

Use of Pharmacy Data to Evaluate Impact of Smoking Regulations on Sales of Nicotine Replacement Therapies in New York City

Kristi Metzger, Farzad Mostashari,
Rick Heffernen, Debjani Das

New York City Department of Health and Mental Hygiene

National Syndromic Surveillance Conference
October 23, 2003

Syndromic Surveillance Data

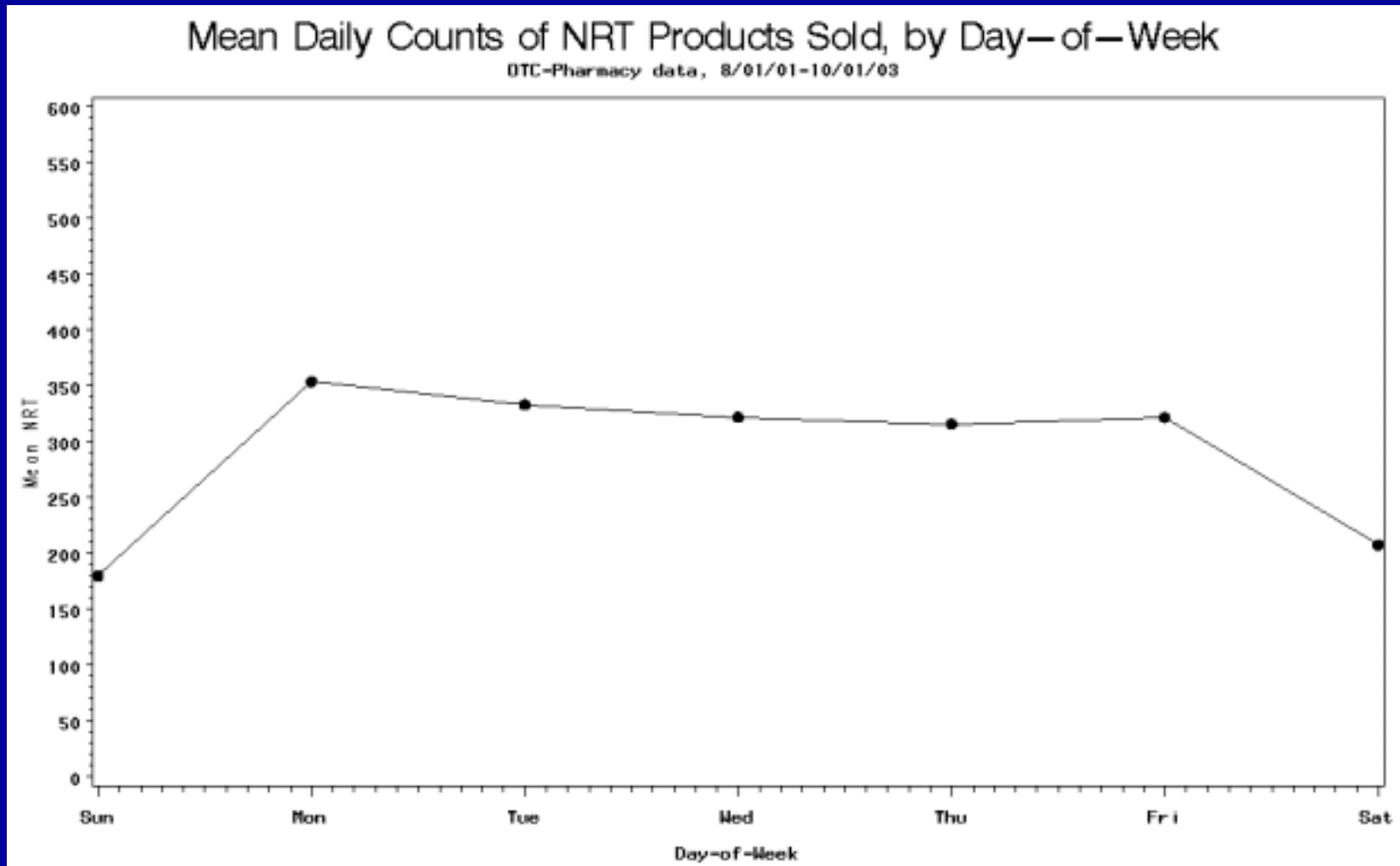


- Over-the-counter (OTC) pharmacy data
- Collected from 100+ pharmacies in NYC, surrounding NYC
- Daily sales information for each store
- Includes nicotine replacement therapy (NRT) sales
- Available since 7/29/01

