



Temporal and Spatial Variations in Birth Defects in Atlanta

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Tracking Conference
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and Developmental Disabilities



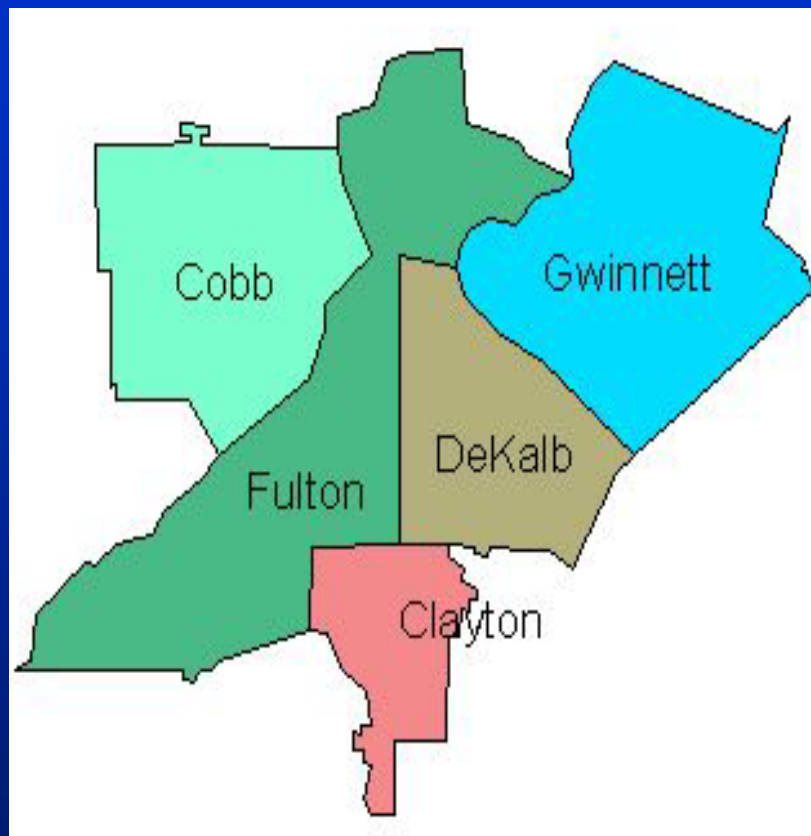
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Metropolitan Atlanta Congenital Defects Program (MACDP)

- A population-based surveillance system of birth defects among infants and fetuses 20+ weeks of gestation
 - Five metropolitan Atlanta counties
 - Active case ascertainment
 - Clinical information reviewed by clinical geneticists
- Operated and funded by CDC since 1967



MACDP Population



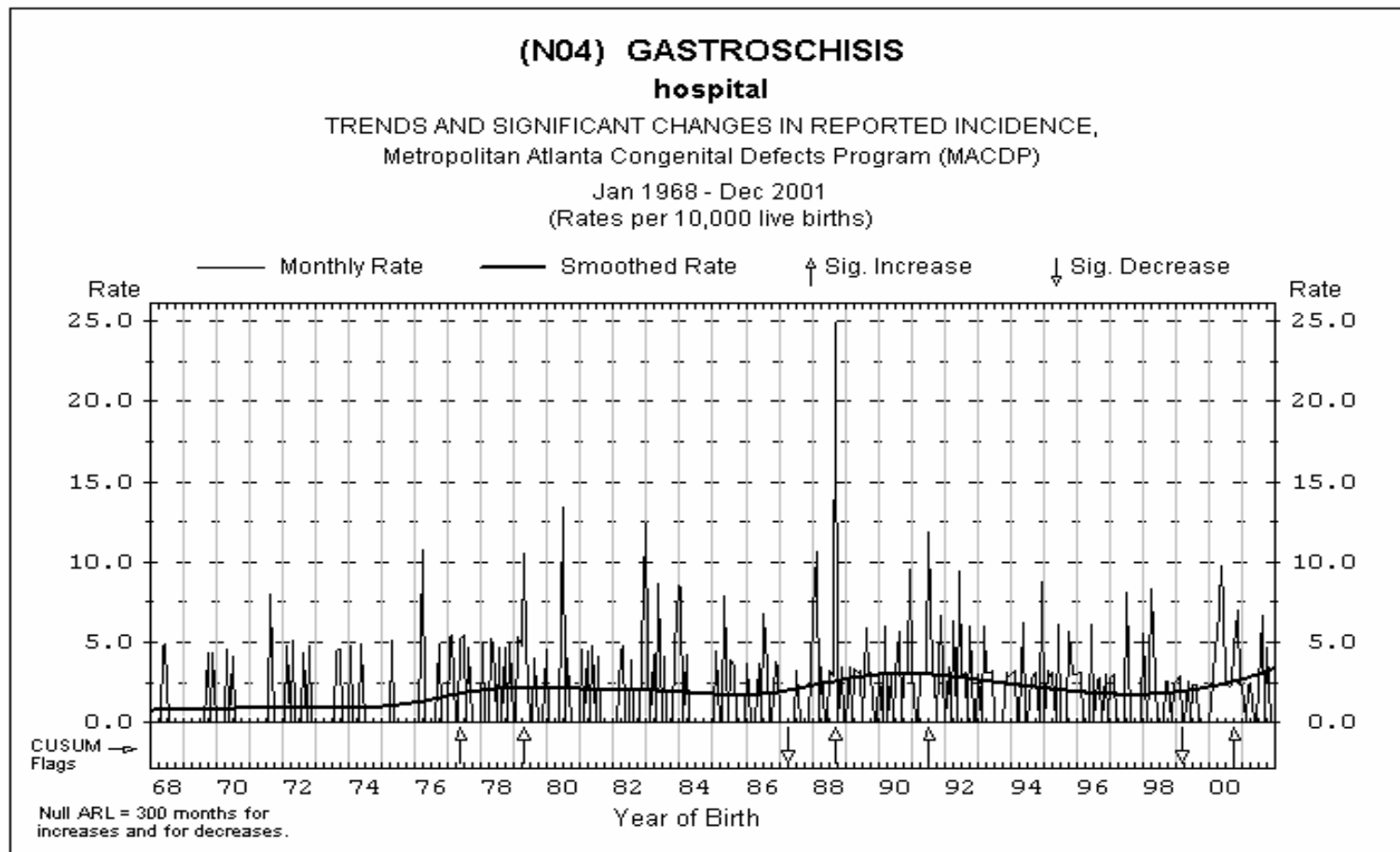
- Births to residents of 5 counties
- In 2002:
 - 50,000 live births
 - 1,500 cases

MACDP Objectives

- **Monitor for trends, clusters**
- Describe morbidity and mortality
- Serve as case registry for studies of risk factors
- Guide and assess prevention interventions
- Educate and advocate



