

**Studies of
Autoimmune/Neurological
Diseases in Communities
Concerned about
Environmental Exposures**

**Environmental Public Health Tracking
Conference**

March 24, 2004

Overview

- Community concerns
- ATSDR funded studies
 1. Multiple sclerosis prevalence studies
 2. Multiple sclerosis case-control study
 3. MS/ALS prevalence studies
- Future plans

Community Concerns

- Residents living near hazardous waste sites expressed concern about elevated rates of autoimmune/neurological diseases and possible association with environmental exposures
 - Multiple sclerosis, amyotrophic lateral sclerosis, lupus, etc.

- Local, state and federal public health agencies receive calls to address concerns and conduct cluster investigations
- No population-based registries
- Cluster investigations are not fruitful

Multiple Sclerosis

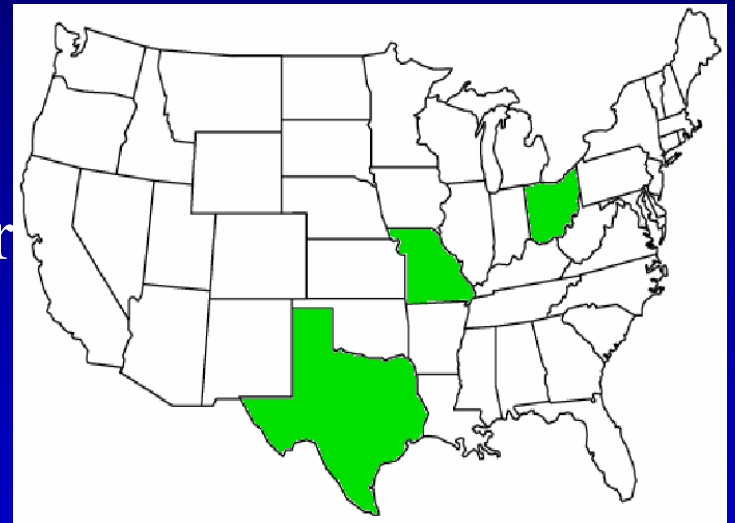
- Most common disabling neurological disease in young people
- Typical onset 20 – 40 years
- Approximately twice as common in women
- Inflammation, destruction, and scarring of the myelin
- Typically considered non-fatal

MS Prevalence in US

- Wide range of national estimates for MS cases in the United States
 - 123,000 (Baum '81)
 - 250,000 – 350,000 (Anderson, '92)
 - 217,000 (Noonan, '02)
- Limited data available on age-, sex-, race-, and region-specific prevalence

1. MS Prevalence Studies

- Cooperative agreements to establish methods for determining MS prevalence
 - Ohio (Lorain County)
 - Jackson County, Missouri
 - Texas (Lubbock)



Initial MS Concerns

- Ohio
 - Reports of 25 people with MS (4200 pop)
 - Local iron foundry and plastics plant
- Missouri
 - Refinery 1904-1982
- Texas
 - Previous El Paso investigation
 - Determine background MS prevalence

Case Ascertainment

- Primary data source: neurologist offices and clinics
- Secondary data sources
 - General practitioners
 - Nursing homes
 - Patient advocacy groups
 - Death certificates
 - Hospital discharge data

ICD Codes Considered

- All records with the following ICD codes were reviewed:
 - multiple sclerosis (340)
 - transverse myelitis (323.9)
 - optic neuritis (377.3)
 - other demyelinating disease (341.8 - 341.9)

Data Collection

- Medical records abstracted to collect:
 - Descriptive data
 - Diagnosis and physician history
 - Laboratory/clinical data
 - Attack history

Case Definition

- Residence within study area
- Physician visit during 3-year period (1/1/98 - 12/21/00)
- MS diagnosis confirmed by consulting neurologist
 - Poser '83 criteria
 - McDonald '01 criteria

Preliminary Results

	19 counties Texas	Jackson County, Missouri	Lorain County, Ohio
Population	424,916	120,799	280,000
Cases	182	109	458
Period Prevalence (per 100,000; 1998-2000)	43	90	164

Conclusions

- MS prevalence increases with distance from equator, which is consistent with data from other parts of the world
- Hypothesized reasons for gradient:
 - Ancestry/genetics
 - UV exposure

2. MS Case-Control Study

- Multi-site
 - Lorain County, Ohio
 - Jackson County, Missouri
 - Lubbock, Texas
- Cases identified from prevalence studies

- Controls selected from same clinic as cases (1:2 matching cases:controls)
- All study participants will be asked to complete a questionnaire and provide a blood sample
- Examine joint role of environmental exposures, infectious disease and genetic susceptibility

Questionnaire

- Demographics
- Complete residential history
- Medical history
- Occupational history
- Reproductive history

Blood Sample

- Infectious disease – EBV
- Genetic susceptibility
 - Human leukocyte antigen (HLA)
 - T cell antigen receptor (TCR)
 - Myelin basic protein (MBP)
 - Tumor necrosis factor (TNF)
 - Apolipoprotein E (APOE)
 - Vitamin D receptor

Status

- Obtained funding and OMB approval
- Obtaining IRB approval (12 IRBs)
- Developing CATI for questionnaire
- Begin data collection 2nd quarter 2004 (tentative)

3. MS/ALS Prevalence Studies

- Expansion of initial prevalence studies to include ALS
 - S.E. Massachusetts
 - Illinois (five communities)
 - Washington (Hanford)
 - Missouri (Herculaneum)
 - Texas (El Paso, Lubbock and San Antonio)

State	Time Period	Criteria	Expected cases
IL	1/1/98- 12/31/02	McDonald El Escorial	MS 60 ALS 2
MA	1/1/98- 12/31/02	Poser/McD El Escorial	MS 700-900 ALS 70-80
MO	1/1/98- 12/31/02	Poser El Escorial	MS 250 ALS 34
WA	1/1/98- 12/31/03	McDonald El Escorial	MS 2500 ALS ?
TX	1/1/98- 12/31/03	Poser El Escorial	MS 400 ALS 150-220

Future Plans

- Increase sample size of MS case-control study by including individuals from additional MS prevalence study areas
- Develop ALS case-control study
- Recommend surveillance of select autoimmune/neurological diseases

Contact Information

Dee Williamson

Division of Health Studies, ATSDR

404-498-0586

djw8@cdc.gov

ATSDR