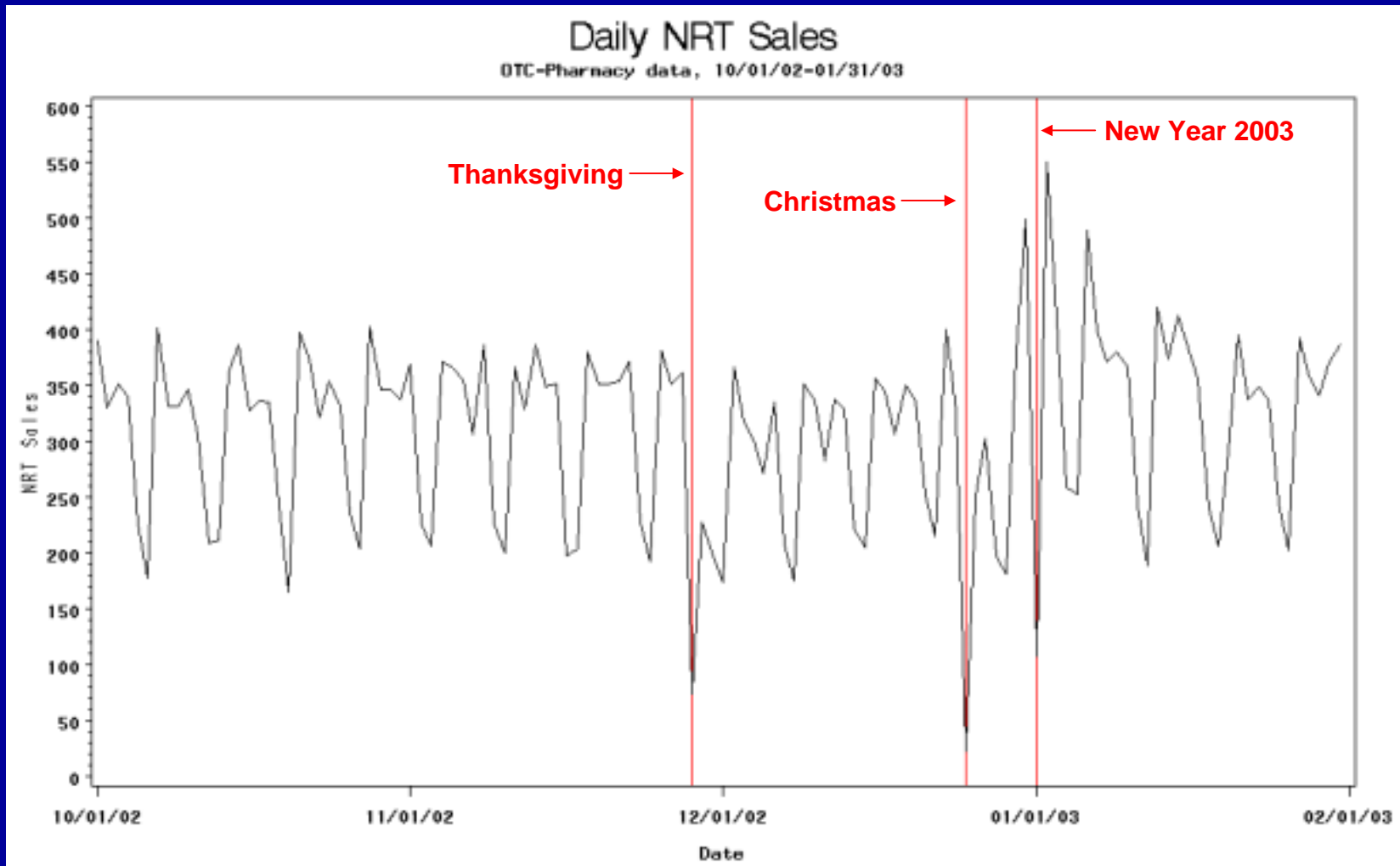
Study Objective #1

- Evaluate OTC pharmacy data as a surveillance tool for smoking cessation
 - Describe trends in NRT sales
 - Look for expected increases in NRT sales (i.e. at New Year's)

