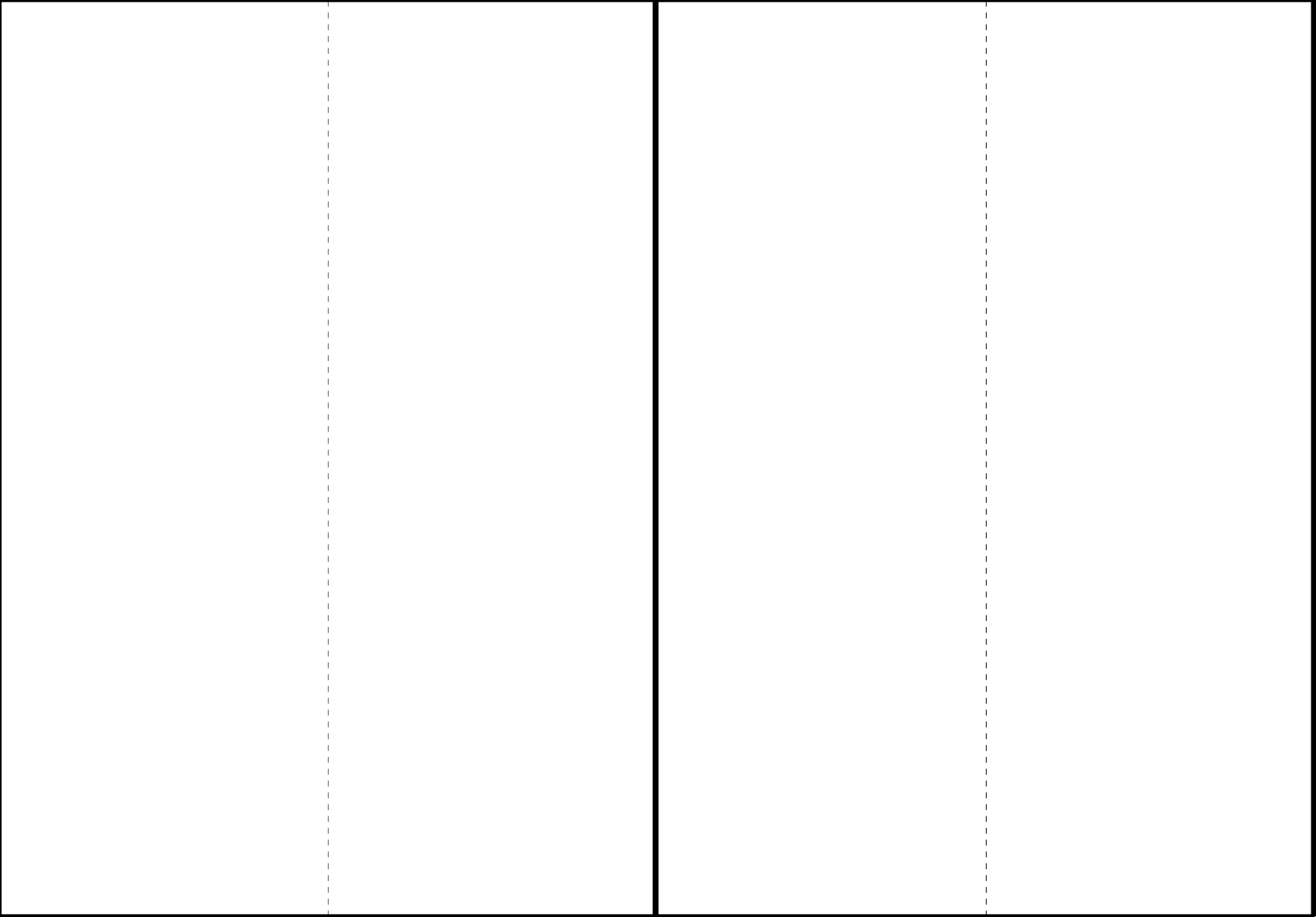
# Estimated and Actual Number of CRT Clients



# Estimated and Actual Number of CRT Clients



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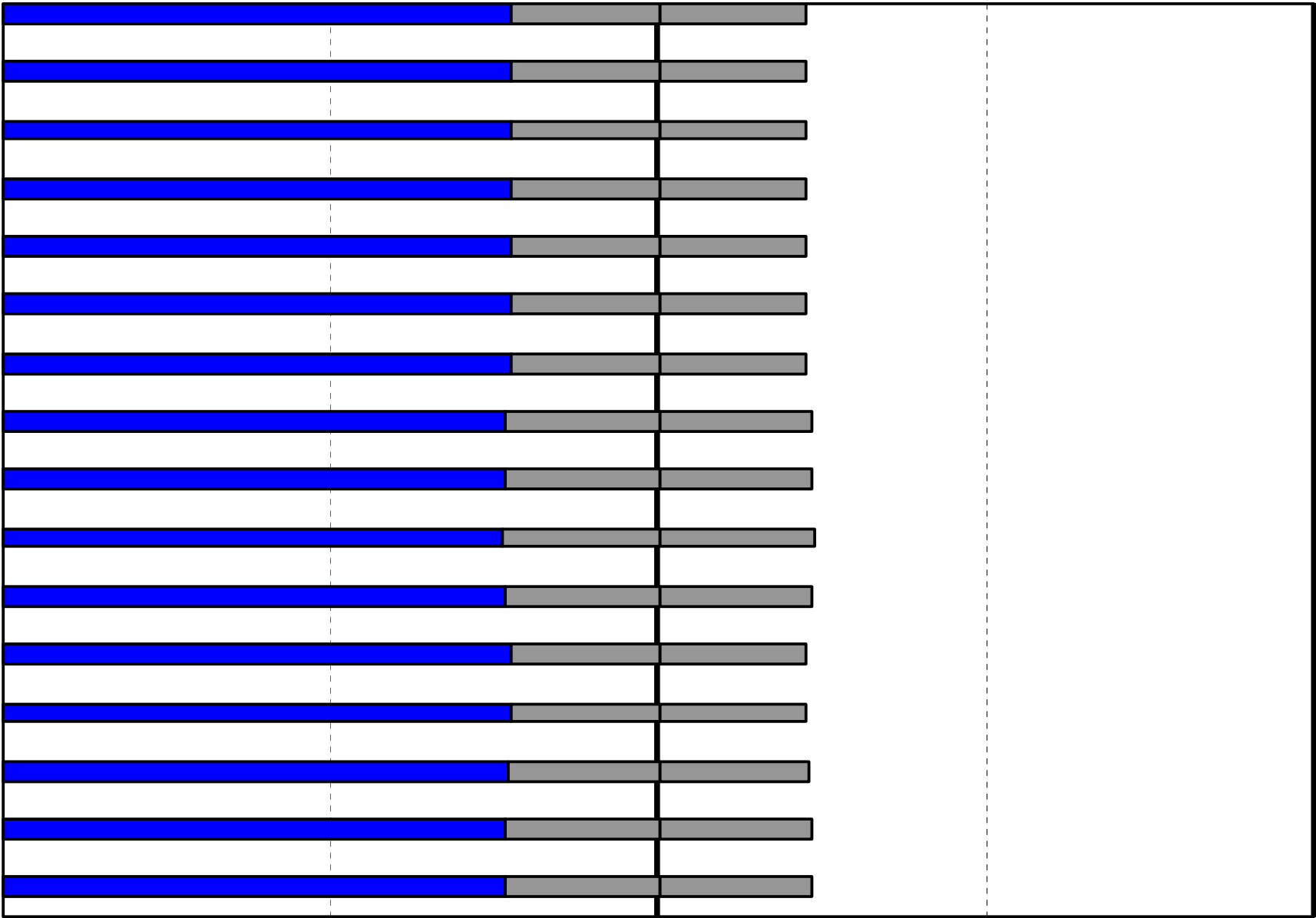