To monitor for temporal clusters



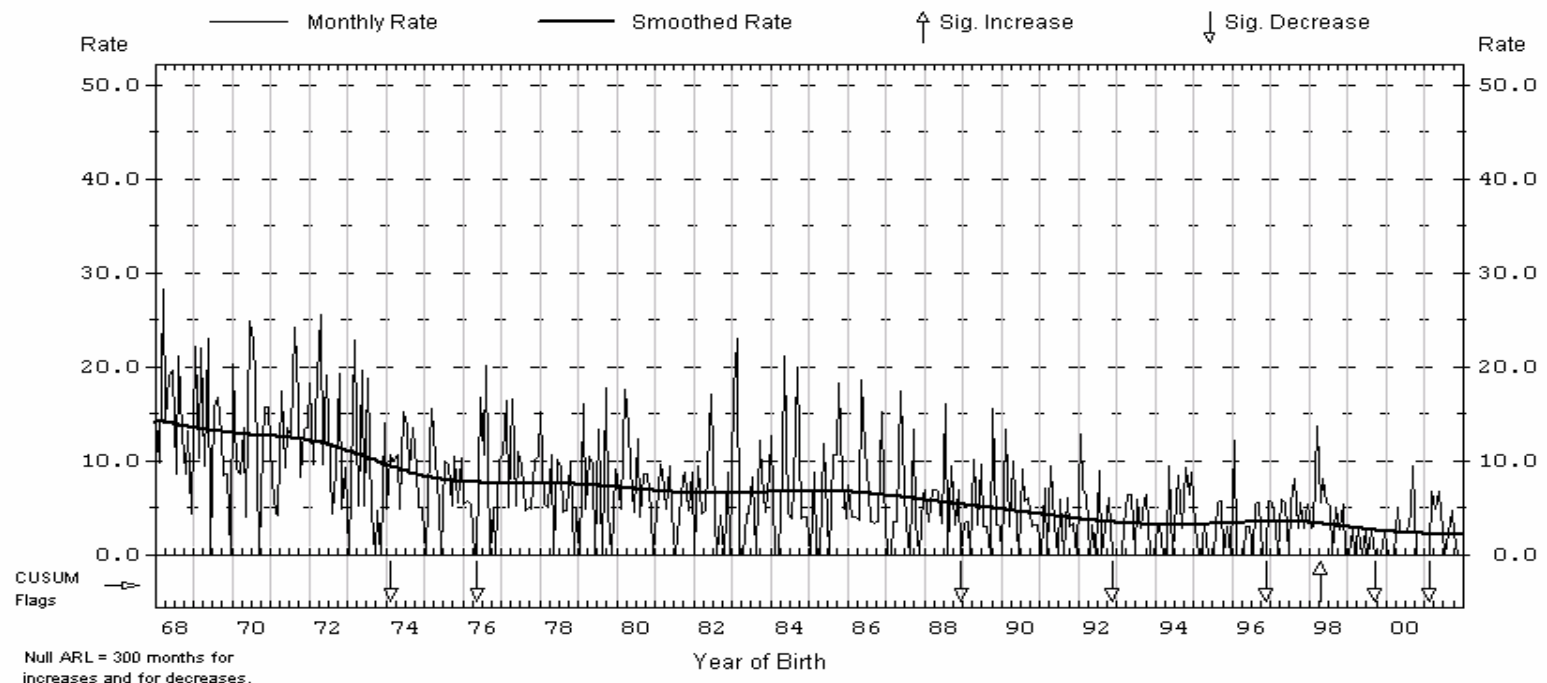
To monitor for temporal trends

(A04) TOTAL SPINA BIFIDA

--Hospital Cases--

TRENDS AND SIGNIFICANT CHANGES IN REPORTED INCIDENCE,
METROPOLITAN ATLANTA CONGENITAL DEFECTS PROGRAM (MACDP)

Jan 1968 - Dec 2001
(Rates per 10,000 live births)



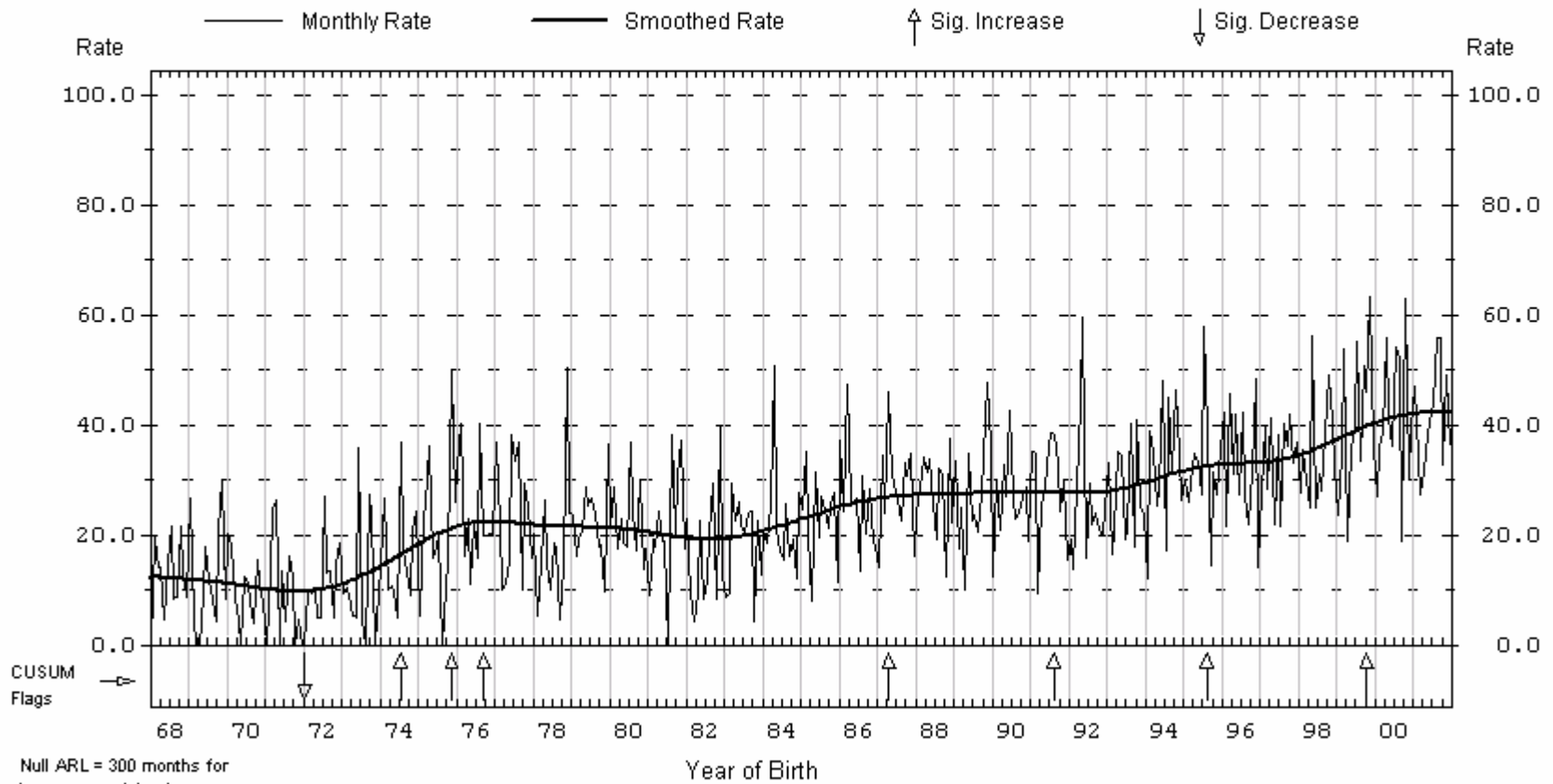
(D05) VENTRICULAR SEPTAL DEFECTS

--Hospital Cases--

TRENDS AND SIGNIFICANT CHANGES IN REPORTED INCIDENCE,
METROPOLITAN ATLANTA CONGENITAL DEFECTS PROGRAM (MACDP)