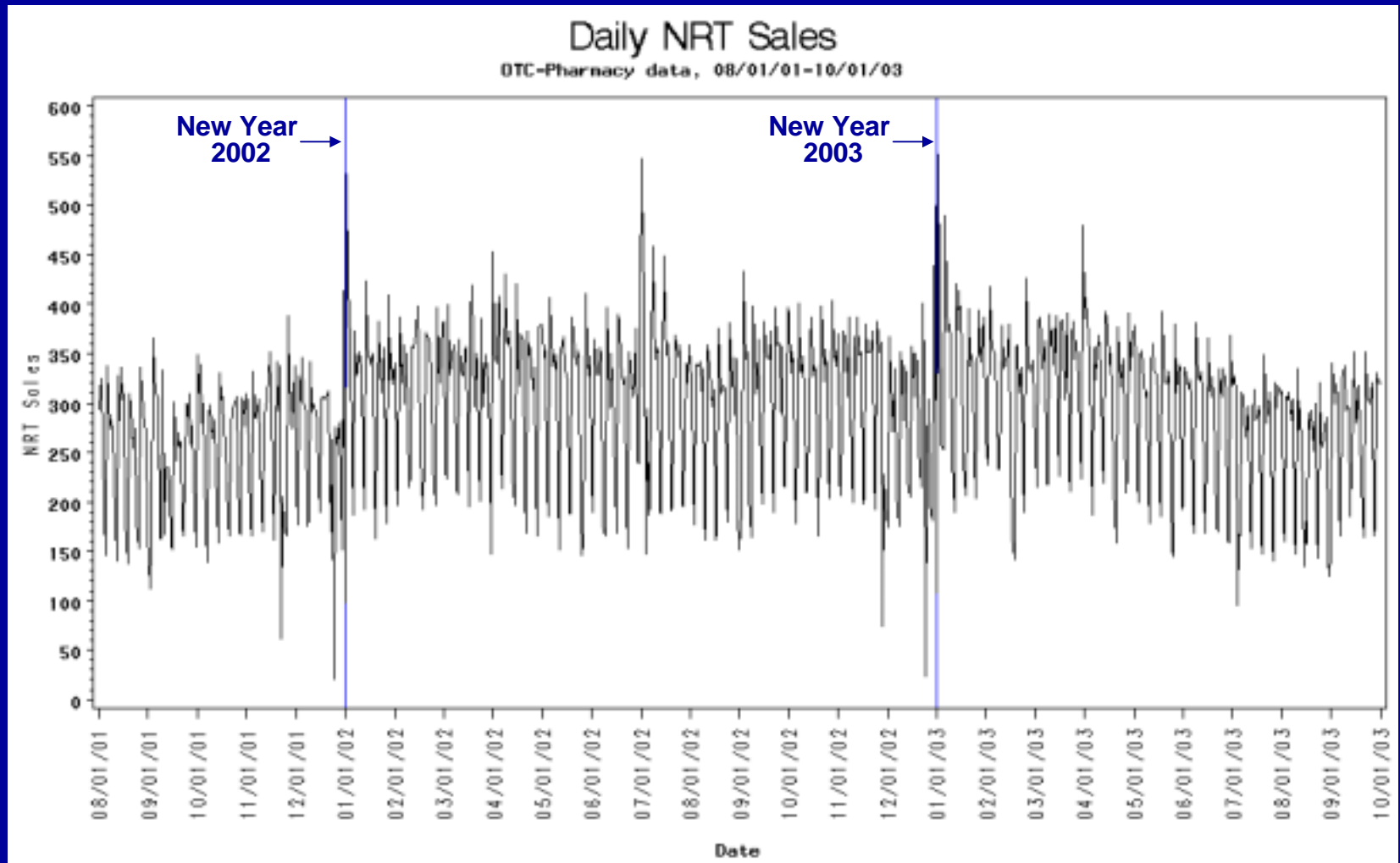
Day-of-Week Trends



Thanksgiving to New Year's



Expected Increases in NRT sales at New Year's



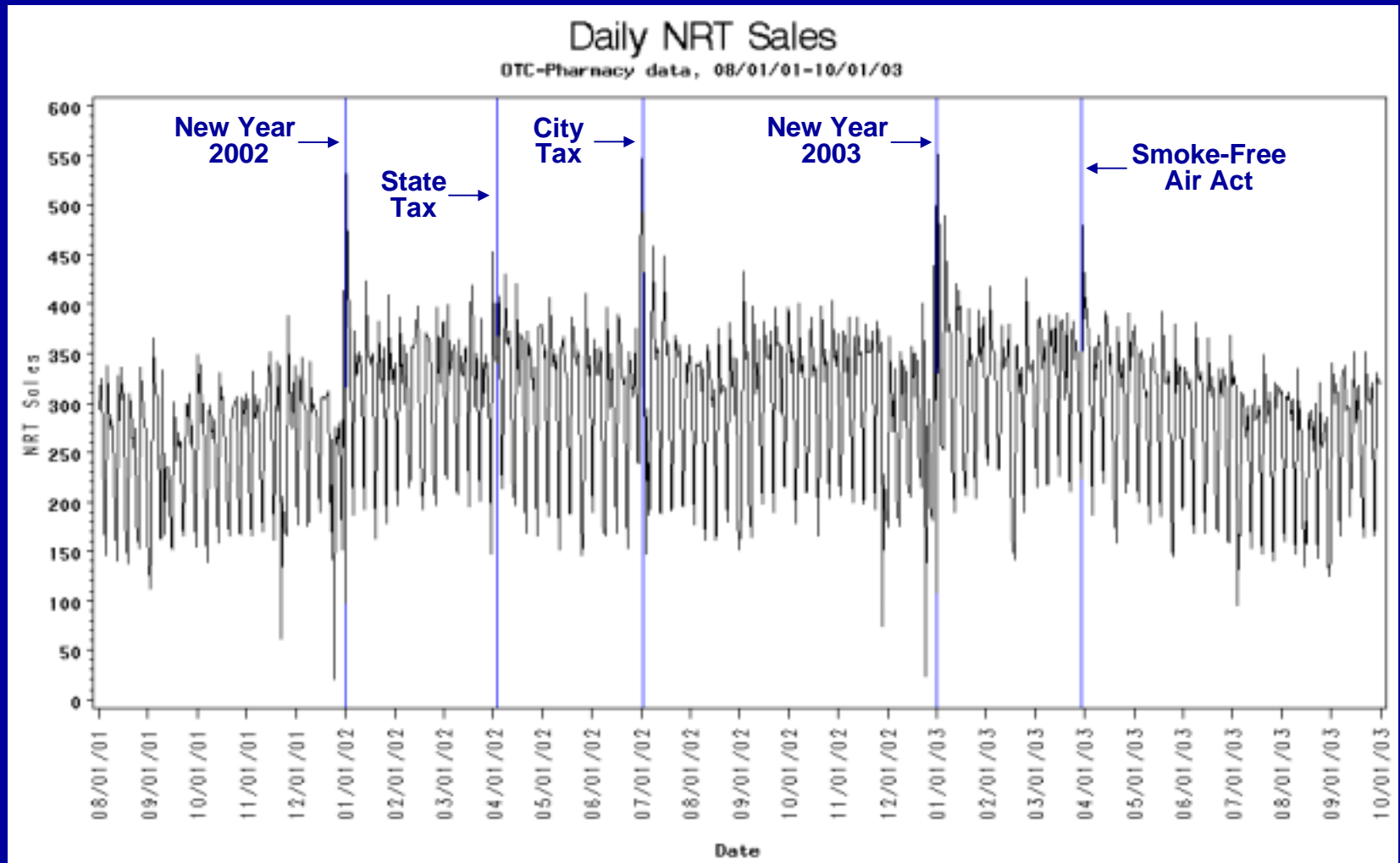
Study Objective #2

- Use OTC data to evaluate impact of taxes/regulations on NRT sales
 - Concurrent increases in NRT sales?
 - New York state tax
 - New York City tax
 - Smoke-Free Air Act

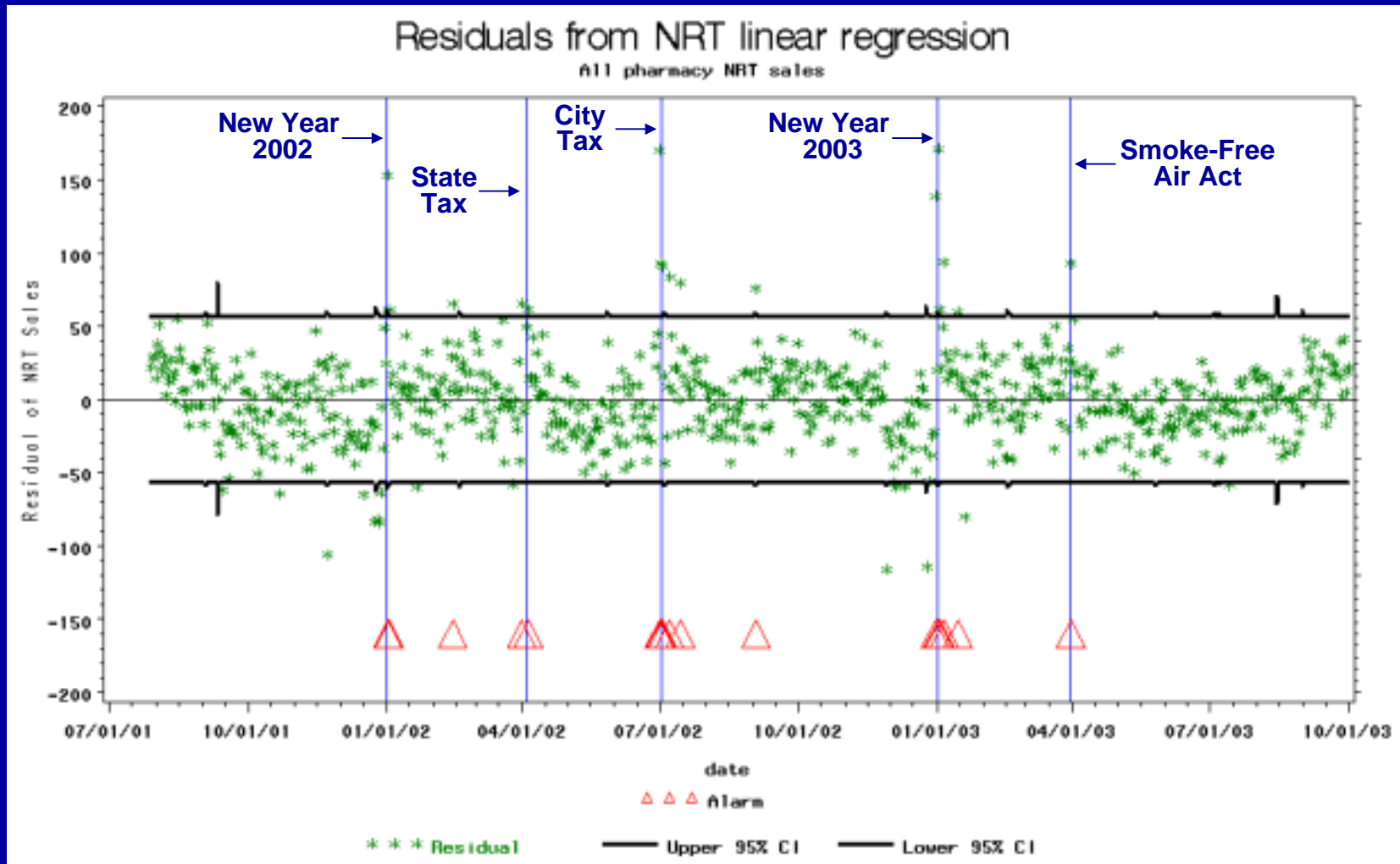
Recent Smoking Taxes/Regulations

- New York state cigarette tax increase
 - 4/3/2002: increase of \$0.39 to \$1.50
- New York City cigarette tax increase
 - 7/2/2002: increase of \$1.42 to \$1.50
- NYC Smoke-Free Air Act
 - 3/30/2003: bans smoking in workplaces

Increase in NRT sales concurrent with taxes/regulations?



Increase in NRT sales concurrent with taxes/regulations?