96%

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104%

# Estimated and Actual Number of CRT Clients

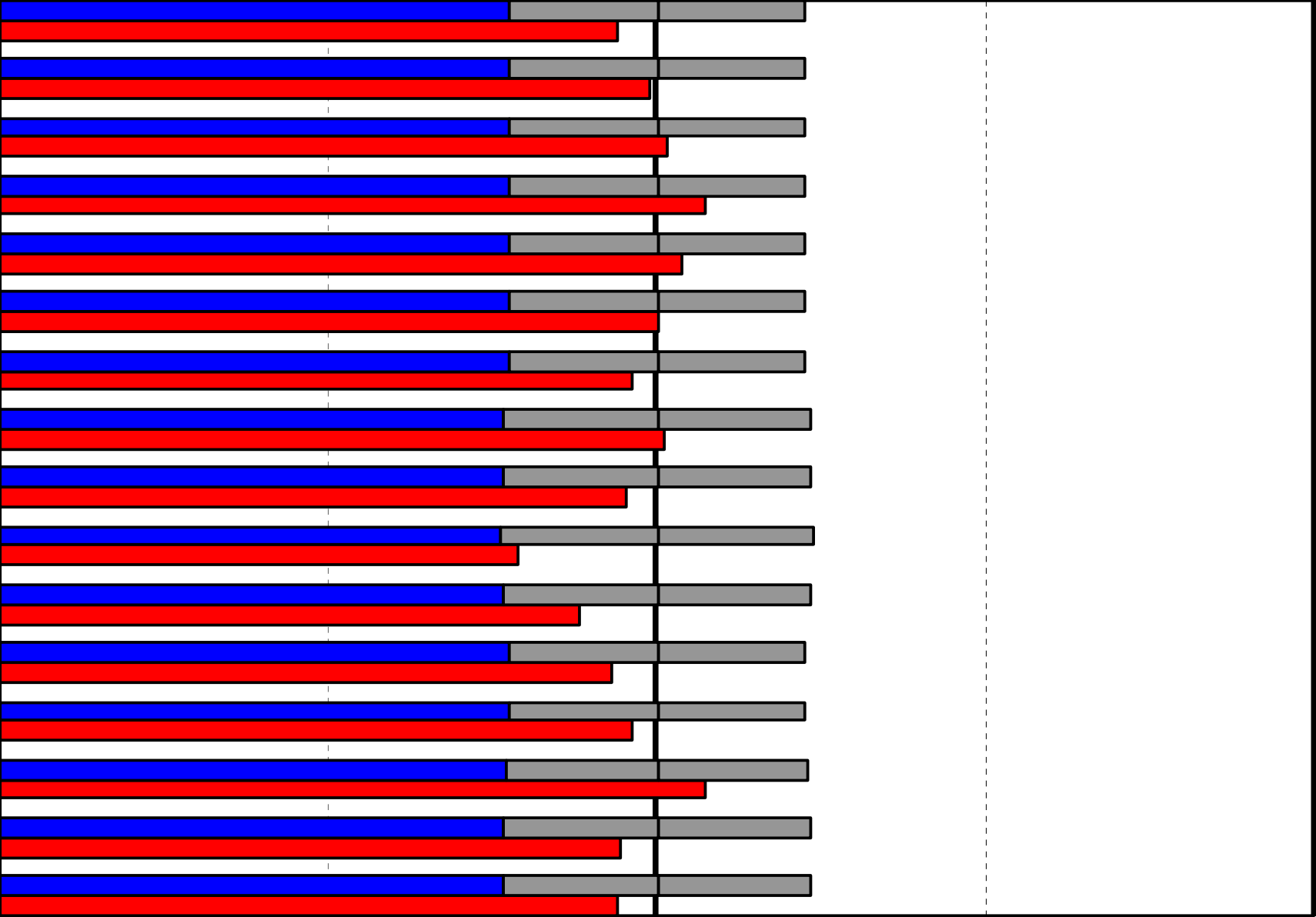


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# Estimated and Actual Number of CRT Clients



