



# History of Developmental Disabilities at CDC

MADDSP/MACDP Partners Meeting  
October 16, 2009

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The National Center on Birth Defects  
and Developmental Disabilities

*The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention*



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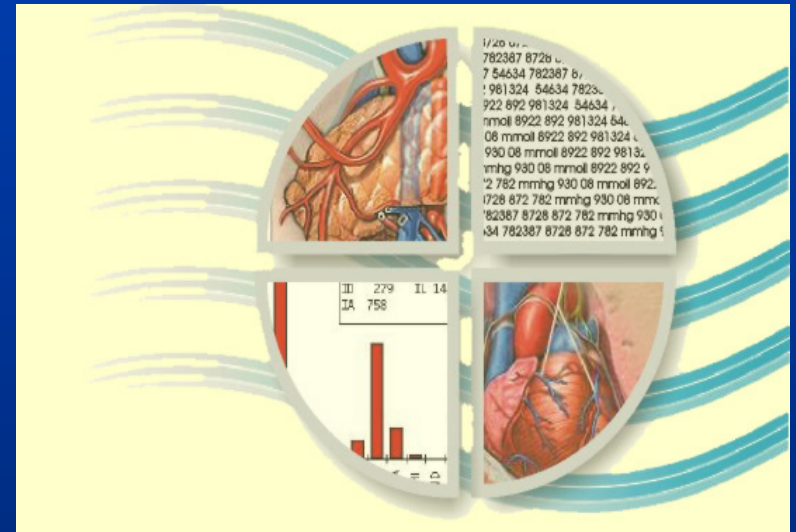
# Developmental Disabilities at CDC

- **The Framework**
  - Epidemiology: A core function of CDC
  - The Public Health Model
  - Surveillance: Understanding Prevalence
- **Why study Developmental Disabilities?**
  - What we know (now)
  - What we were asked (then)
- **The Contributions of a Single Community**
  - MADDS
  - MADDSP
- **1990s: Concerns over rates of autism**
  - Applying MADDSP Methods in Brick Township, NJ
  - MADDSP's Contributions
- **2000: Expansion of Efforts**
  - The ADDM Network
  - The Study to Explore Early Development (SEED)



# Epidemiology

The branch of medicine that deals with the study of the causes, distribution, and control of disease in populations.





# Public Health Model



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# What is Public Health Surveillance?



The ongoing, systematic collection, analysis, and interpretation of data (e.g., regarding agent/hazard, risk factor, exposure, health event) essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control



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# Why Study Developmental Disabilities? What we know now, 2009...



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# Definition of Developmental Disabilities (DD)

## Developmental Disabilities Act of 1978 (PL 96-602)

A group of severe chronic conditions that are attributable to an impairment in physical, cognitive, speech or language, psychological, or self care areas that are manifested during the developmental period (younger than 18 (or 21) years of age)

*Crocker, 1989; Yeargin-Allsopp et al. 1992*



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# Why are DDs an Important Public Health Issue?



13% of children in the United States  
have a disability

2% of all children will require lifelong care  
for their disability

Boulet, Boyle, Schieve. Health Care Use and Health and Functional Impact of Developmental Disabilities Among US Children, 1997-2005. Arch Pediatr Adolesc Med. 2009;163(1):19-26.



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## Incremental Lifetime Cost Estimates For Developmental Disabilities: Children born in 2000 (2003 Dollars)

Developmental Disability	Total Lifetime Costs for Incident Cohort (in millions)	Per-person Lifetime Costs
<b>Mental Retardation/ Intellectual Disability</b>	\$51,237	\$1,014,000
<b>Cerebral Palsy</b>	\$11,470	\$921,000
<b>Vision Impairment</b>	\$2,102	\$417,000
<b>Hearing Loss</b>	\$2,484	\$566,000

Centers for Disease Control and Prevention. Economic costs associated with mental retardation, cerebral palsy, hearing loss, and vision impairment --- United States, 2003. MMWR Morbidity and Mortality Weekly Report 2004;53(3):57-59.



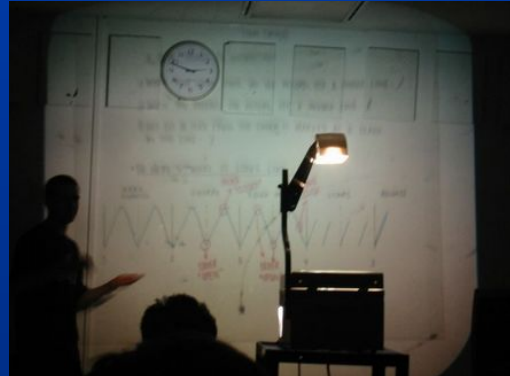
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# Why Study Developmental Disabilities? What we were asked, 1979





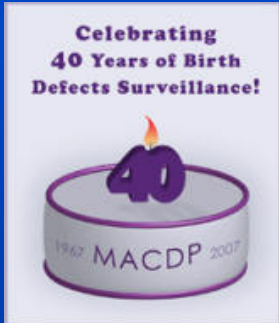
# 1979: How many children have a developmental disability?