*Linear regression including linear, quadratic terms, sine/cosine terms
day-of-week indicators, holiday/postholiday indicators, terms for 9/11 and Blackout*

Study Objective #3

- Use OTC data to evaluate impact of taxes/regulations on NRT sales in different neighborhoods
 - Within NYC boundaries vs. outside NYC
 - By zip code characteristics (e.g. poverty, racial/ethnic distribution)

Store Characteristics

- Pharmacy locations
 - In 100+ ZIP codes
 - Most in NYC / some in NY state, NJ
- 2000 Census data for each ZIP
 - Proportion of population by race, income, poverty status, education, foreign-born
 - Dichotomized as higher or lower than NYC (income categorized into quartiles)

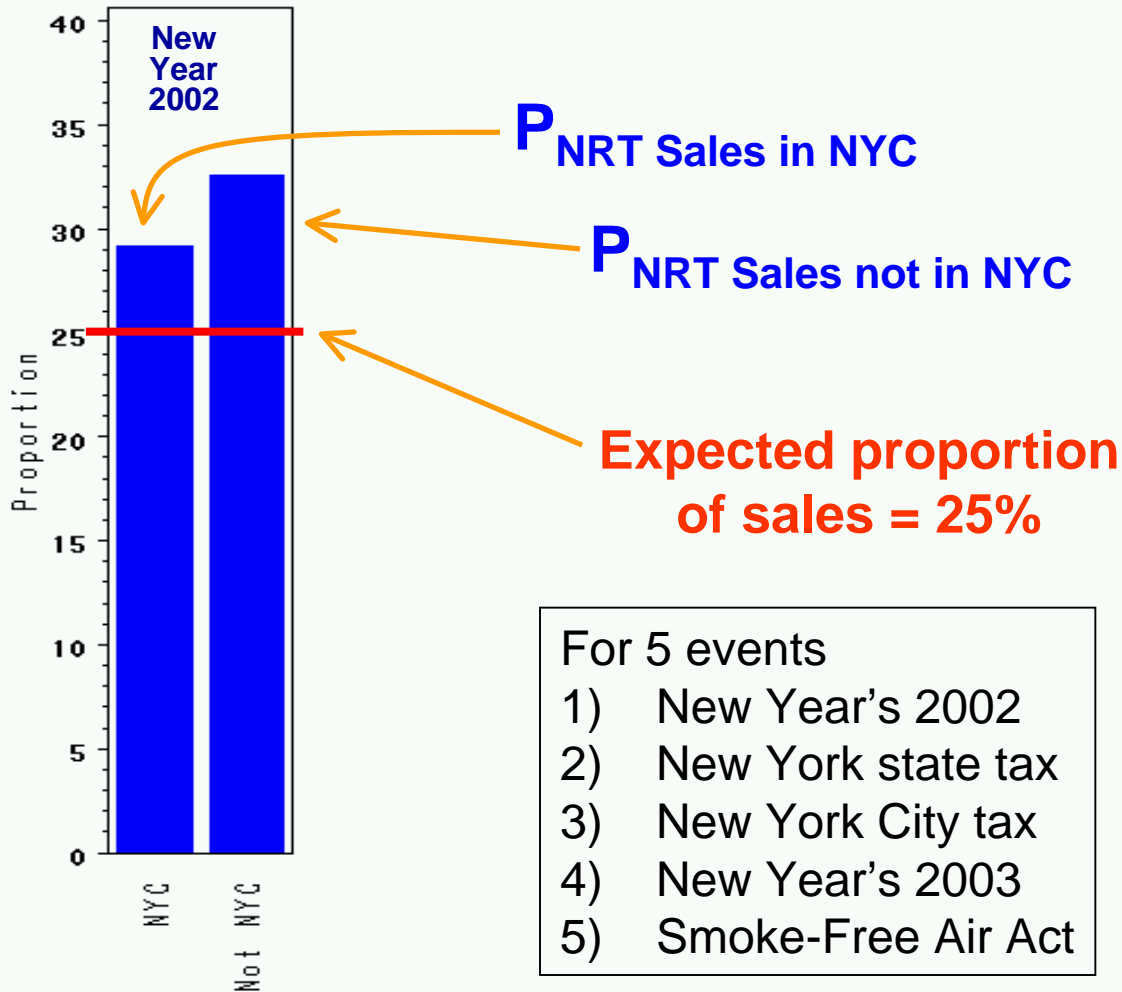
Method to Evaluate Differences

$$P_{\text{NRT Sales}} = \frac{\text{NRT sales week of event}}{\text{NRT sales week of event} + 3 \text{ weeks prior}}$$