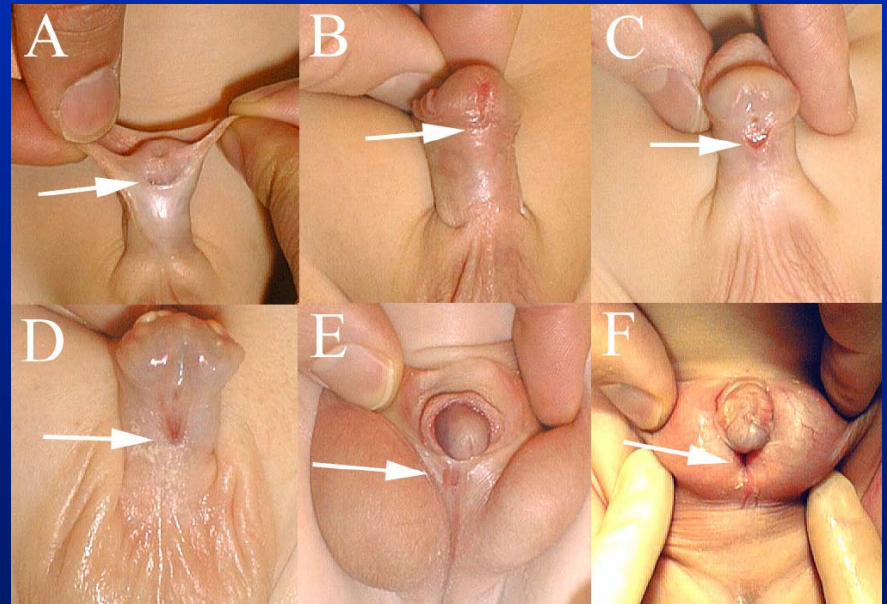
Jan 1968 - Dec 2001

(Rates per 10,000 live births)