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# **Pennsylvania**

**Jerry Goessel**

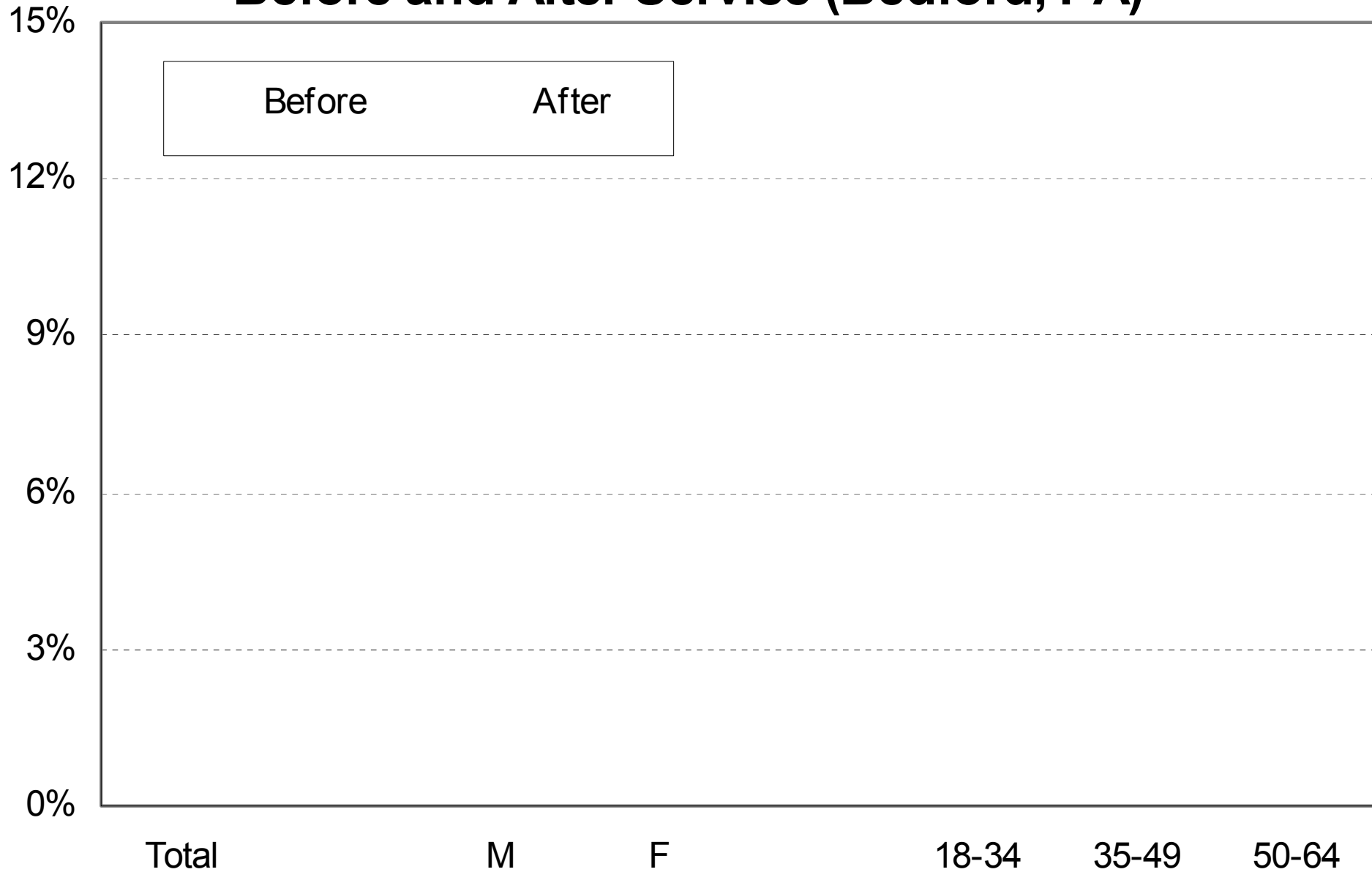
# **Question/Issues**

**Criminal Charges  
Before & After Treatment**

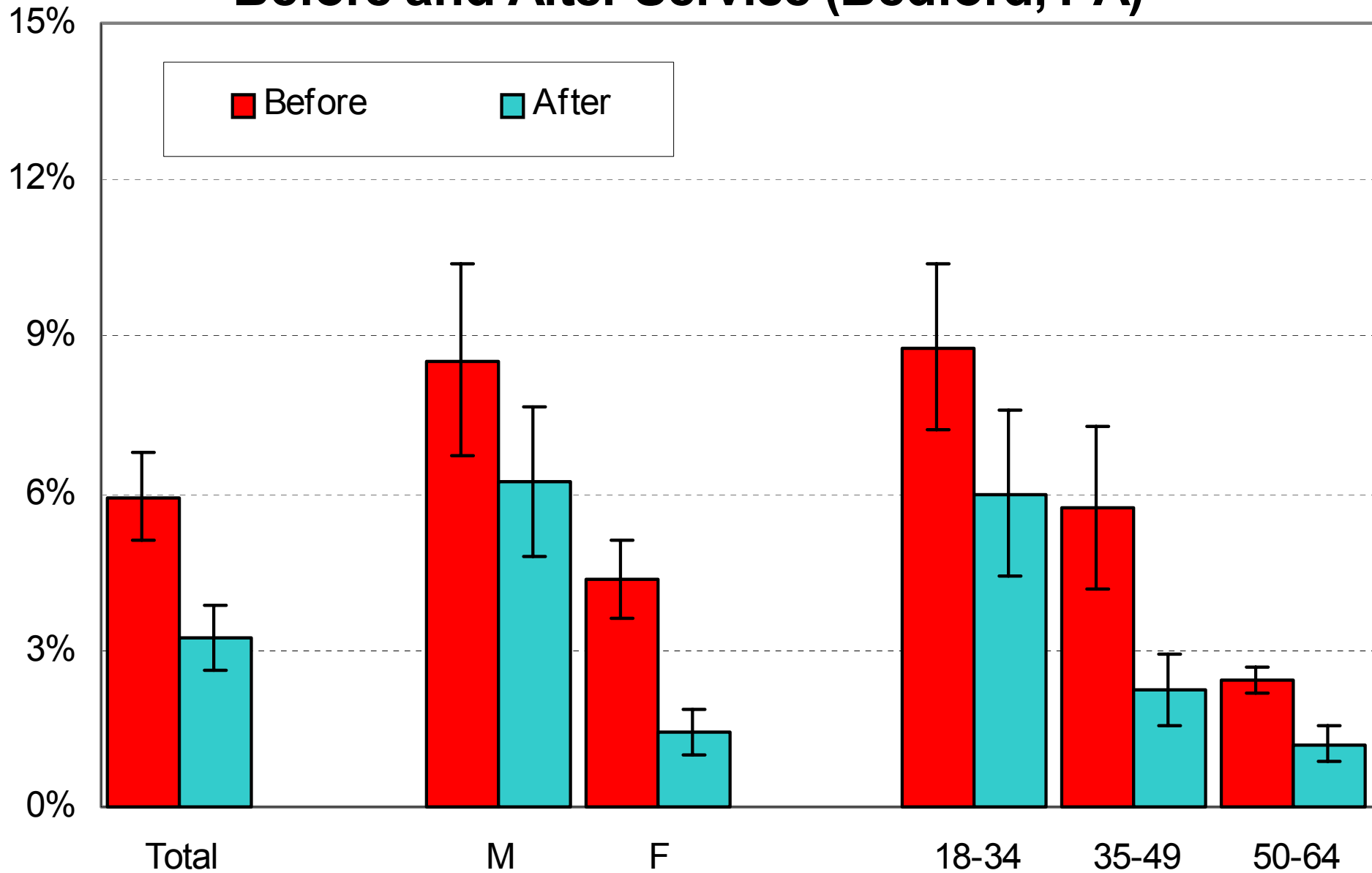
## **Data Access**

**Ask... Wait... Ask Again...**

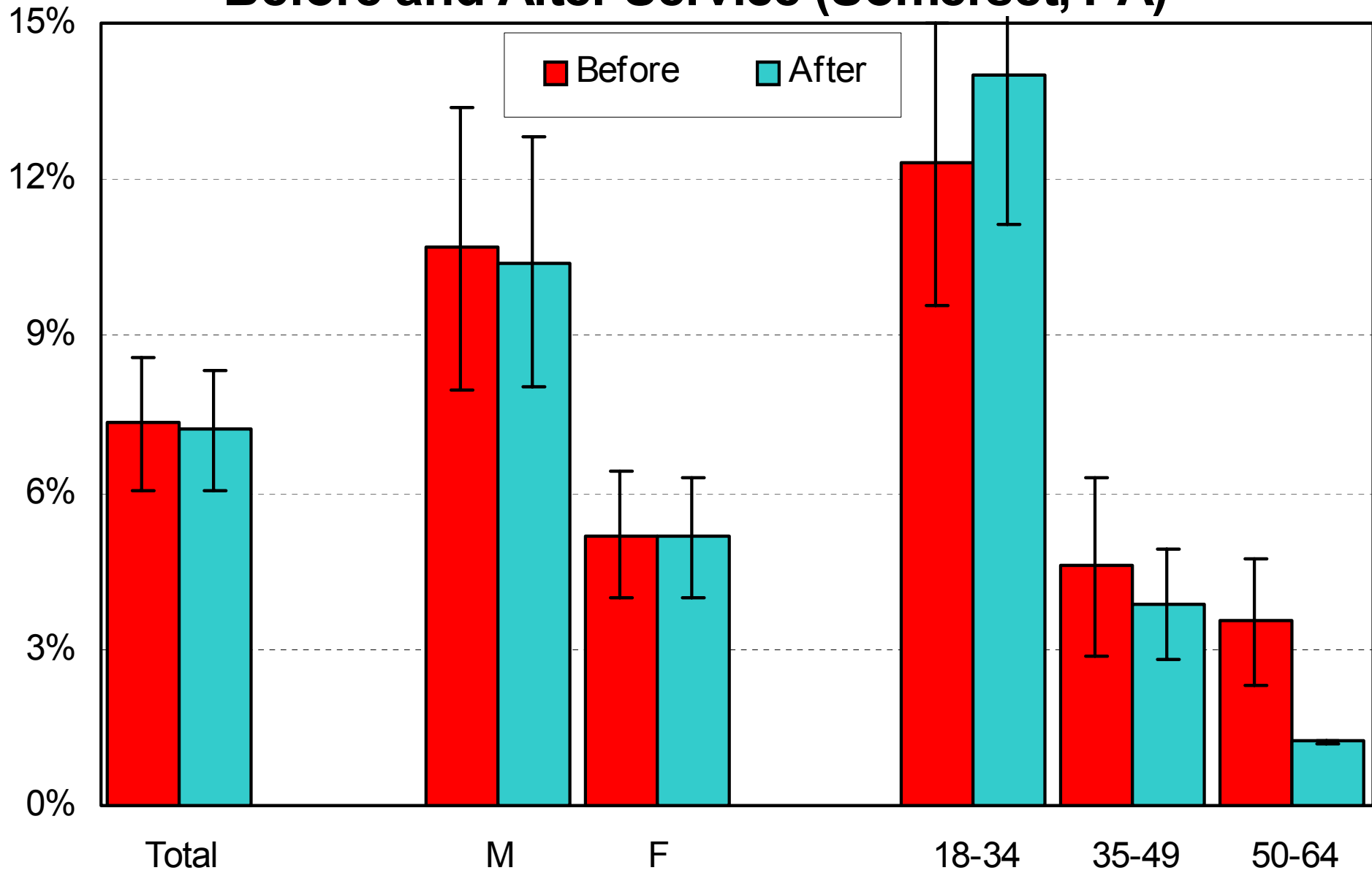
# Charged with a Crime Before and After Service (Bedford, PA)



# Charged with a Crime Before and After Service (Bedford, PA)



# Charged with a Crime Before and After Service (Somerset, PA)

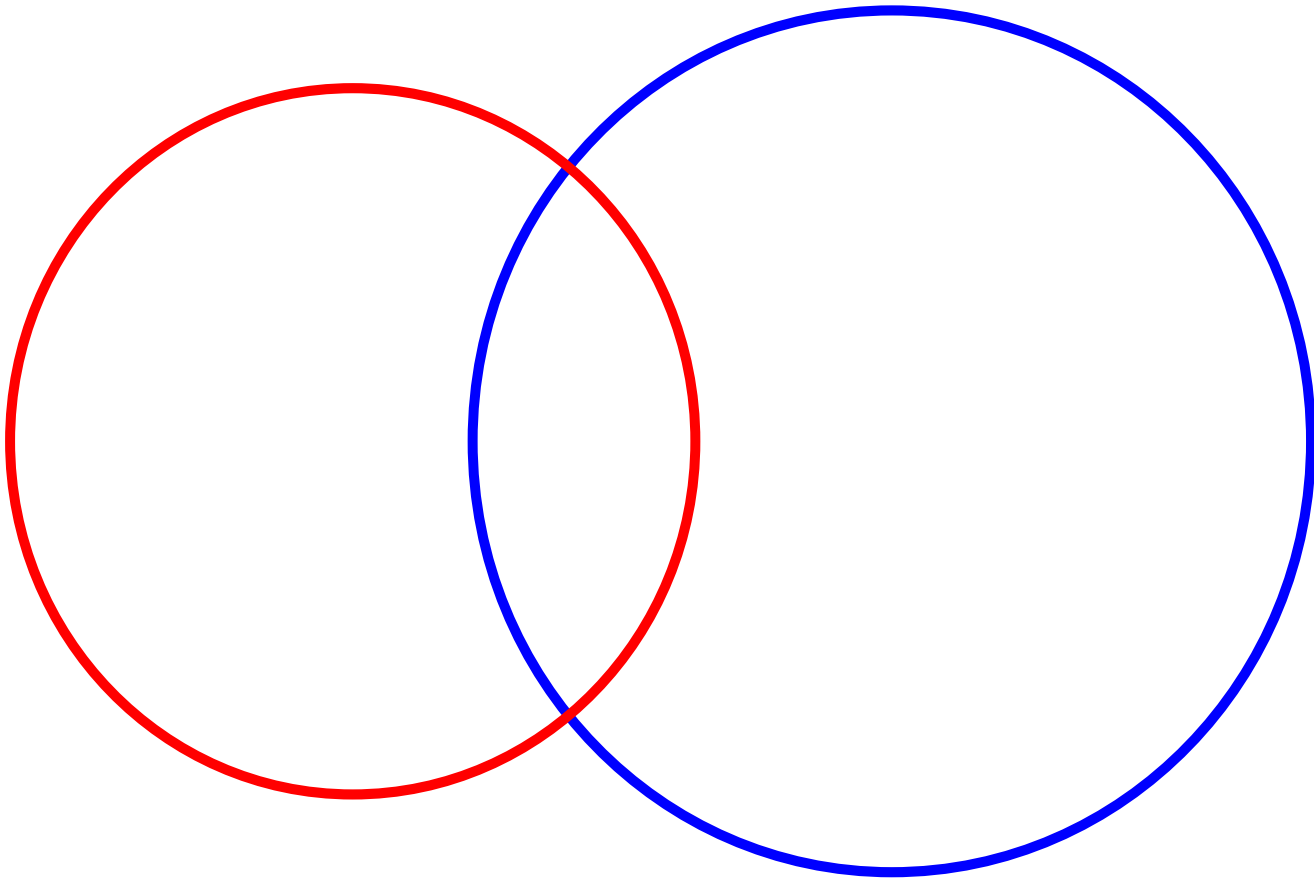


# Next Questions

Other Counties?

Different Clinical Groups?

