



# Improving Crime Data

## Analysis of St. Louis Rape Trends, 1995-2003

Richard Rosenfeld  
Robert Fornango  
University of Missouri-St. Louis

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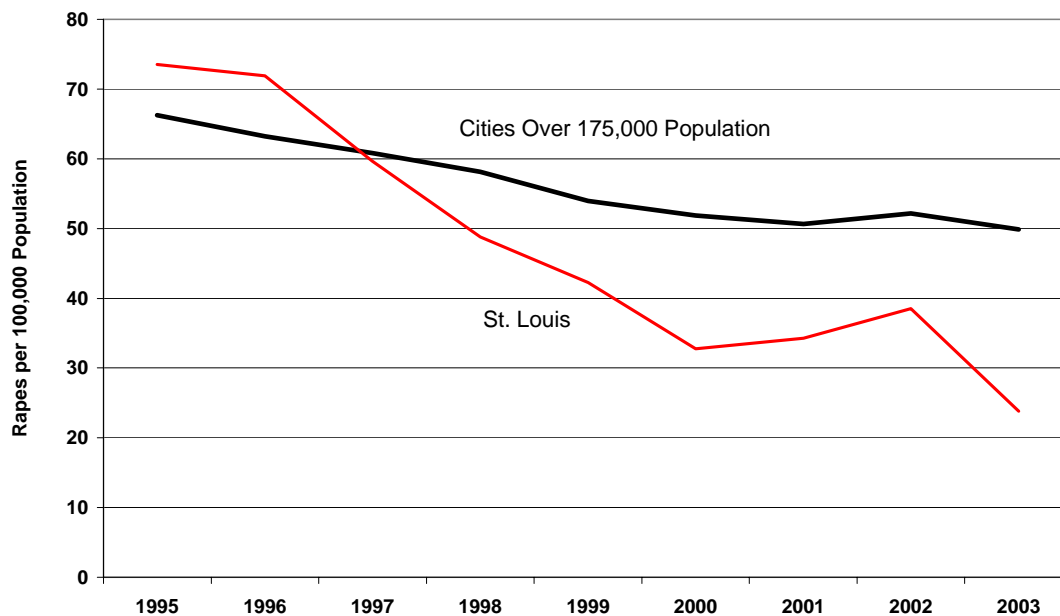
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The city of St. Louis records fewer rapes than expected for a city of its size and characteristics. We present rape trends since 1995 for St. Louis and compare the number of recorded rapes in St. Louis with estimates derived from a statistical model applied to rape data for the 95 US cities with populations greater than 175,000. Our results suggest that St. Louis either has achieved a massive and unusual drop in recorded rapes, especially over the last two years, or employs different definitions and classifications of rape and other sexual assaults than are used in most other large cities.

### Trends in Rape Rates Since 1995

Figure 1 compares rape trends since 1995 in St. Louis and the 95 cities with more than 175,000 residents. (The data are from the FBI's Uniform Crime Reports.) St. Louis had a higher than average rate of rape in 1995. By 1997, the St. Louis rate had fallen below the average for the 95 cities. Although most cities have experienced a decline in police-recorded rapes since 1995, the drop in St. Louis has been much greater than elsewhere. Between 1995 and 2003, rape rates in St. Louis fell by 68%, compared with an average decrease of 25% for the 95 largest cities. By 2003 St. Louis ranked 86<sup>th</sup> among the 95 cities in rapes per 100,000 residents. In 1995 St. Louis ranked 33<sup>rd</sup>.

Figure 1. Rape Trends, 1995-2003: St. Louis and Cities Over 175,000 Population (N=95)



## **Expected Number of Rapes in St. Louis**

The number of recorded rapes in St. Louis is much smaller than in most other cities of its size. The St. Louis police recorded 136 rapes in 2002 and 81 rapes in 2003. By comparison, Tulsa, Oklahoma recorded 243 rapes in 2002 and 272 in 2003. Cincinnati recorded 388 and 307, Atlanta registered 276 and 281, and Kansas City counted 300 and 308 in 2002 and 2003, respectively.