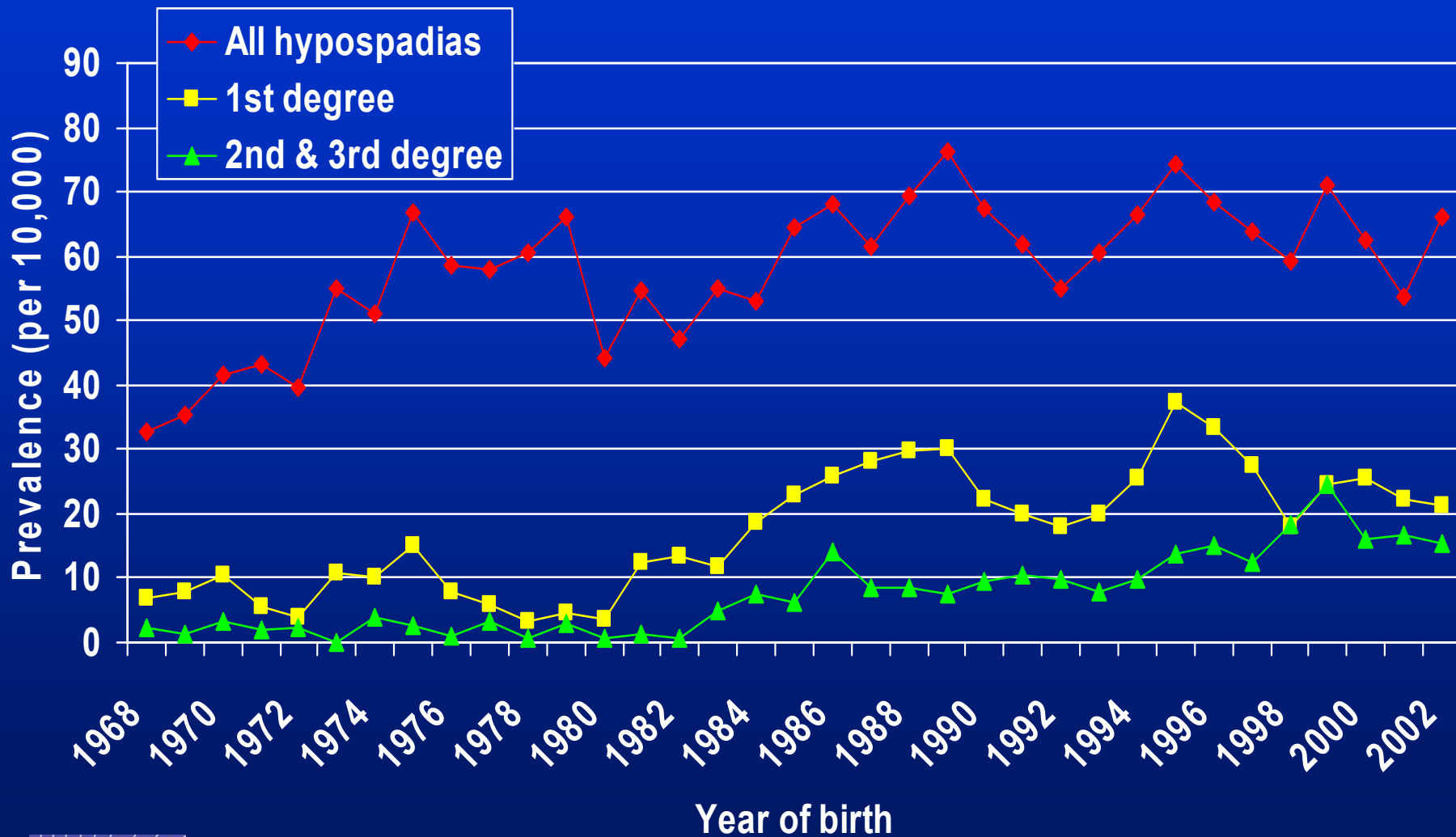


Prevalence of hypospadias

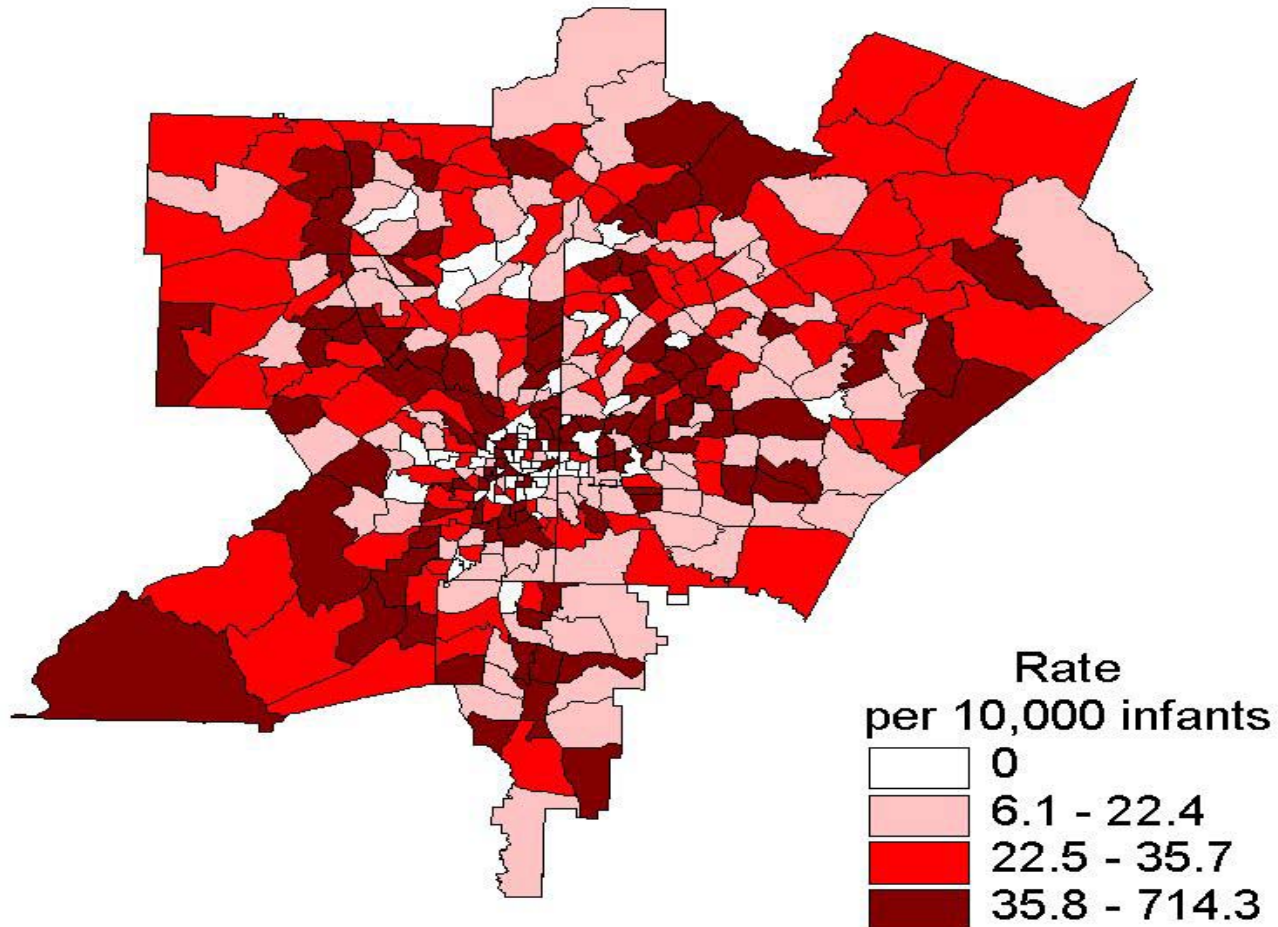
- Abnormality of urethral meatus
- 0.31-47 per 10,000 births
- Risk factors
 - Maternal age
 - Parity
 - Low birth weight
- Increasing prevalence in recent years



Prevalence of hypospadias by severity