# Caseload Overlap

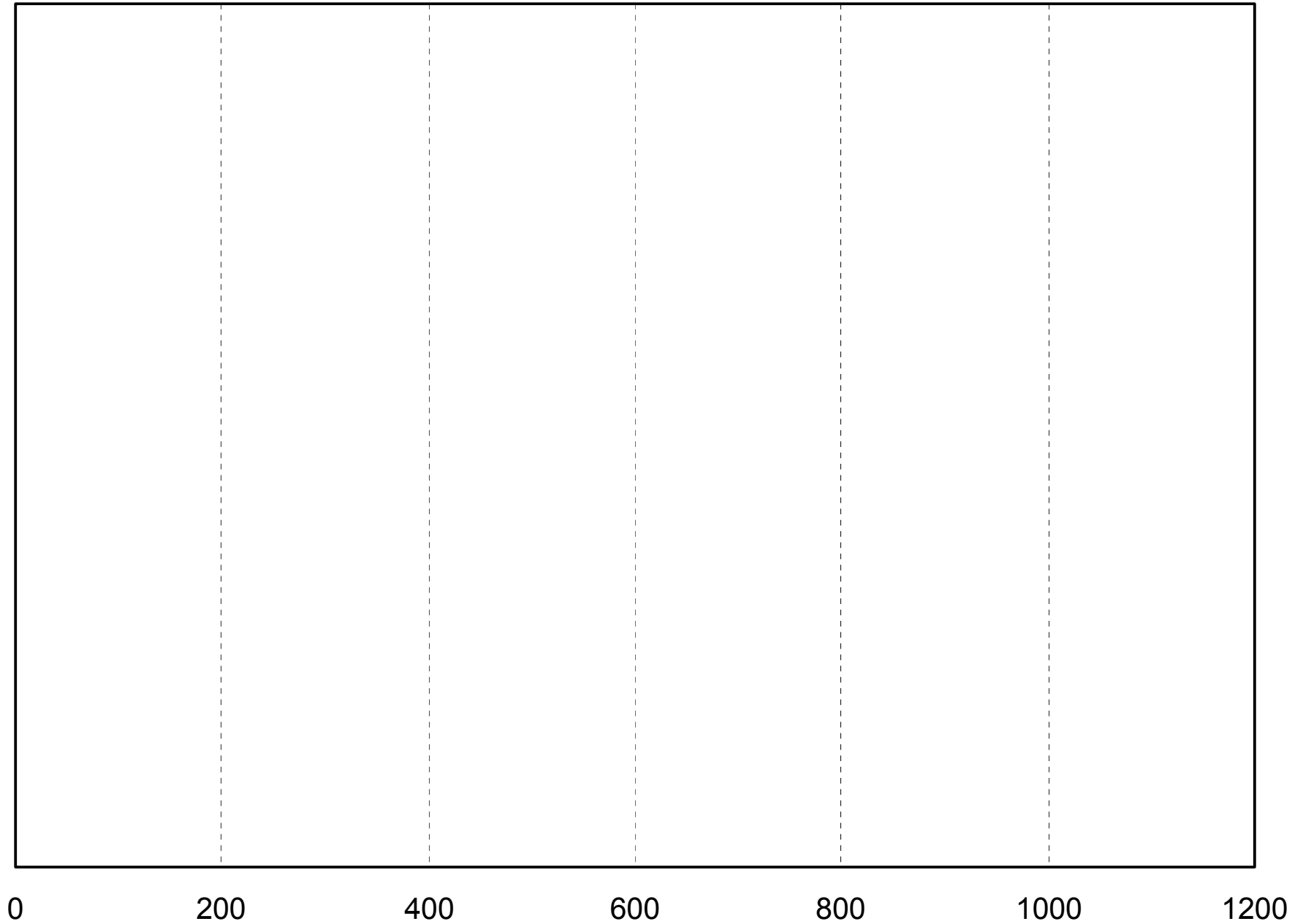


$$(A \cap B) = A + B - (A \cup B)$$

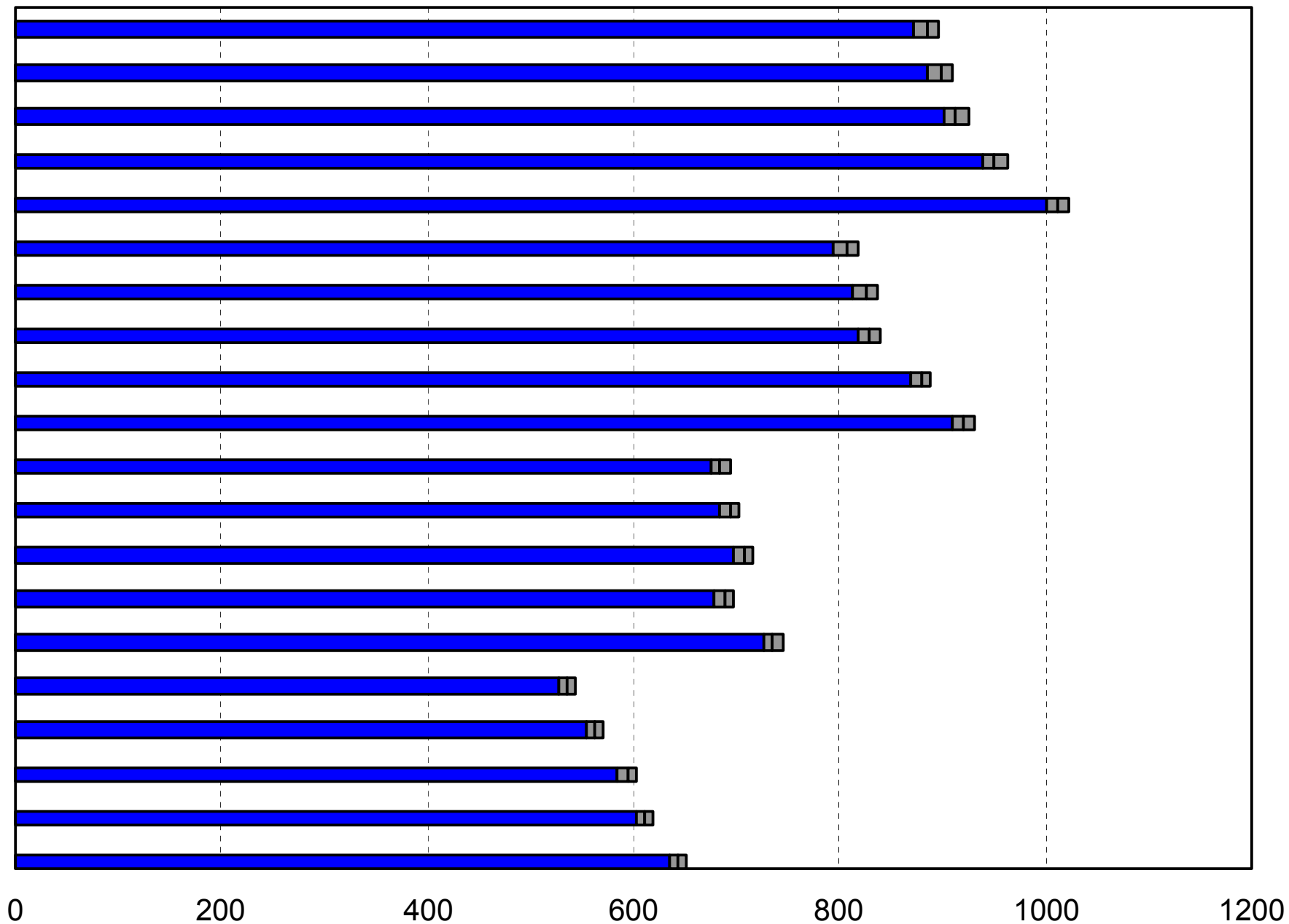
**VERIFICATION**

**CASELOAD OVERLAP**

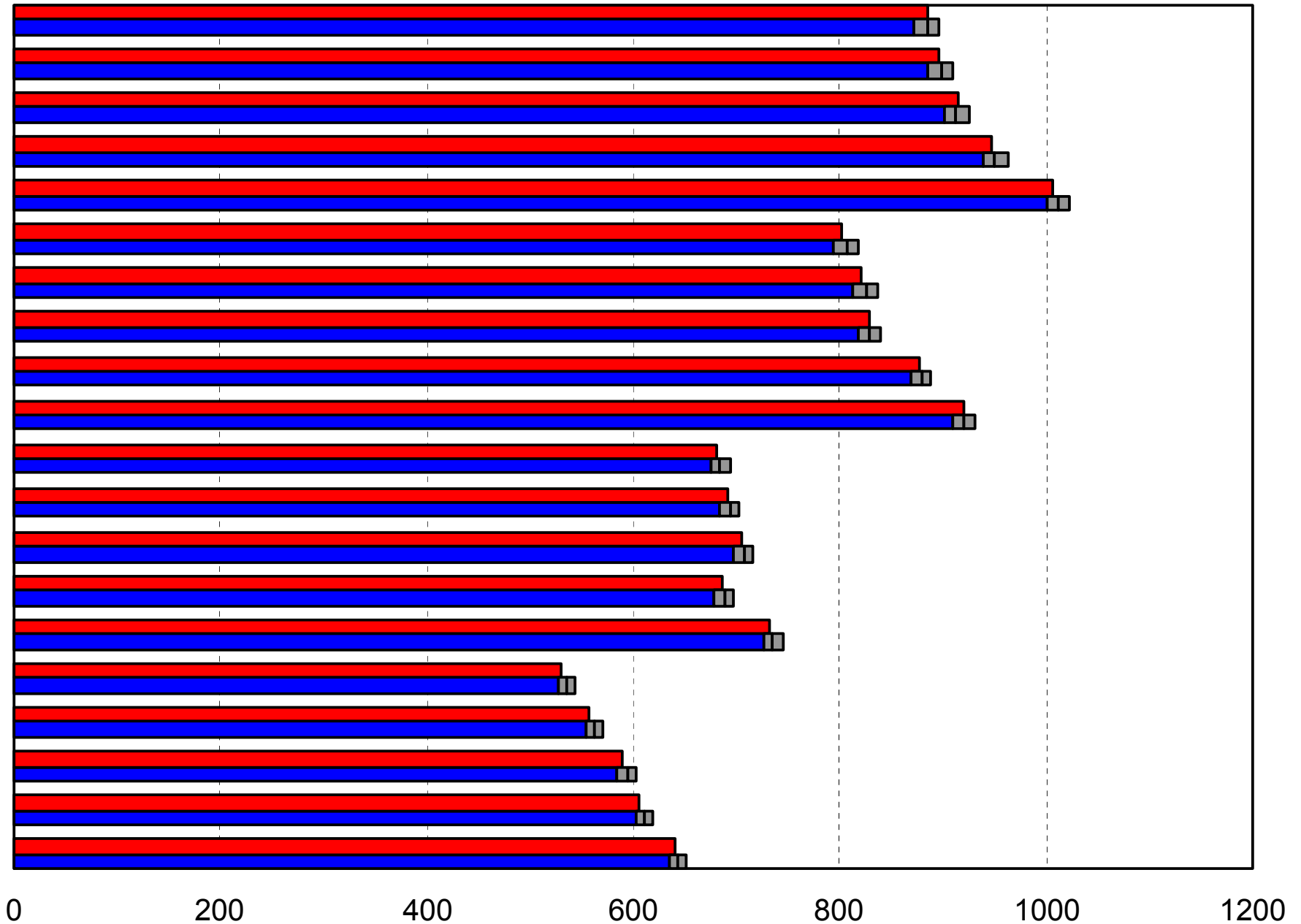
# Estimated and Actual Number of CRT Clients