The St. Louis rape figures also are far lower than would be expected based on conditions normally related to the frequency of rape in large US cities. We estimated the expected number of St. Louis rapes in 2002 and 2003 from an equation that models rape as a linear function of four variables that reliably predict differences across cities in rape rates: the sex ratio (males per 100 females), divorce rate, percent of families with children headed by a female, and female labor force participation rate. In addition, the model includes an indicator of the trend in rapes within each of the 95 cities since 1995. We achieved reasonably good model fit applying the equation to data for the 95 largest US cities (see Appendix for estimation details).

Our model produces an estimated 229 rapes in St. Louis in 2002 and 214 in 2003, or 93 more than were recorded by the St. Louis police in 2002 and 133 more than were recorded in 2003.

It is possible that St. Louis has achieved very large reductions in the frequency of rape over the past decade. However, decreases of the magnitude reported here and counts that are so much lower than expected from systematic comparisons with other cities are highly unusual. It also is possible that a different method of defining and classifying rape and other sexual assaults is used in St. Louis than elsewhere, even though all jurisdictions are supposed to apply the same classification procedures to crimes counted in the FBI's Uniform Crime Reports. Our results suggest that this alternative explanation of St. Louis rape figures should be investigated before comparing St. Louis rape figures to those for other cities or to its own recent history.

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## **Appendix**

### **Estimation of Expected Rapes in St. Louis**

We used the following equation to estimate the expected frequency of rape in St. Louis during 2002 and 2003:

$$\text{RAPE RATE} = a + b_1(\text{SRATIO}) + b_2(\text{FLAB}) + b_3(\text{DIV}) + b_4(\text{FFAM}) + b_5(\text{TREND}), \text{ where} \quad \text{Eq. (1)}$$

RAPE RATE = Rapes per 100,000 population;

SRATIO = Number of males per 100 females;

FLAB = Percent of females 16 and over in civilian labor force;

DIV = Percent of persons 15 and over divorced;

FFAM = Percent of families with children under 18 headed by a female; and

TREND = Linear trend of 1995-2001 rape rates for 2002 equation, 1995-2002 rape rates for 2003 equation

Equation (1) was fitted to data for the 95 US cities with 2000 populations greater than 175,000. The rape data are from the FBI's *Uniform Crime Reports*. The data for the covariates are from the 2000 US Census. To produce reliable parameter estimates and avoid overfitting, the average 1999-2001 rape rates for the 95 cities were first regressed on the covariates using ordinary least squares. The 2002 rape rates were then regressed on the fitted values from this equation and the within-city linear trend of 1995-2001 yearly rape rates. The predicted 2002 St. Louis rape rate per 100,000 was obtained and converted to a count. The same procedure was used to obtain the predicted St. Louis rape rate for 2003, with the linear trend based on the 1995-2002 yearly rape rates. The 2002 and 2003 prediction equations are given below:

$$\text{RAPE}_{2002} = -1.527 + 1.125(\text{PRRAPE}_{99-01}) + 1.810(\text{TREND}_{95-01}) \quad \text{Eq. (2)}$$

$$R^2 = .434, F = 35.31 (p < .001)$$

$$\text{RAPE}_{2003} = -2.366 + 1.089(\text{PRRAPE}_{99-01}) + 1.991(\text{TREND}_{95-02}) \quad \text{Eq. (3)}$$

$$R^2 = .432, F = 34.95 (p < .001)$$

The expected St. Louis rape rate in 2002 is  $-1.527 + 1.125(71.28) + 1.810(-7.622) = 64.87$  rapes per 100,000 population. The 2002 rape count is  $((64.87/100000)*353004) = 229$ . The expected St. Louis rape rate in 2003 is  $-2.366 + 1.089(71.28) + 1.991(-6.194) = 62.93$ . The expected 2003 rape count is  $((62.93/100000)*340256) = 214$ .