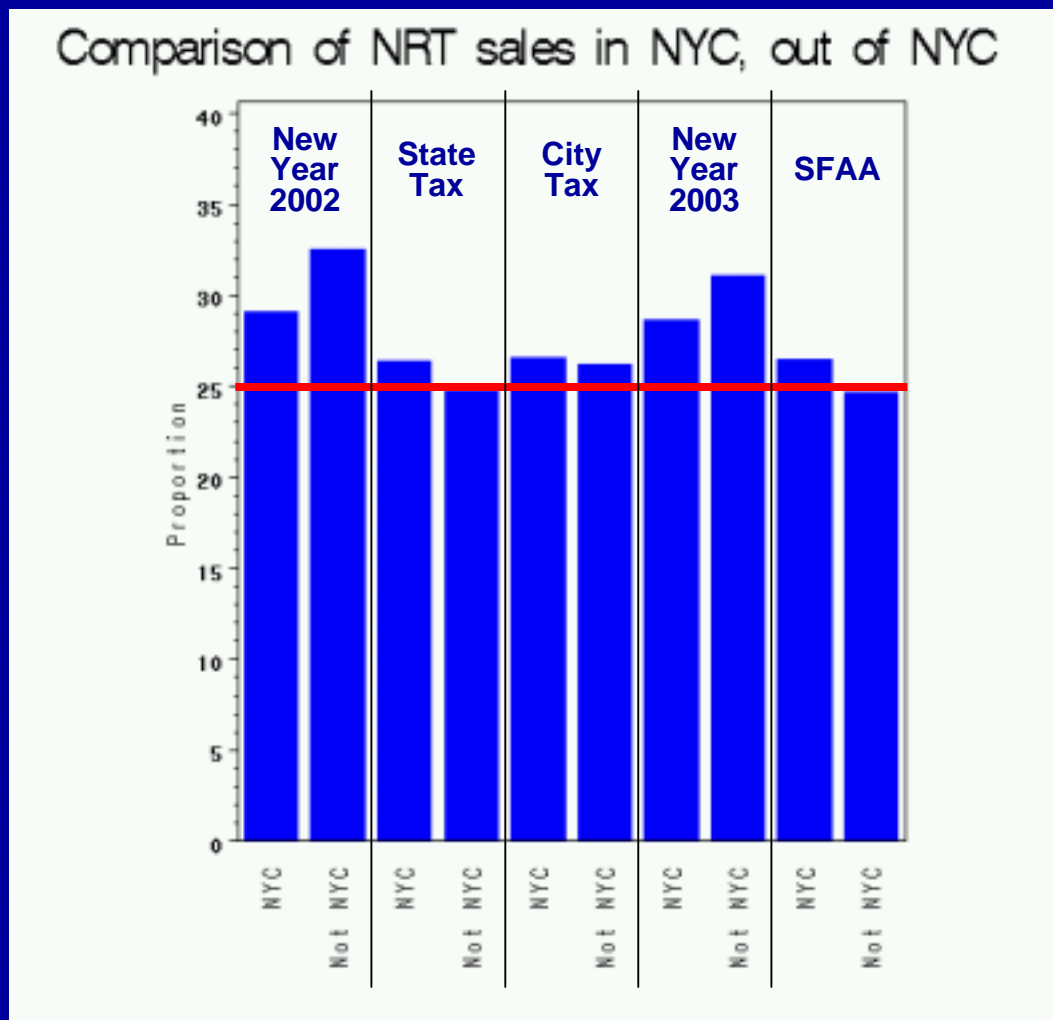


Expect 25% of sales to occur in 1 of 4 weeks

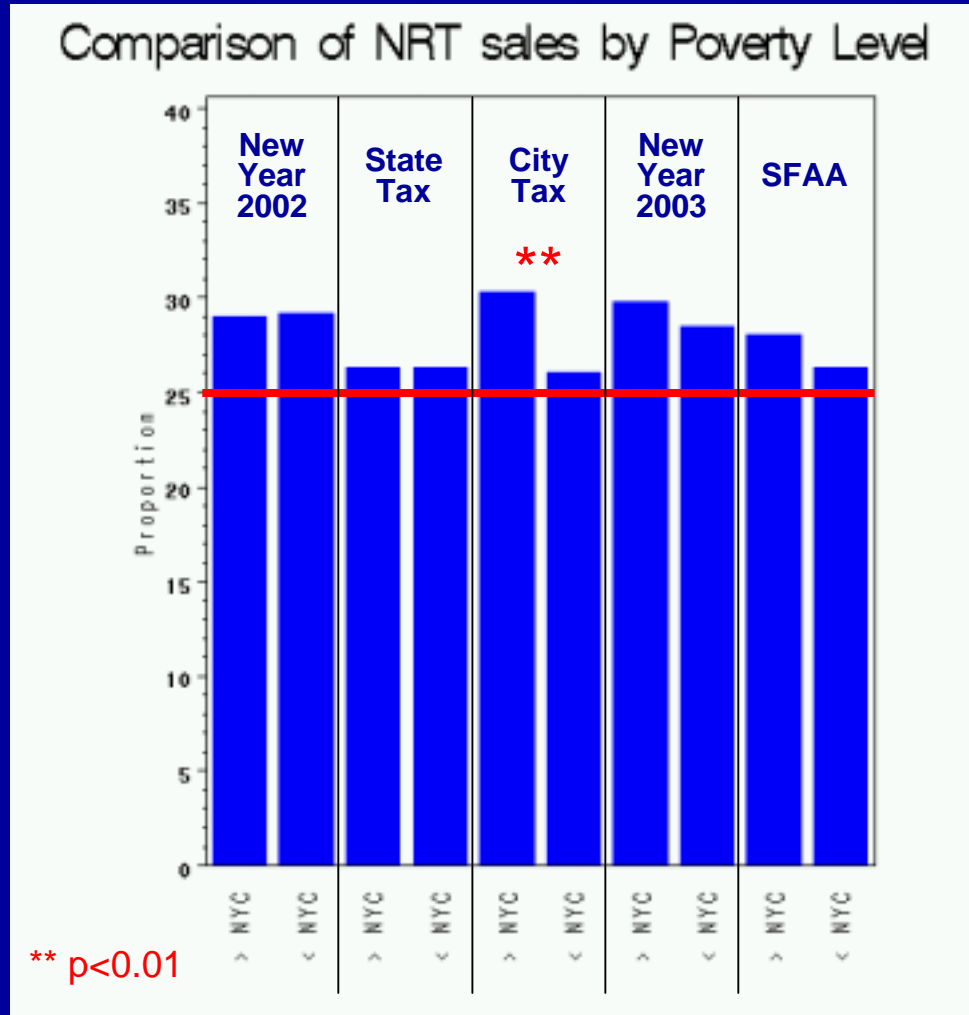
Method to Evaluate Differences



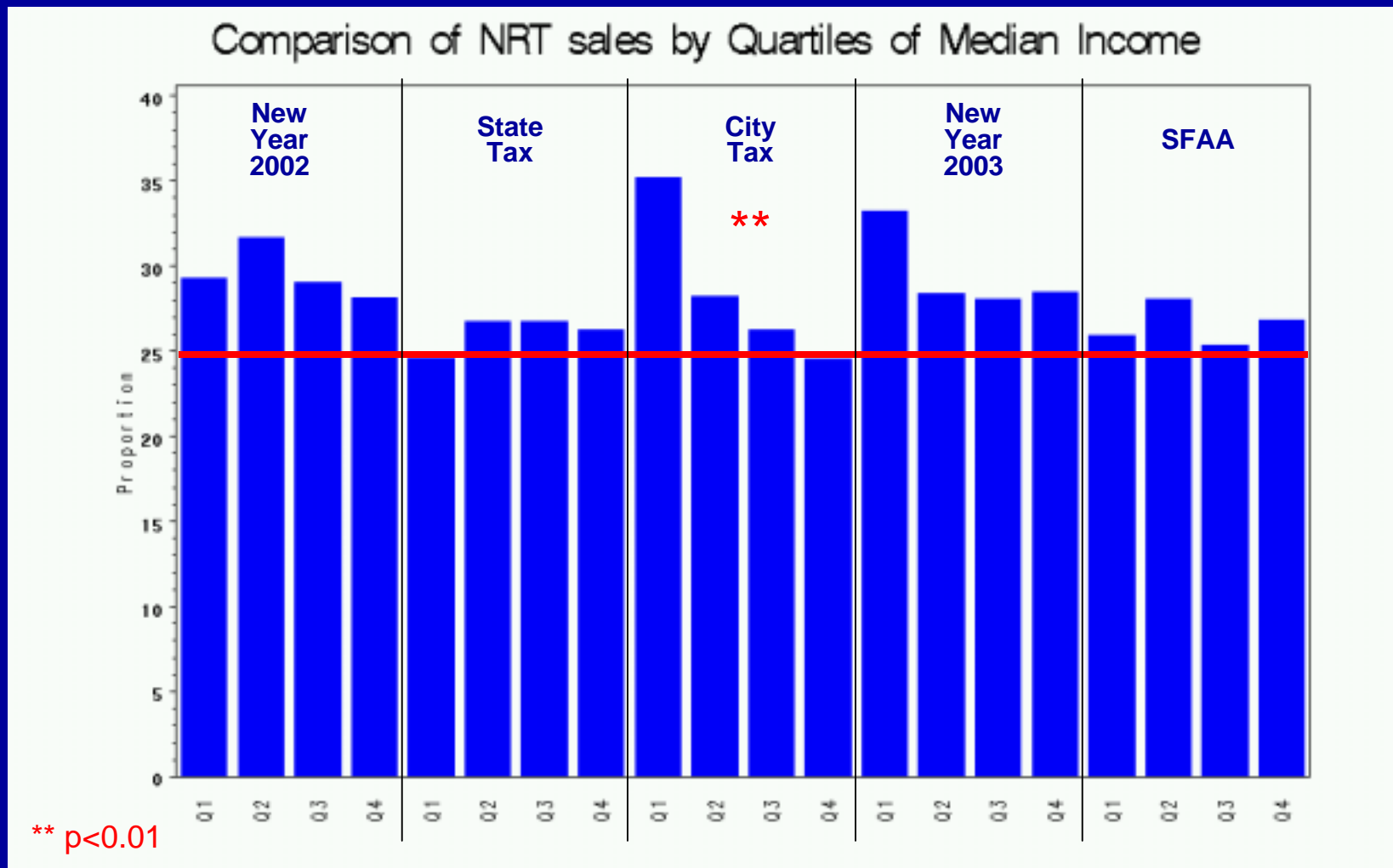
Difference in sales at NYC, non-NYC stores?