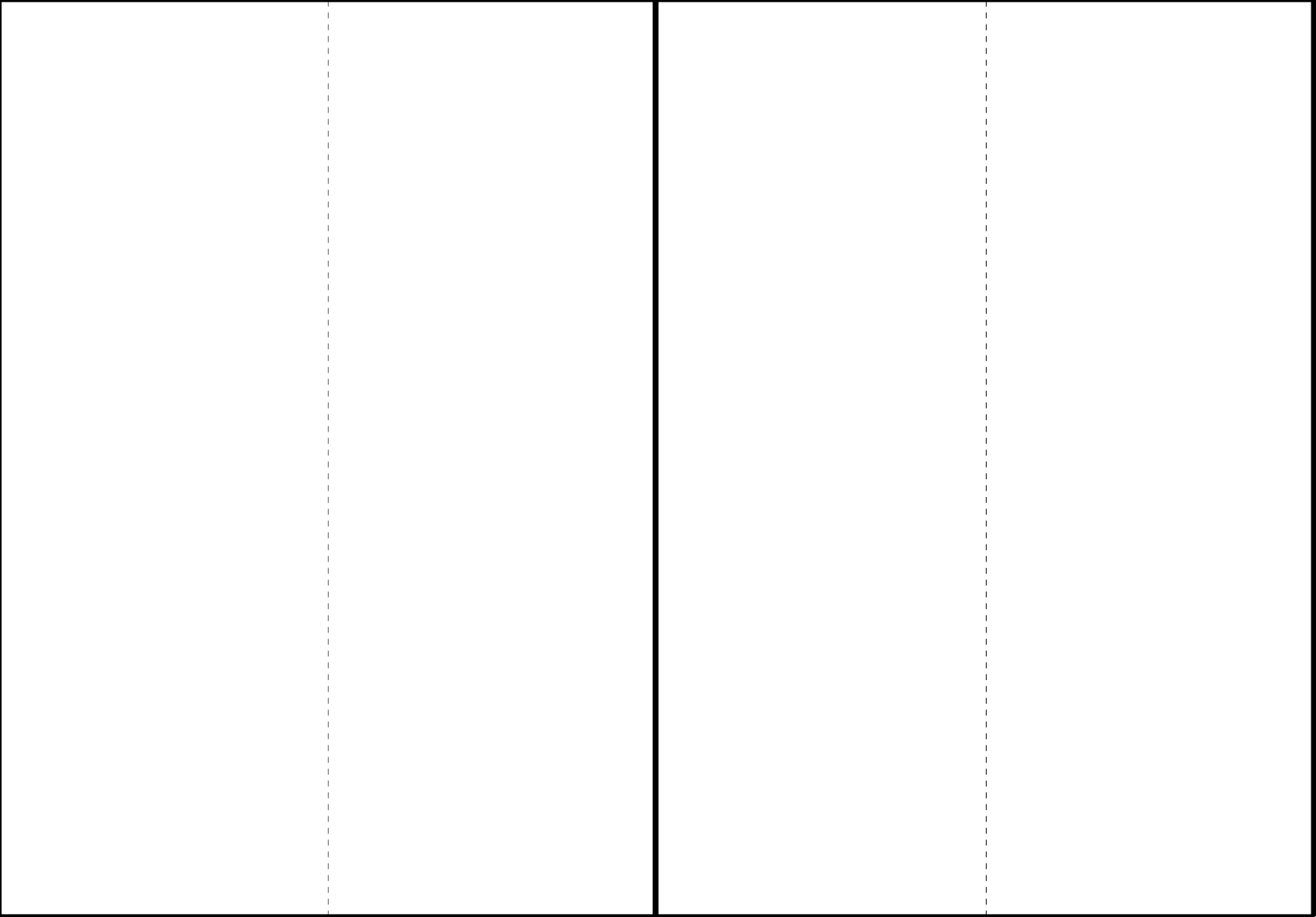
# Estimated and Actual Number of CRT Clients



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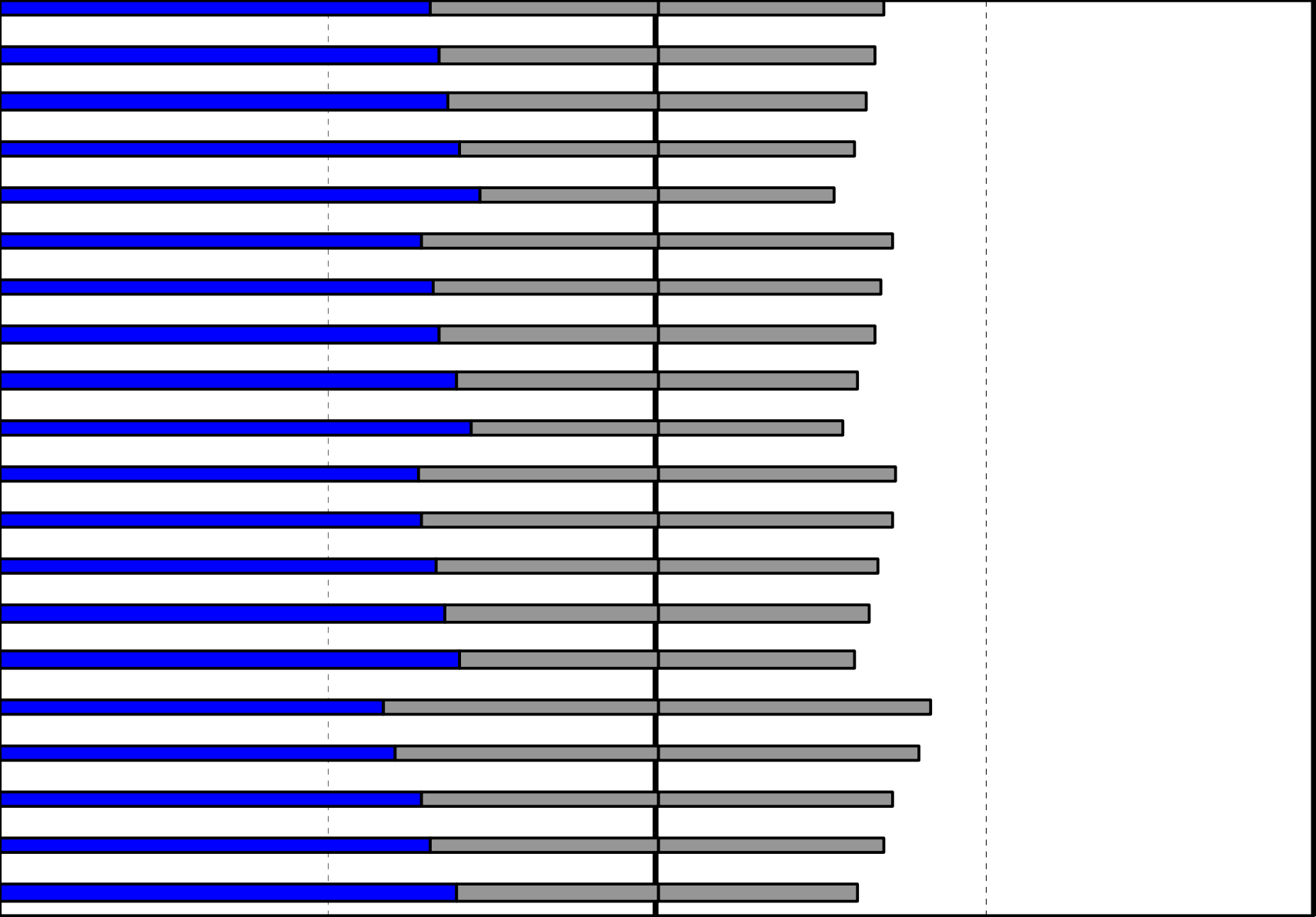