Rates of hypospadias by census tract, 1990-2000



Hypospadias, 1990-2000

Analysis for possible clusters of census tracts
with high rates

Location IDs included.: 130890219.03

Population.....: 238

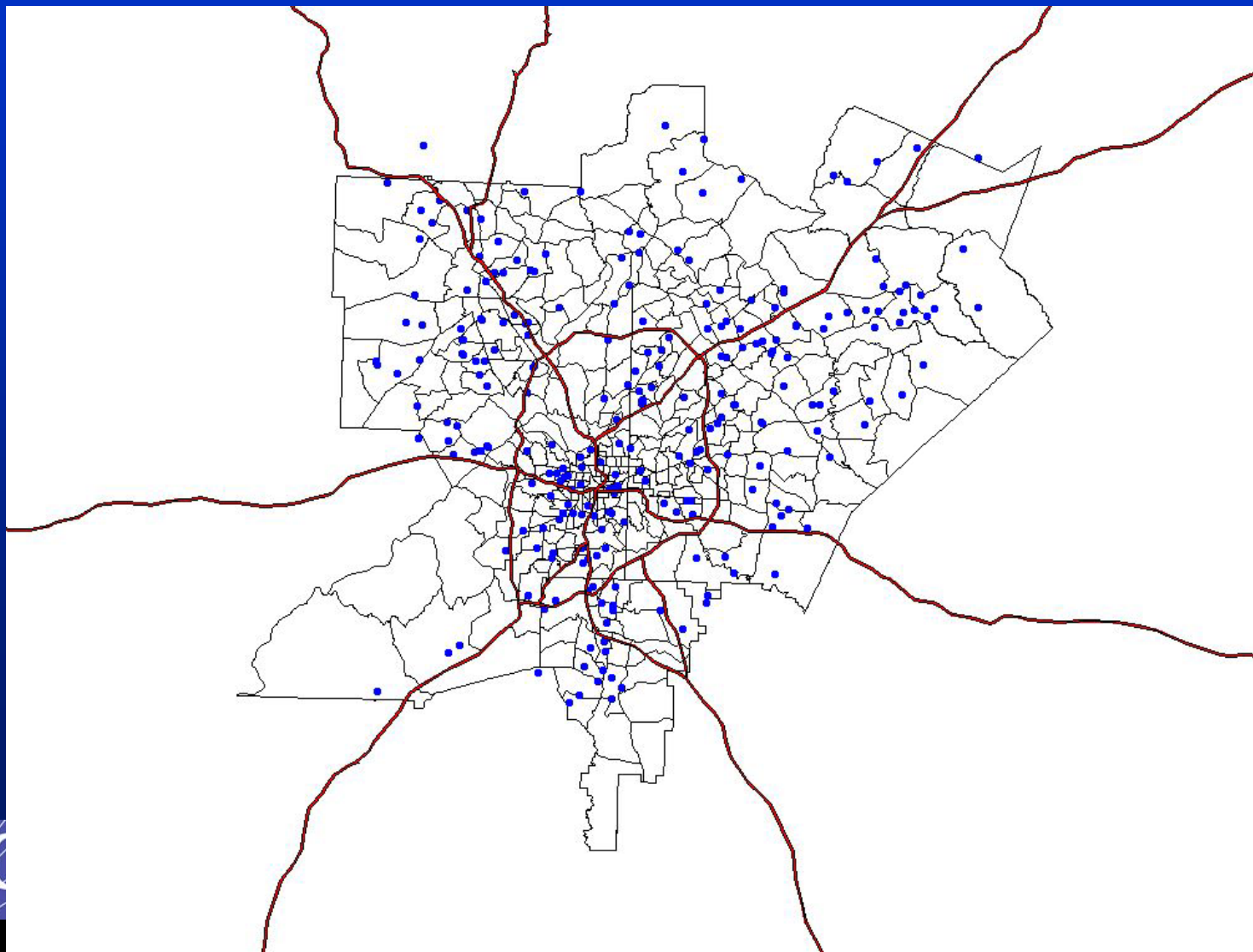
Number of cases.....: 17 (6.24 expected)