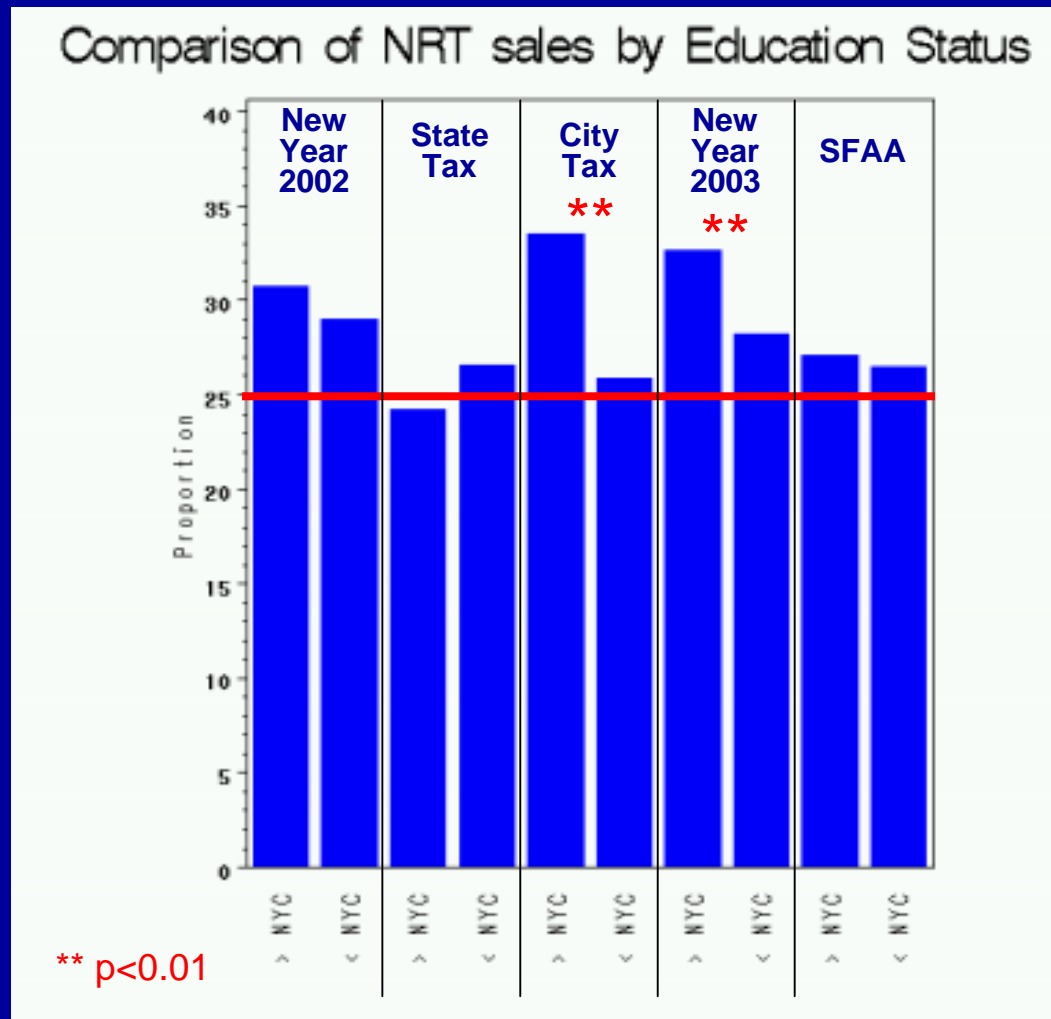
Difference in Sales at NYC Stores by ZIP: Proportion Below Poverty



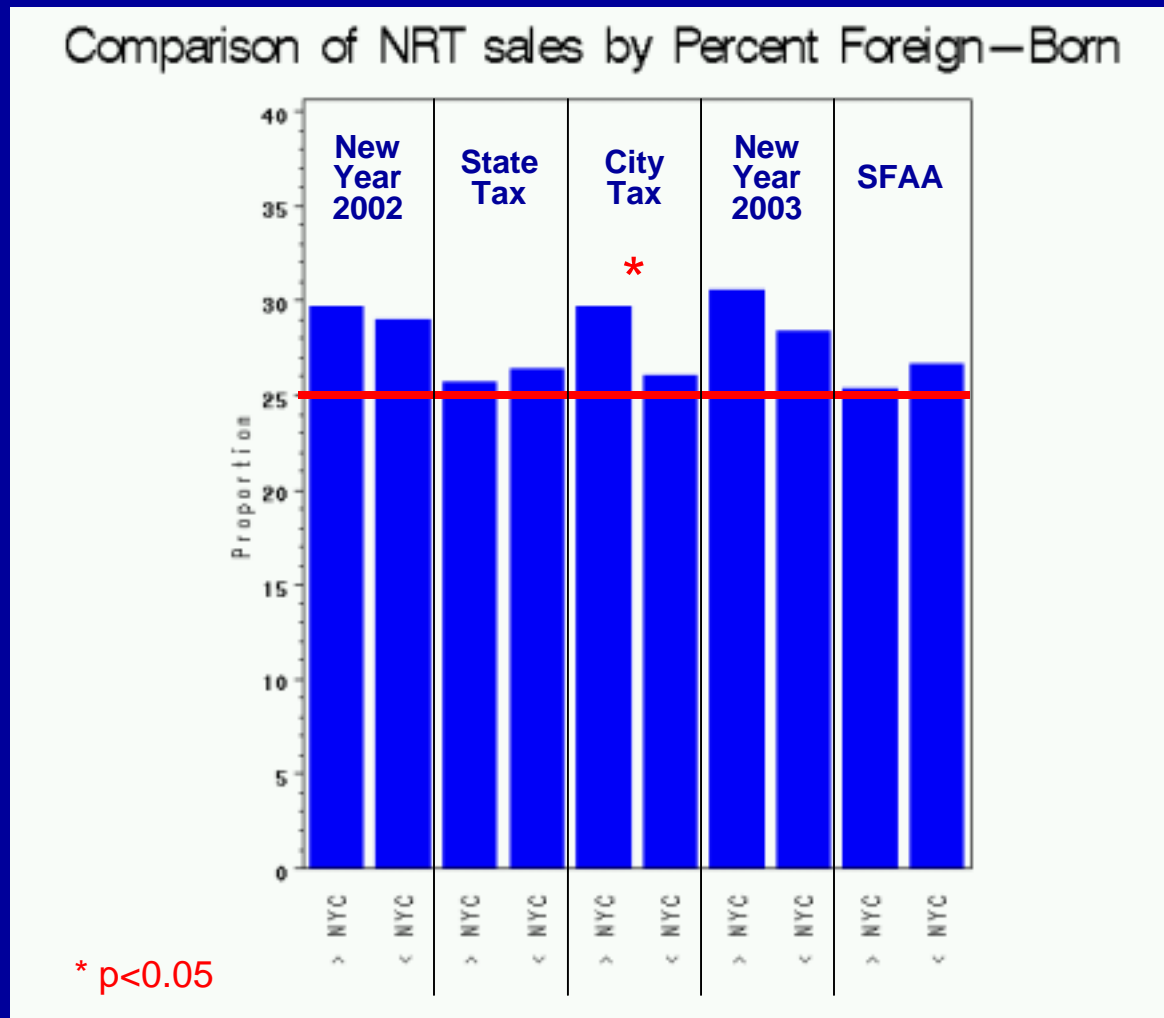
Difference in sales at NYC stores by ZIP: Quartiles of Median Income