96%

100%

104%

# Estimated and Actual Number of CRT Clients

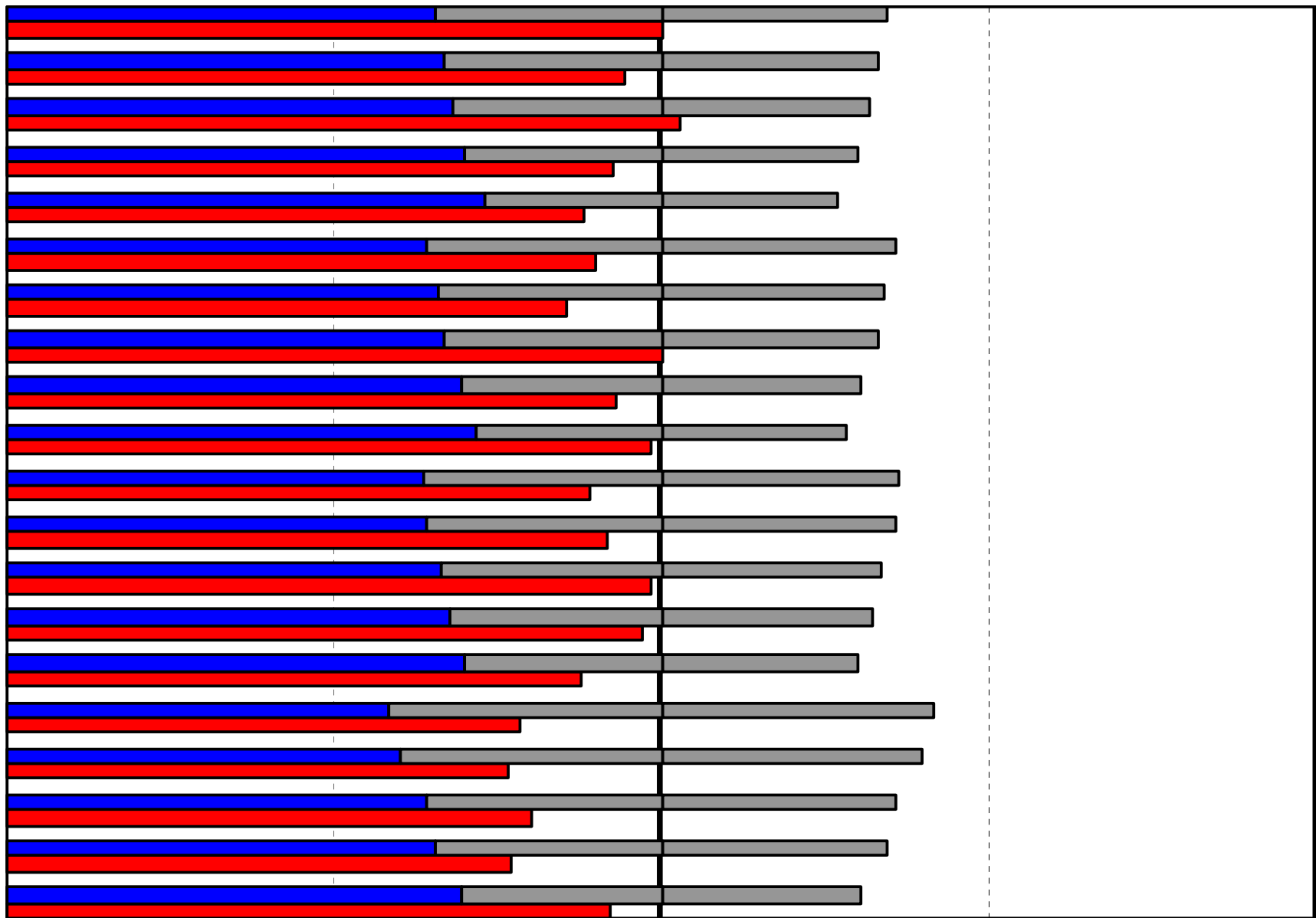


96%

100%

104%

# Estimated and Actual Number of CRT Clients



96%

100%

104%

# Connecticut

Al Bidorini

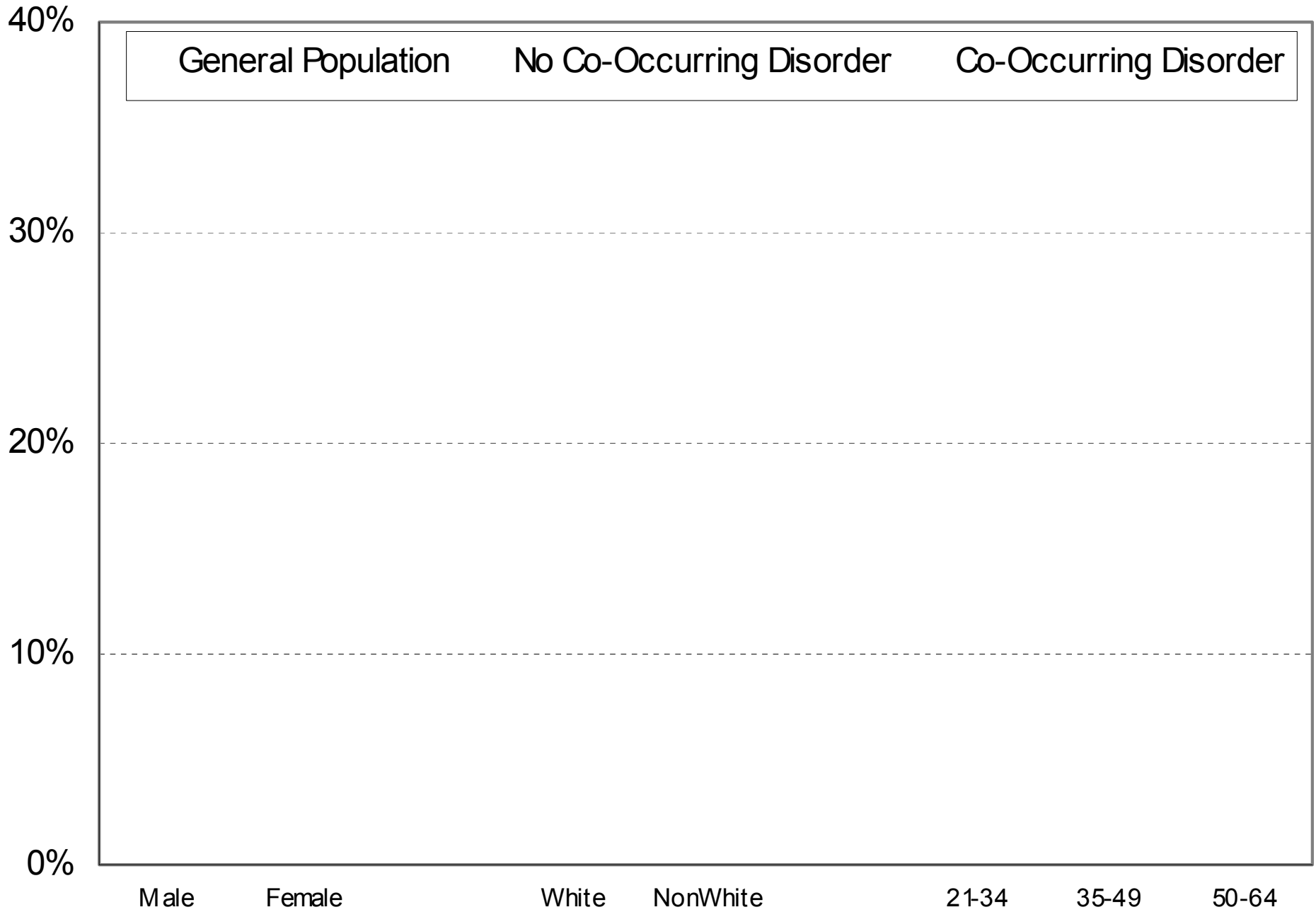
# **Question/Issues**

**Arrest Rates  
for Co-Occurring Disorders**

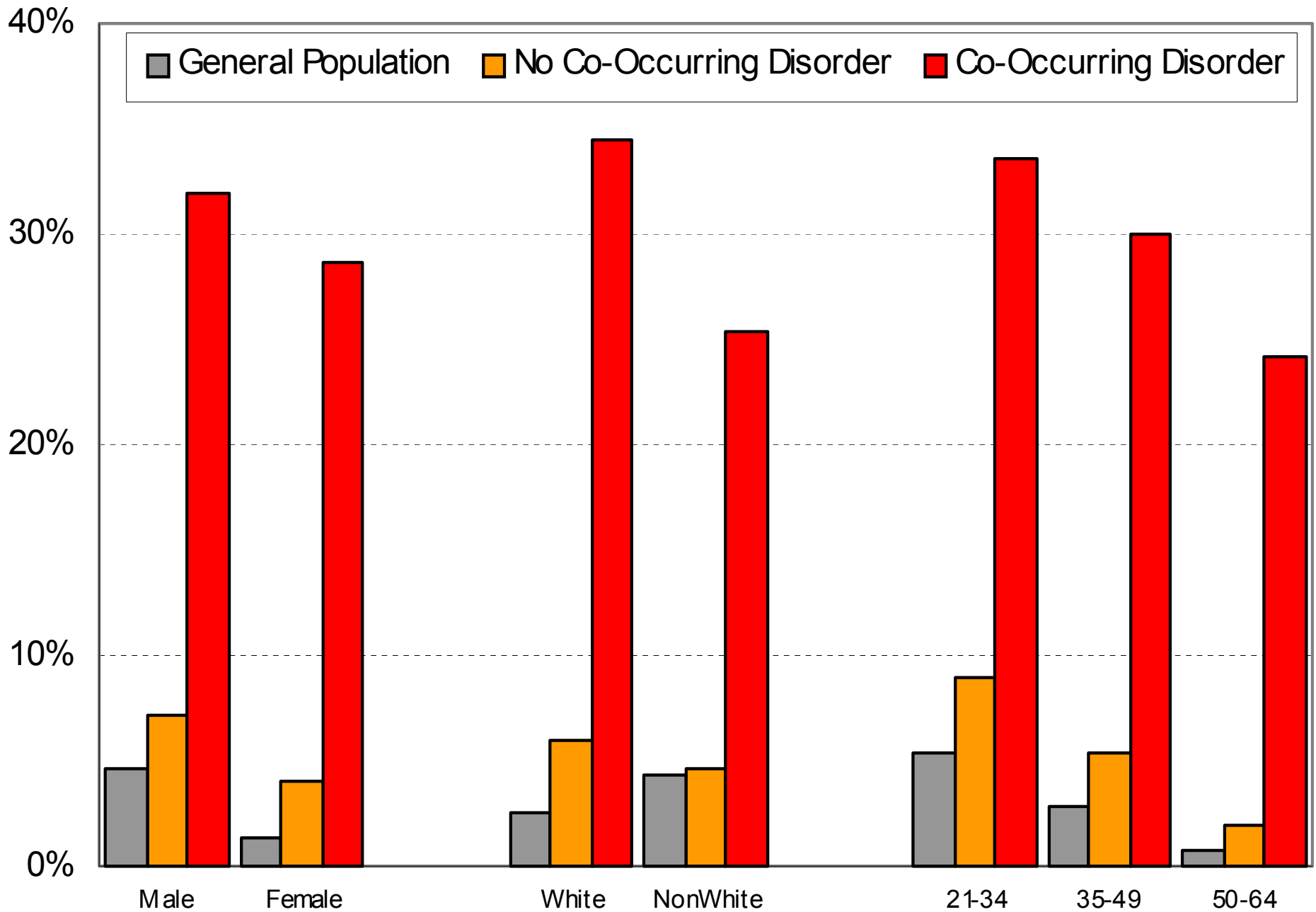
**Data Access**

**Legislative Mandate**

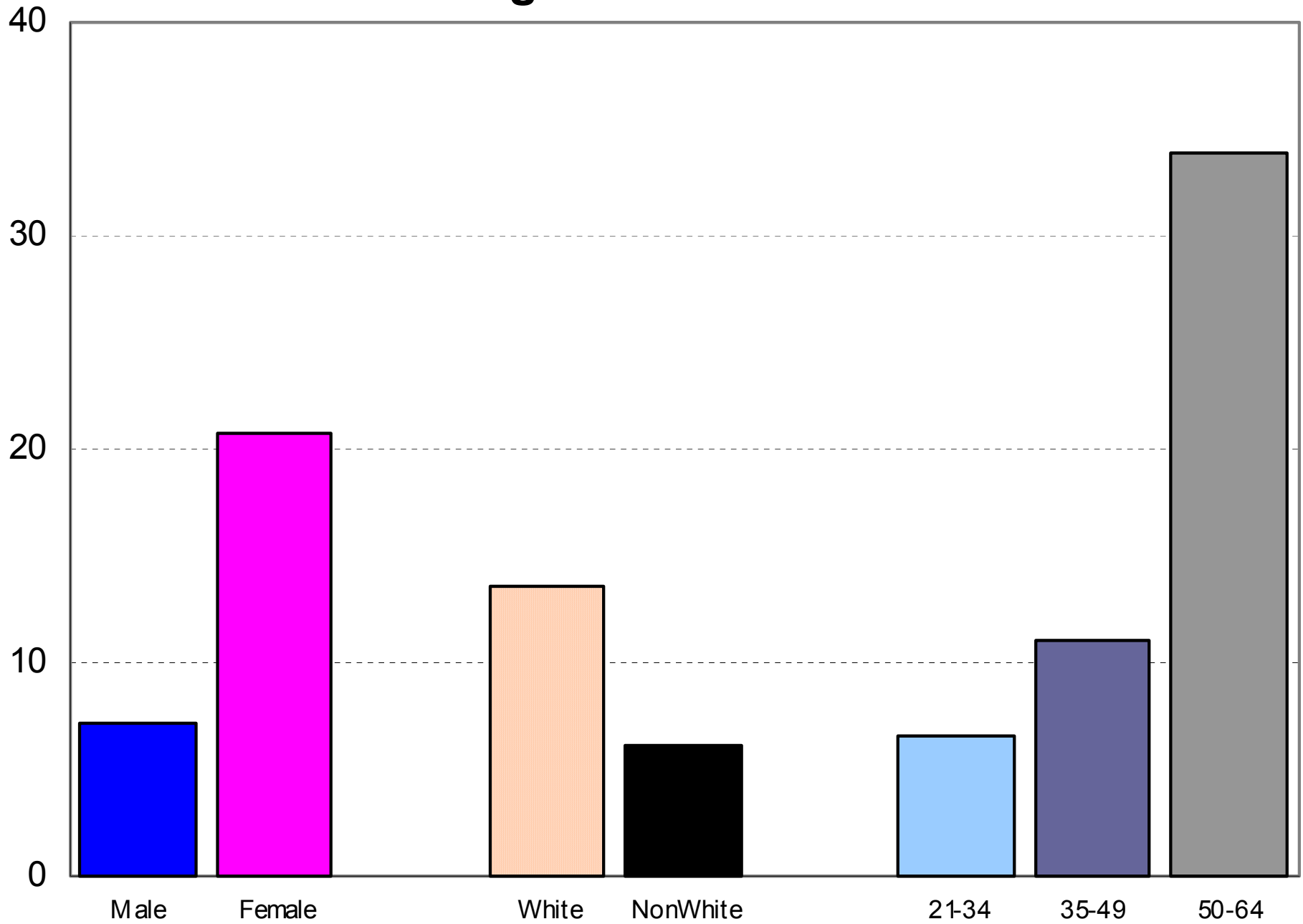
# Arrest Rate



# Arrest Rate



# Co-Occurring: Relative Risk of Arrest



# **Next Questions**

**Change Over Time?**

**Different Service Providers?