Overall relative risk.: 2.726

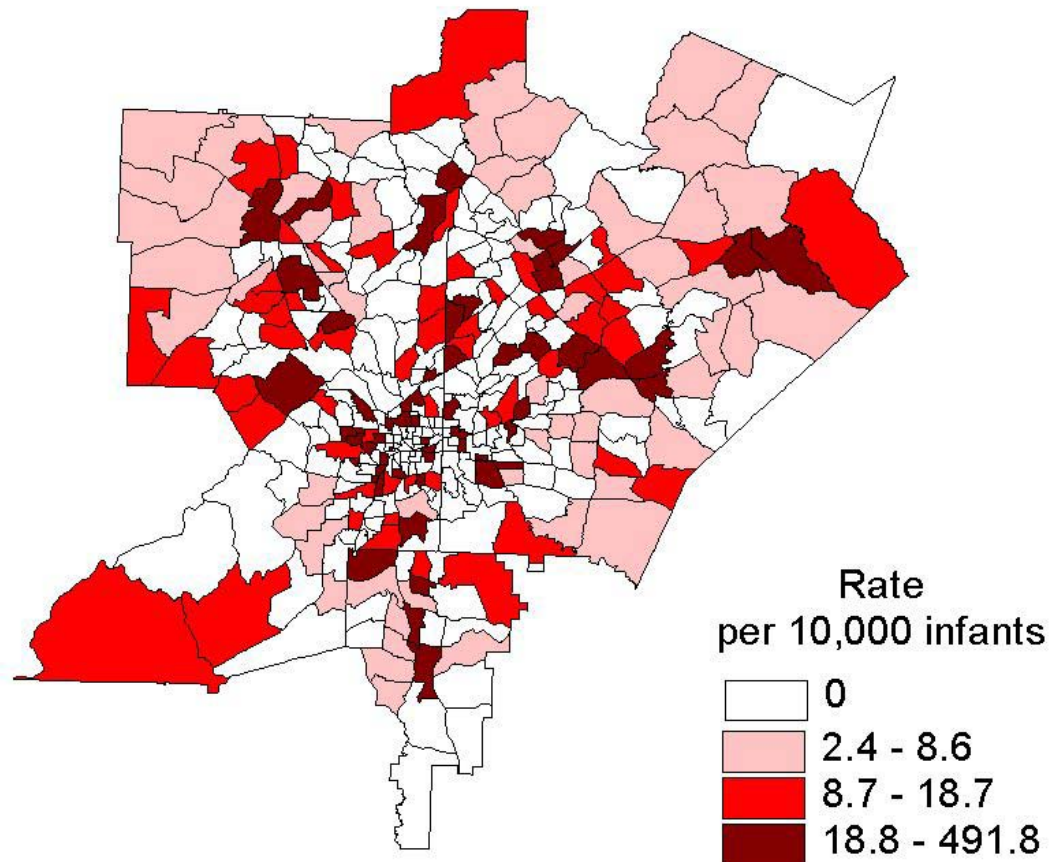
P-value.....: 0.186



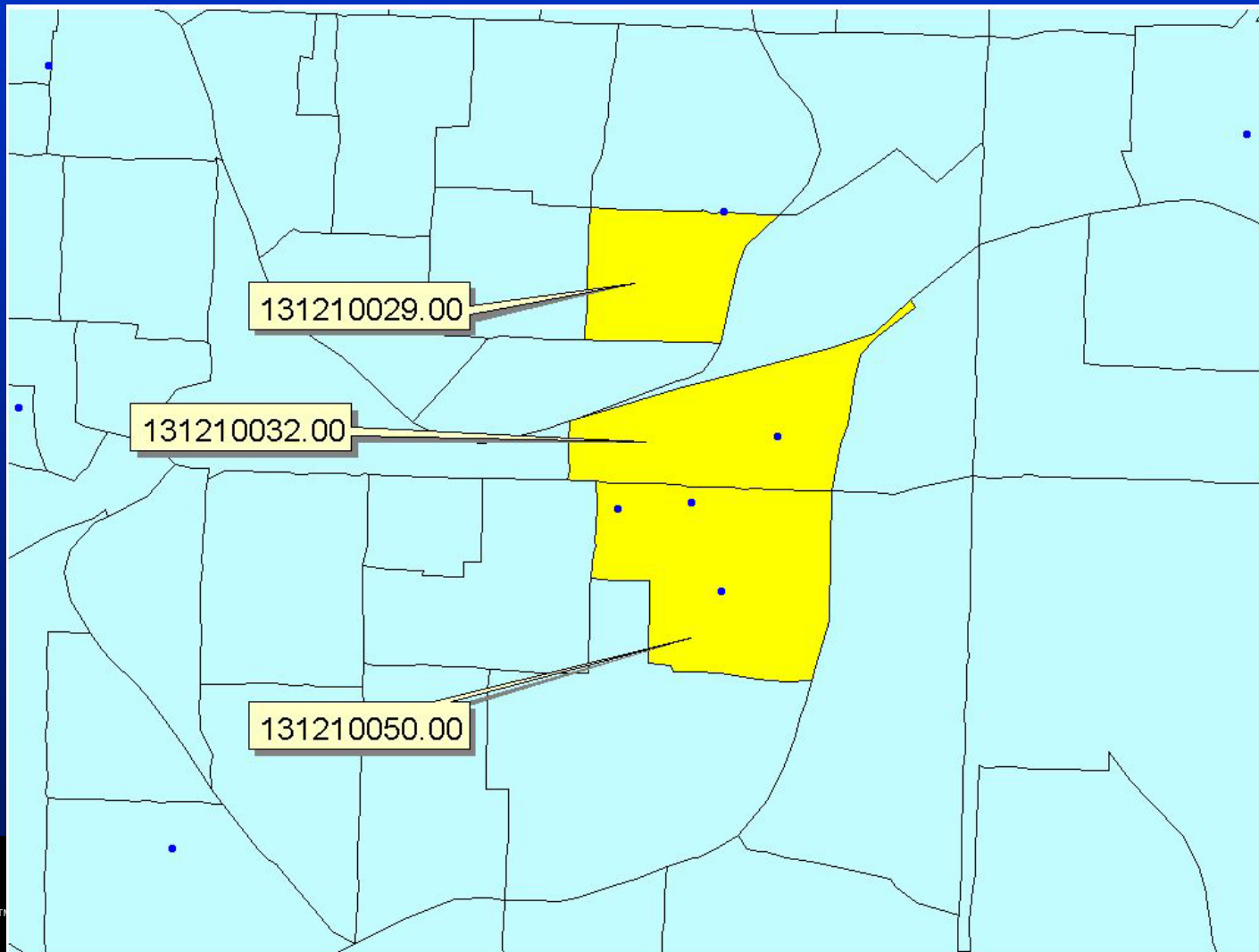
Cases of NTDs, 1990-2000



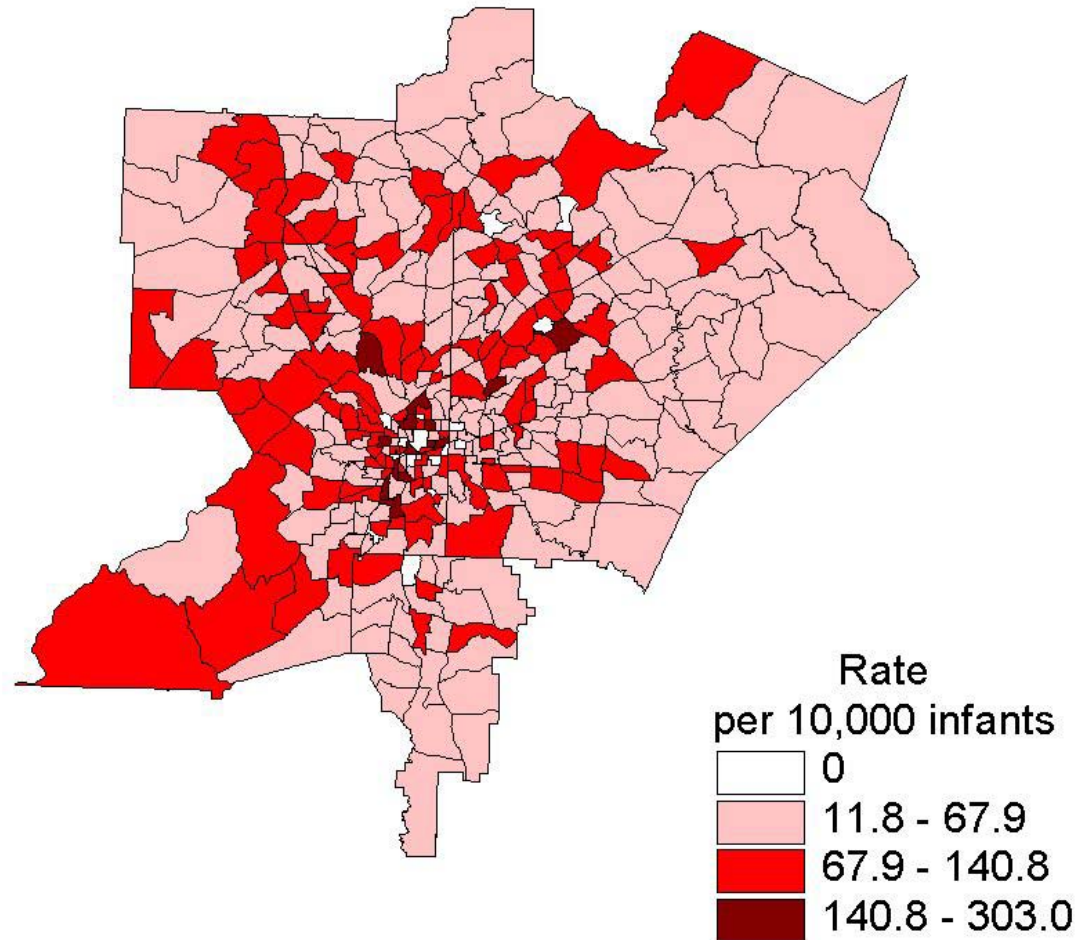
Rates of NTDs, by Census Tract, 1990-2000



NTD possible cluster, 1990-2000



Rates of ASD, by Census Tract, 1990-2000



ASD possible cluster, 1990-2000

MOST LIKELY CLUSTER

Location IDs included.: 130670313.05, 130670313.04,
131210078.03

Number of cases.....: 46 (24.89 expected)