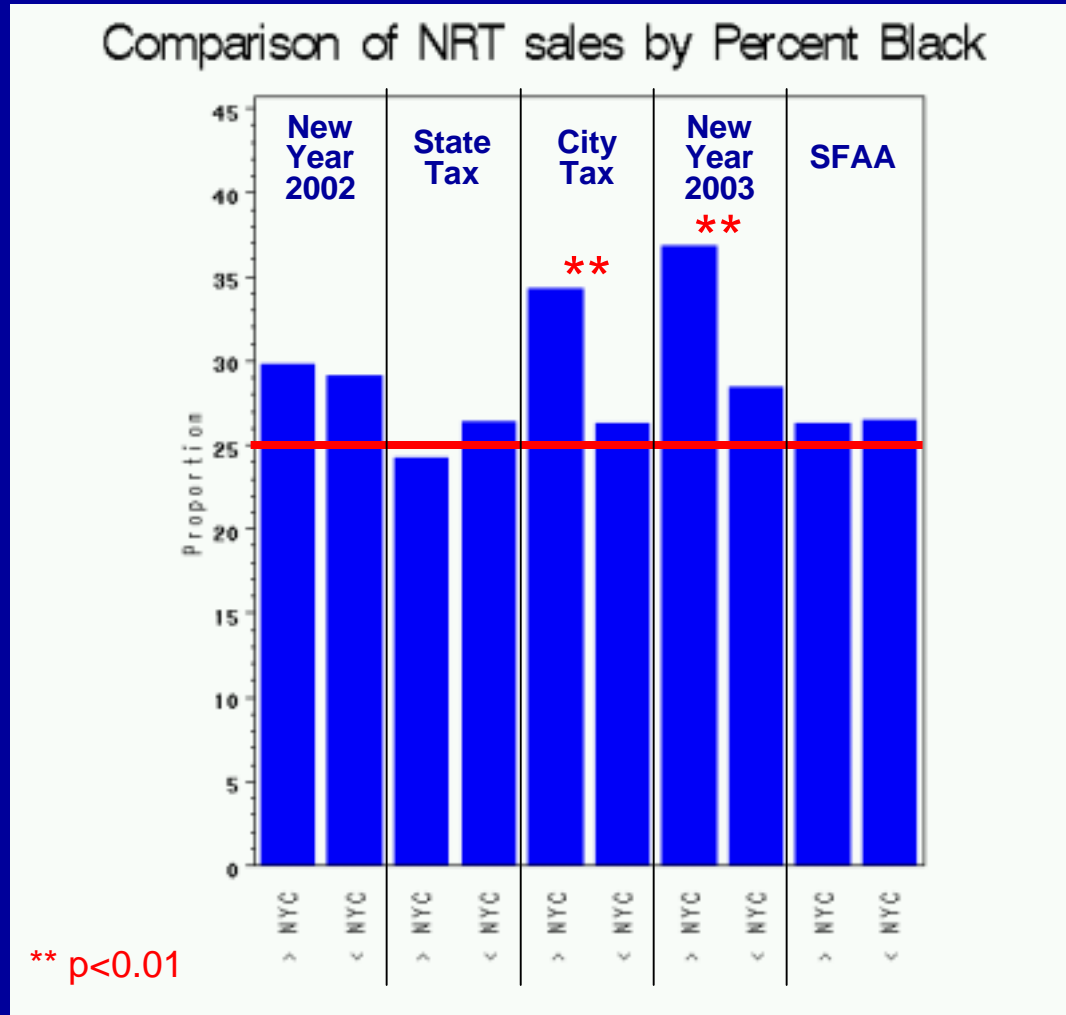
Difference in Sales at NYC Stores by ZIP: Education Status (Less than High School)