**

# **Monitoring System Performance**

**Washington, DC**

**Priscilla Blackburn**

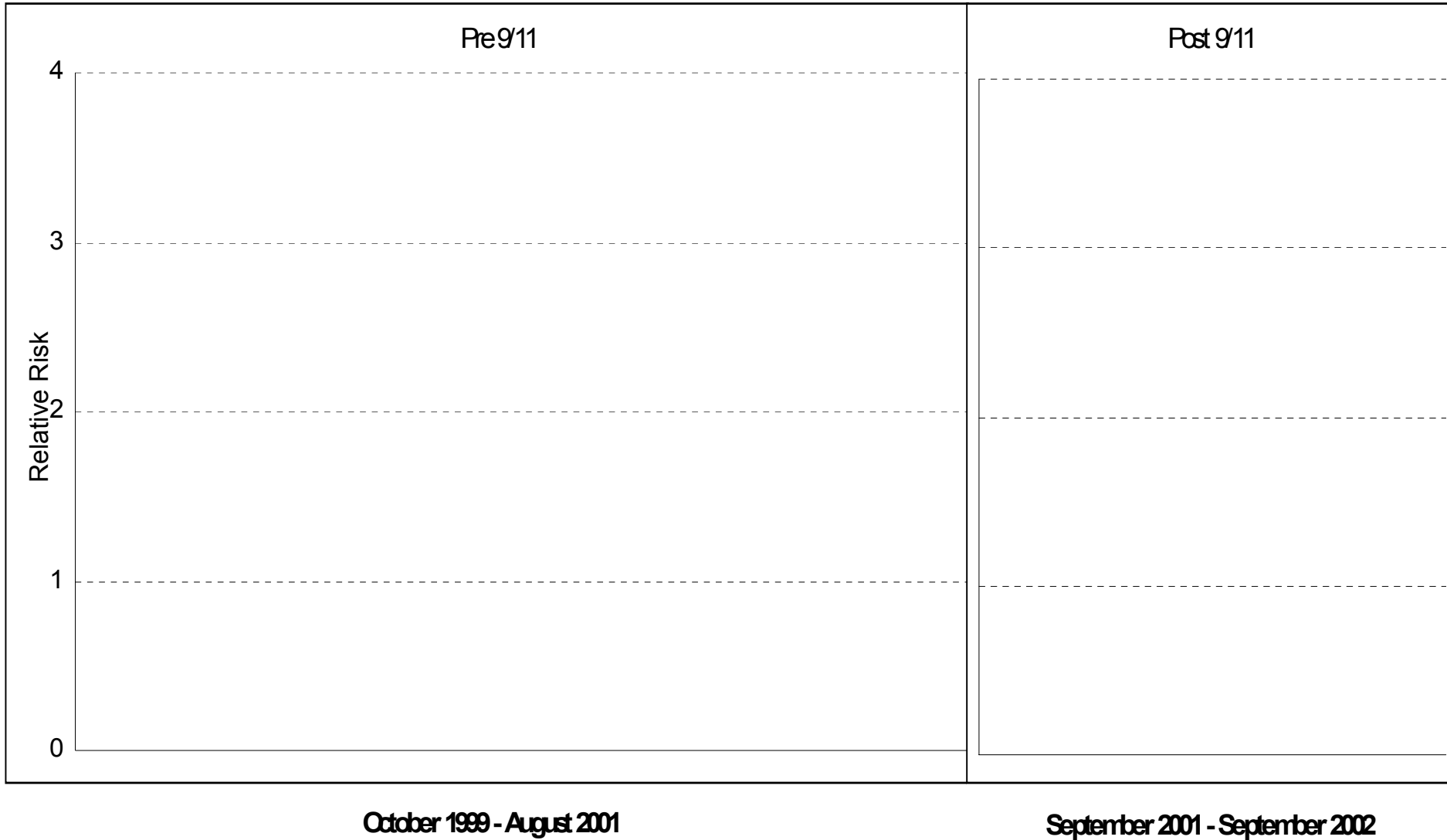
# **Question/Issues**

Impact of 9-11

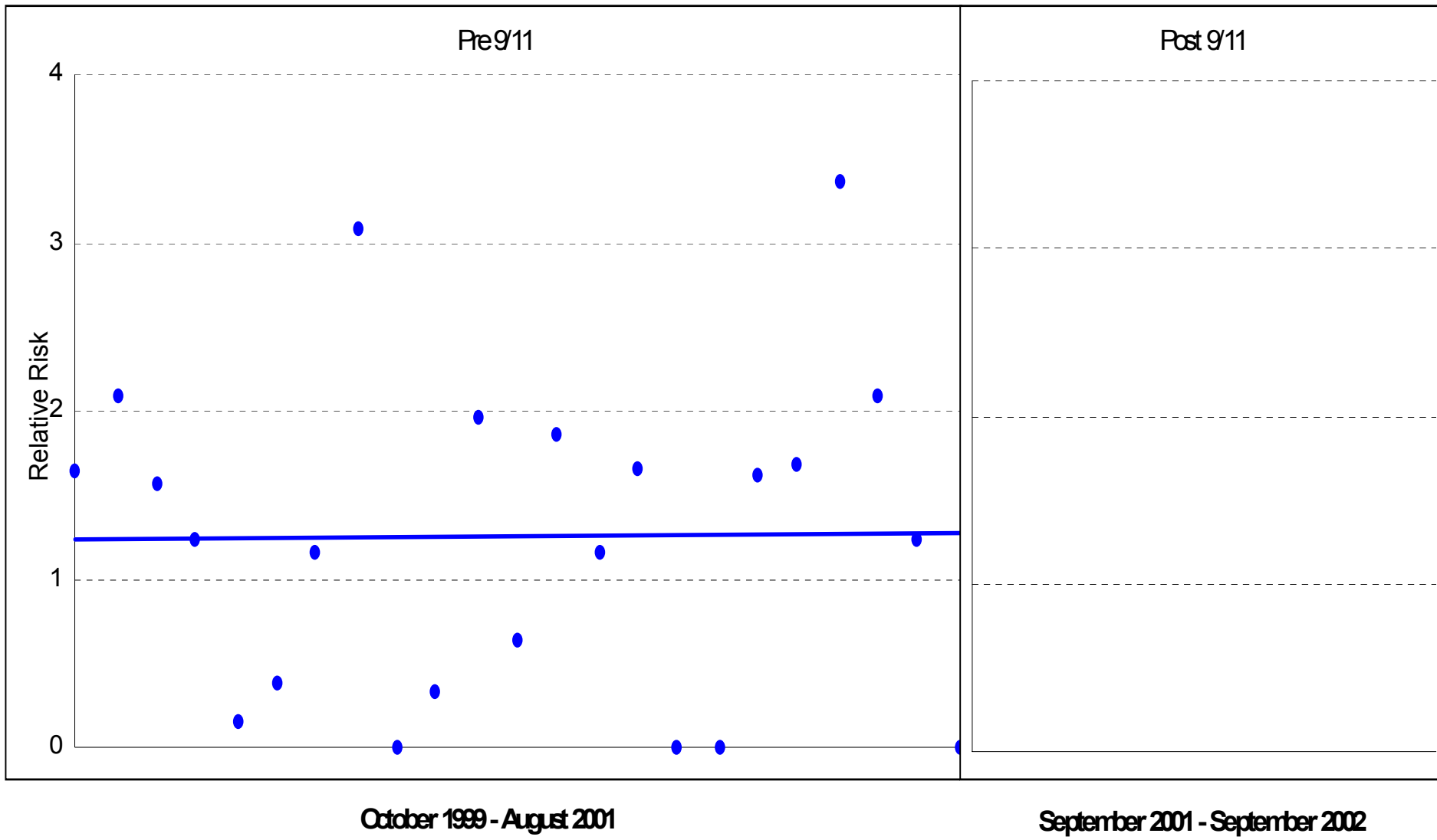
## **Data Access**

Political & Personal Connections

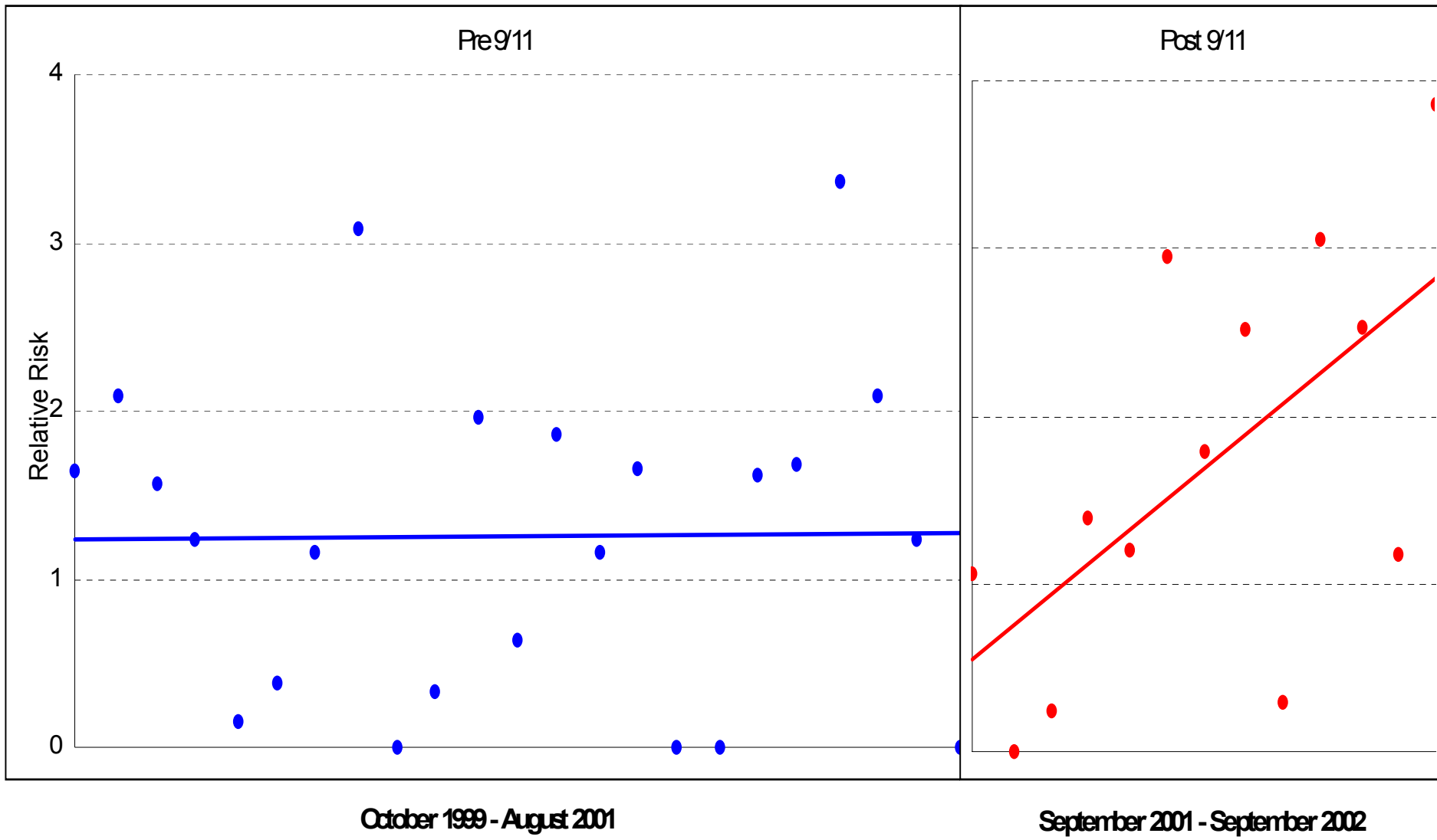
# Relative Risk of Arrest For Young Males (18 - 34) in Washington DC



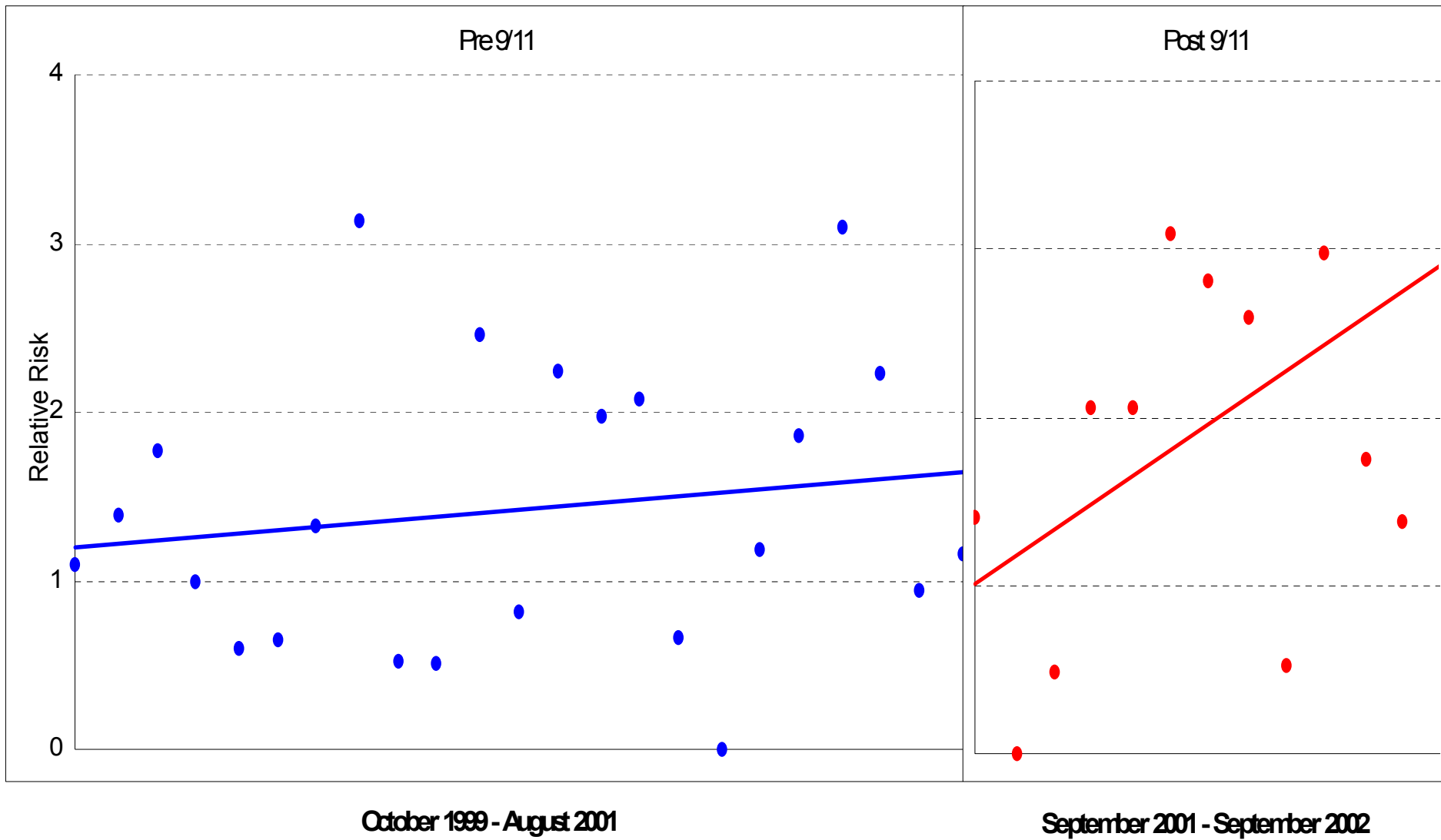
# Relative Risk of Arrest For Young Males (18 - 34) in Washington DC



# Relative Risk of Arrest For Young Males (18 - 34) in Washington DC



# Relative Risk of Arrest For Non-white Clients (18 - 34) in Washington DC



# Next Questions

Changes in System of Care?

DC Area Sniper?

Implications for Disaster  
Preparedness?

**DATA**

**ARE**

**EVERYWHERE**

# Potential Data Sources

Court

Probation

State Police

Arrest

Incarceration

**Parole**

**Public Defender**

**Juvenile Justice**

**Motor Vehicles**

**For More Information:**

**Contact John or Steve**

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[www.thebristolobservatory.com](http://www.thebristolobservatory.com)

**and/or participating states.**

**SAVE**

**THE**

**DATA**

[www.thebristolobservatory.com](http://www.thebristolobservatory.com)