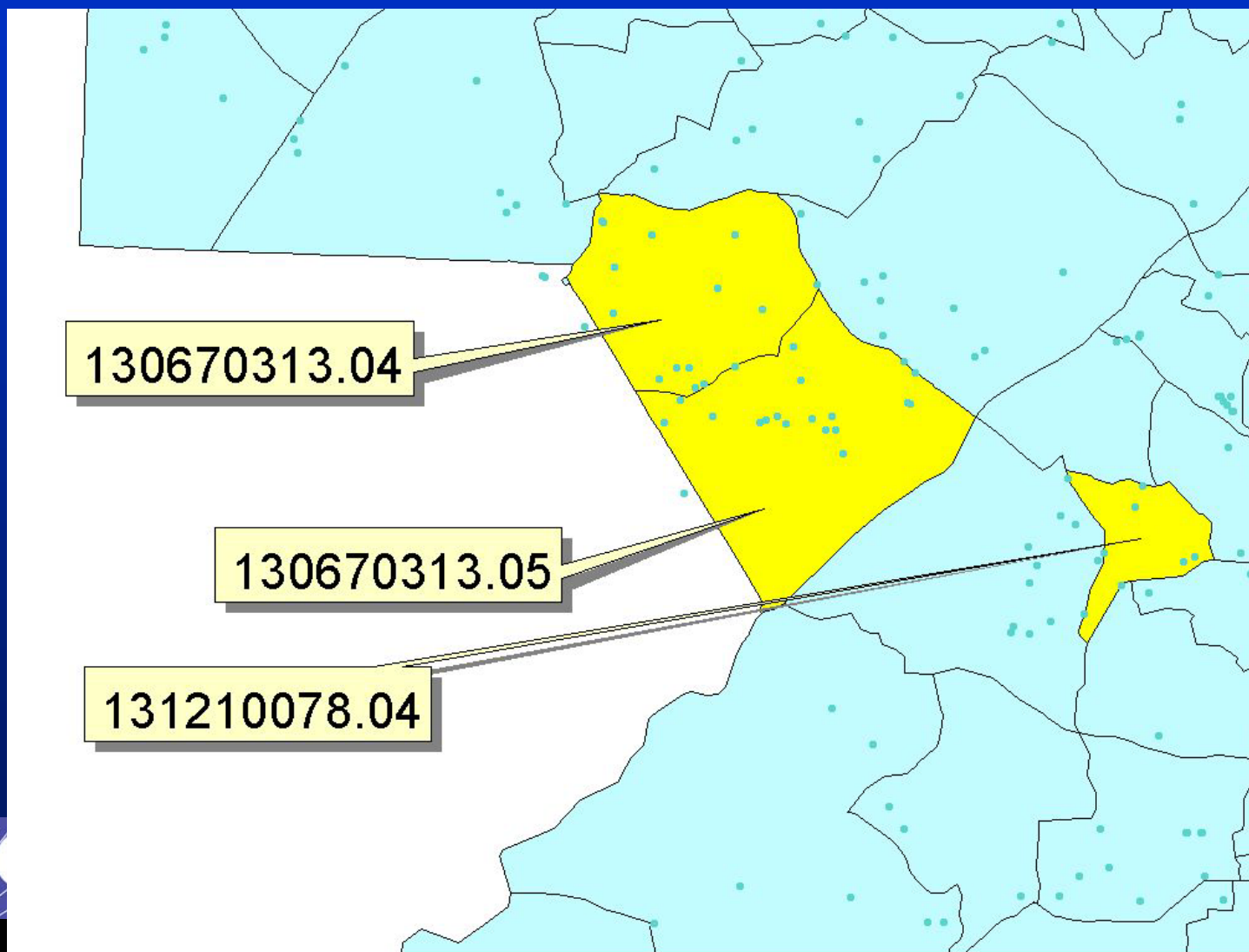
Overall relative risk.: 1.848

P-value.....: 0.095



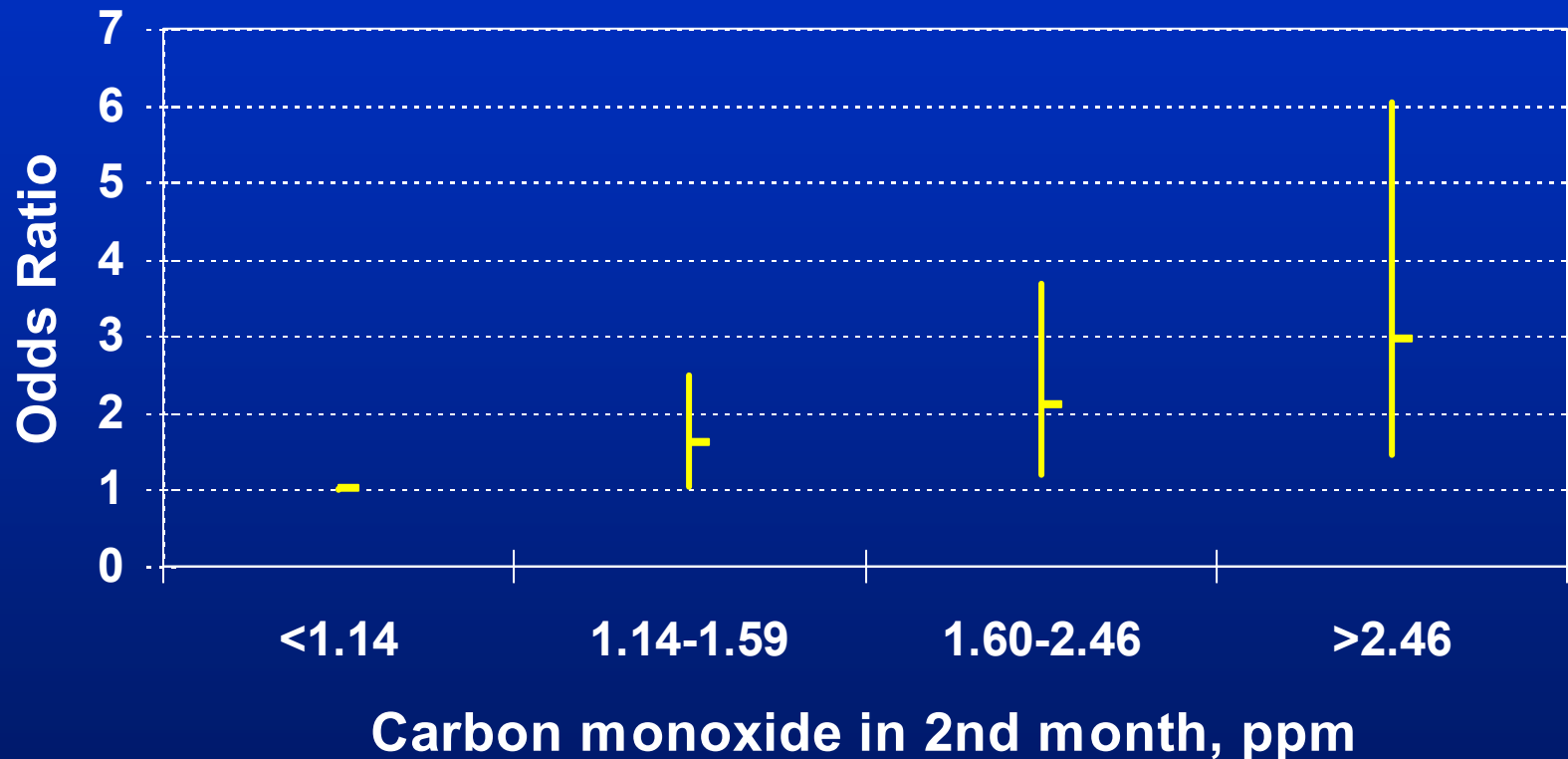
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ASD possible cluster, 1990-2000



Odds Ratios and 95% CI for VSD and CO, Southern California, 1987-1993

Ritz et al. (2002)



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HELIX-Atlanta Purpose

hazard, exposure, and non-infectious
health effect surveillance and monitoring



environmental
public health surveillance

- To link data
 - identify, implement, and evaluate feasible linkage methods
 - conduct valid analysis methods
 - inform public health action to improve health of communities
 - evaluate the utility and sustainability



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Air Quality Data: State AIRS Network

- State air quality compliance monitoring network
- Criteria pollutants only
 - PM₁₀, NO₂, SO₂, CO, O₃ (and PM_{2.5} since 1999)
- Data from multiple monitors, # increasing over time



Air Quality Data: ARIES



- Located in downtown Atlanta
- Operating 8/1/98-present
- Extensive ambient air quality measurements

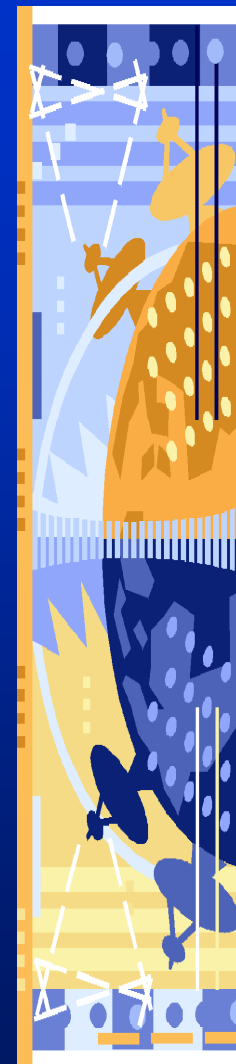
Air Quality Data: ARIES

- PM_{10}
 - $PM_{2.5}$
 - $PM_{10-2.5}$
 - $PM_{2.5}$ components
 - Ultrafine PM
 - O_3
 - NO_2
 - CO
 - SO_2
 - Polar VOCs
- Sulfates
Water-soluble
metals
Acidity
Organic carbon
Elemental carbon