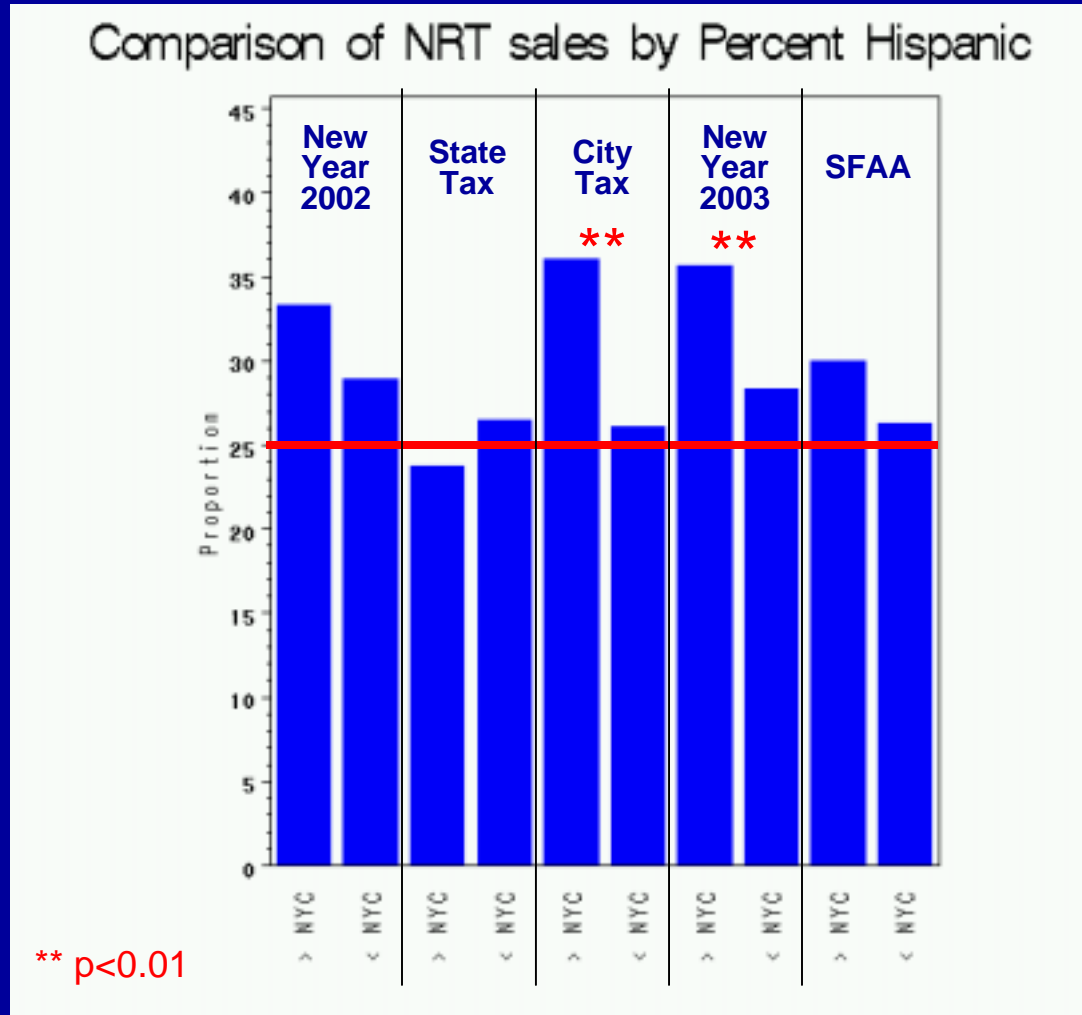
Difference in Sales at NYC Stores by ZIP: Percent Foreign-Born



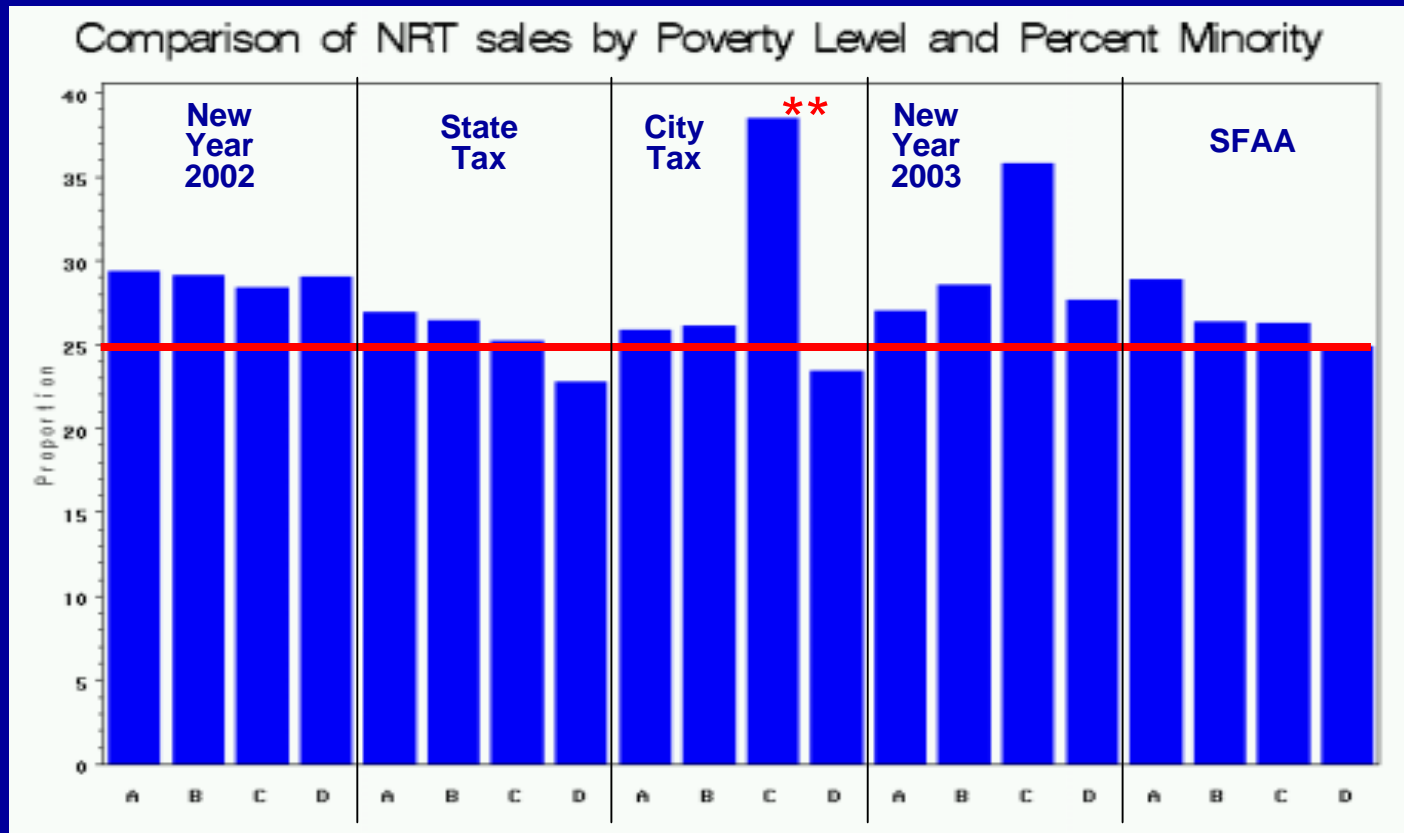
Difference in Sales at NYC Stores by ZIP: Percent Black



Difference in Sales at NYC Stores by ZIP: Percent Hispanic



Difference in sales at NYC stores by ZIP: Poverty Level and Percent Minority



** p<0.01

- A: More poverty, fewer minorities
- B: Less poverty, fewer minorities
- C: More poverty, more minorities
- D: Less poverty, more minorities

Conclusions

- Smoking taxes/regulations associated with increases in NRT sales
 - Very small increase observed for state tax
 - Largest increase observed for NYC tax
 - Moderate increase observed for SFAA

Conclusions, cont.

- Differential impact on sales by ZIP code characteristics
 - NYC tax increase: more sales in ZIP codes with more poverty, less education, larger percentages of foreign-born, minorities
 - SFAA: similar increases in sales observed across neighborhoods

Conclusions, cont.

- Syndromic surveillance data can be useful for non-BT, non-ID surveillance
- Provides clues to behavioral patterns
- May not be representative of entire geographic region of interest
- Must use non-identifiable data

10/23/2003