HELIX-Atlanta Partners

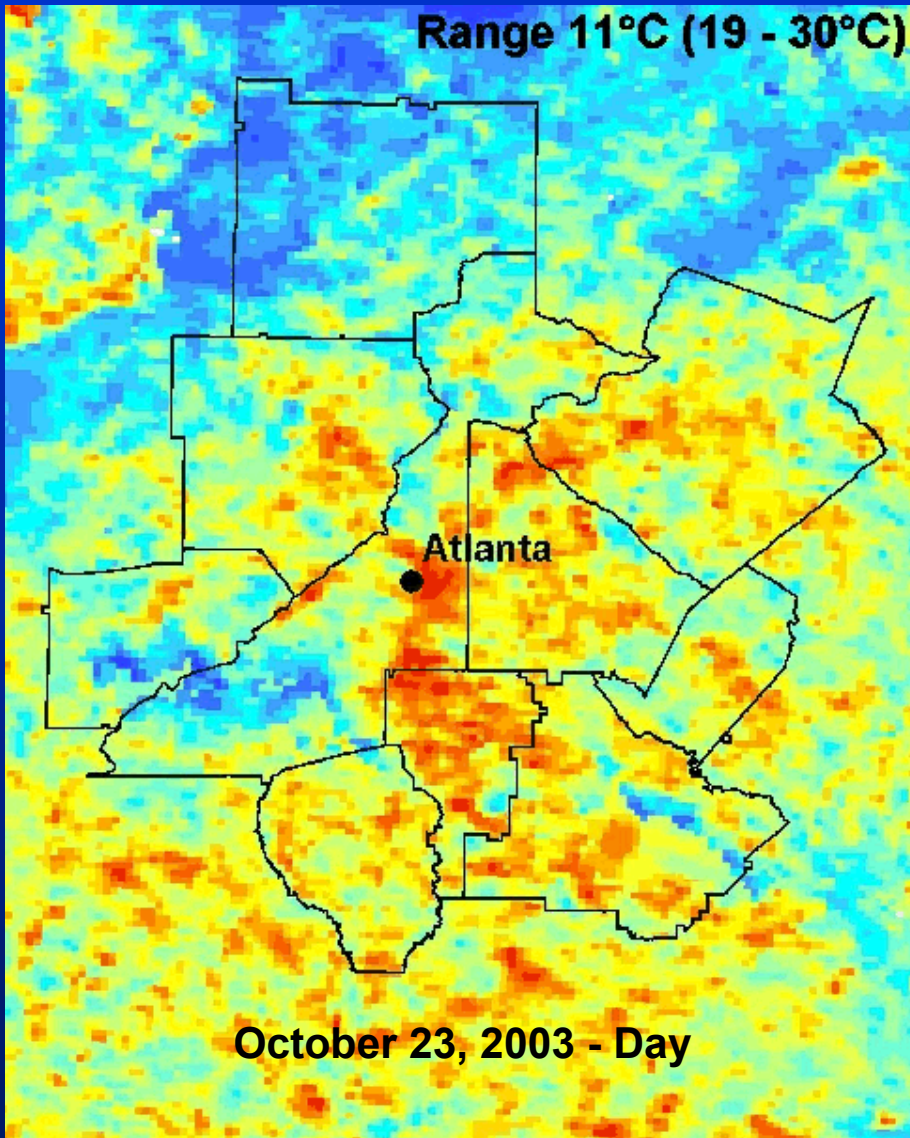
NASA Data:

- Collected to study Earth processes: weather, climate, natural hazards
- Petabytes on air, water, land, ice; from space, air and ground
- Resolutions scalable from global to local, daily to decadal
- Designed to answer research questions useful to public health

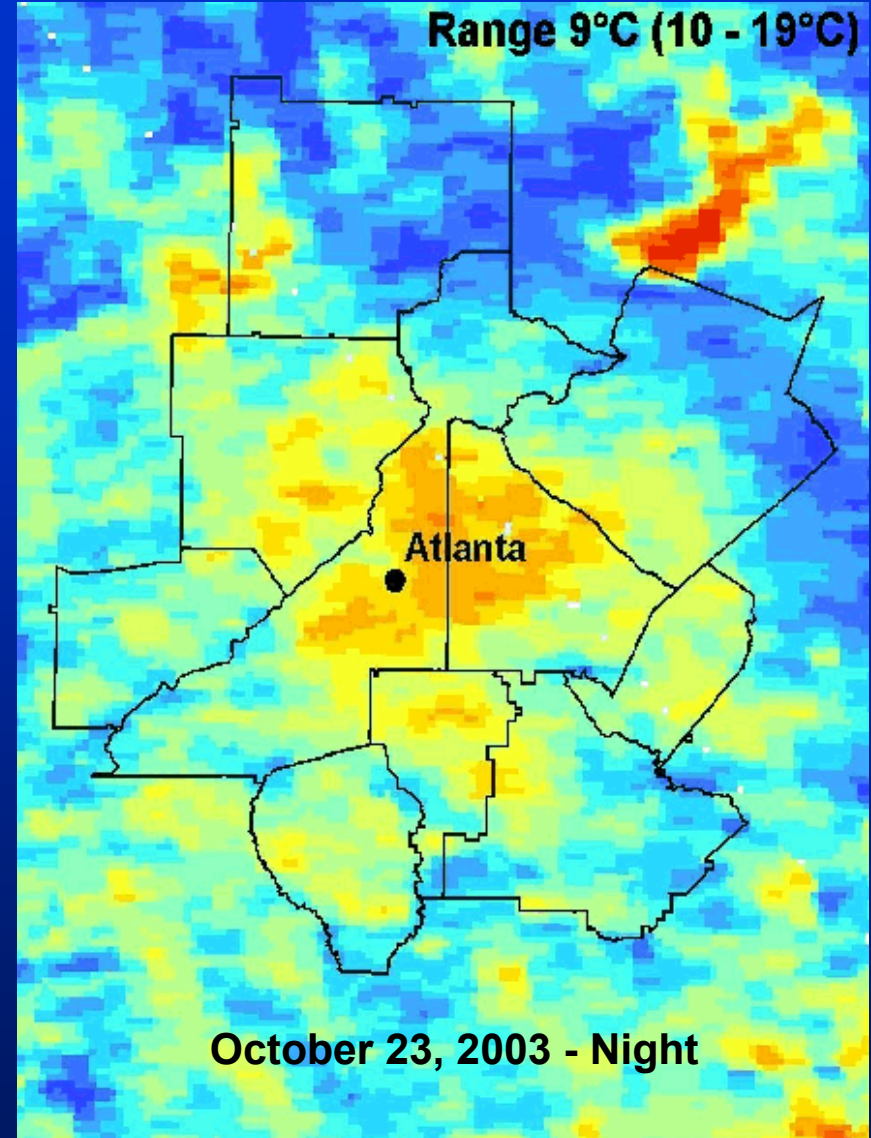


Land Surface Temperature

Range 11°C (19 - 30°C)



Range 9°C (10 - 19°C)



Plans for 2004



- Continue collaboration with:
 - HELIX-Atlanta environmental public health tracking effort to develop a linkage prototype
 - National Birth Defects Prevention Study in studies of risk factors for birth defects