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# Goal: Establish Methods for Tracking Developmental Disabilities



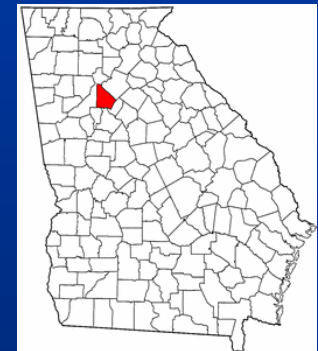
**1968:** Surveillance for Birth Defects

**1979-80:** Request for presentation of data on ID and CP



**1981:** EIS Officer assigned to Birth Defects Branch to study DDs

**1981-83:** Pilot study of MR/ID in DeKalb County, GA





# Growing the Roots...

- How do we answer this important public health question?
  - Partnership with Georgia Department of Health
  - Partnership with Georgia Department of Education



# Individuals with Disabilities Education Act

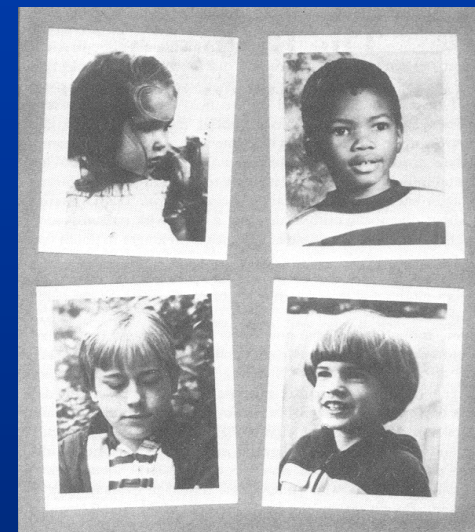
- Enacted by Congress in 1975 to ensure that children with disabilities had the opportunity to receive a *free appropriate public education*
- Guides how states and school districts provide special education and related services to eligible children with disabilities
- Disabilities covered by IDEA include (§§300.304 through 300.311)
  - autism
  - deaf-blindness
  - deafness
  - emotional disturbance
  - hearing impairment
  - mental retardation
  - multiple disabilities
  - orthopedic impairment
  - other health impairment
  - specific learning disability
  - speech or language impairment
  - traumatic brain injury *or*
  - visual impairment (including blindness)





# Purpose of Developmental Disabilities Surveillance at CDC

- To conduct **ongoing tracking** of children affected with developmental disabilities (DDs) in an effort to
  - Identify **rates**,
  - **Trends**, and
  - **Patterns** of occurrence of DDs
- **To inform public health**





# MADDS Study Population and Methods

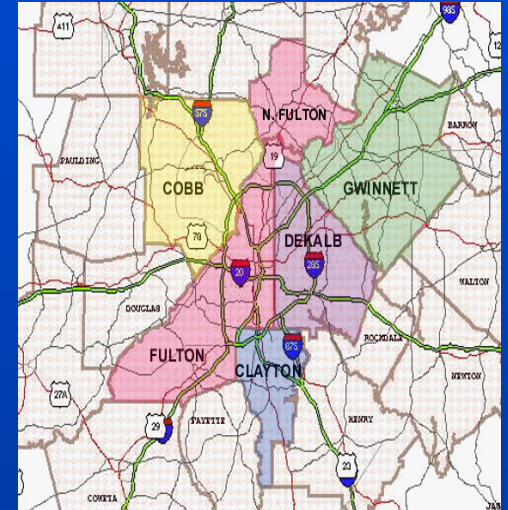
**Who:** Ten-year old children in 1985, 1986, 1987

**Where:** Clayton, Cobb, DeKalb, Fulton, and Gwinnett

**DDs Monitored:** Cerebral Palsy, Intellectual Disability, Hearing Loss, Visual Impairment and Epilepsy

**Methods:** Population-based, active record review at multiple sources

**Multiple sources:** 9 school systems (2 with decentralized records)  
24 clinical sources







# Landmark Publications: MADDs

YeARGIN-ALLSOPP M, MURPHY CC, OAKLEY GP, SIKES RK. A Multiple-Source Method for Studying the Prevalence of Developmental Disabilities in Children: The Metropolitan Atlanta Developmental Disabilities Study. Pediatrics, 1992, 89:524-30.

## A Multiple-Source Method for Studying the Prevalence of Developmental Disabilities in Children: The Metropolitan Atlanta Developmental Disabilities Study

Marshayn Yeargin-Allsopp, MD\*; Catherine C. Murphy, MPH†; Godfrey P. Oakley, MD\*; R. Keith Sikes, DVM, MPH‡; and the Metropolitan Atlanta Developmental Disabilities Study Staff§

**ABSTRACT.** The Metropolitan Atlanta Developmental Disabilities Study is the first US, population-based epidemiologic study of the prevalence of mental retardation, cerebral palsy, hearing impairment, and visual impairment among school-age children. The study population consisted of children who were 16 years of age between 1985 and 1987 and whose mothers were residents of the five Georgia counties of Clayton, Cobb, DeKalb, Fulton, and Gwinnett at the time of the child's birth. Since children with developmental disabilities are identified by and receive services from various health, social service, and education systems, a multiple-source case identification method was used. This study is unique in that individual school records were used to identify children with the four disabilities. Use of a multiple-source method made it possible to confirm specific conditions and to classify subtypes of disabilities. About 95% of the children with one or more of these four disabilities were initially identified through the school systems. This approach is much less costly than conducting medical and psychological assessments on populations of children. In addition, this method made it possible to estimate accurately the "administrative prevalence" of these disabilities (ie, the number of children previously identified with these disabilities for the purpose of providing services). The prevalence rates found in this study, per 1000 16-year-old children, were as follows: mental retardation, 18.3; cerebral palsy, 2.6; hearing impairment, 1.9; and visual impairment, 3.6. This population-based method for surveillance of developmental disabilities can be useful to those who seek to judge the effectiveness of prevention strategies for these conditions, to those who need to plan for services for persons with these conditions, and to those who conduct epidemiologic studies searching for environmental and other causes of these conditions. *Pediatrics* 1992;89:524-30; **disability, cerebral palsy, deafness, developmental disability, hearing, mental retardation, prevalence studies.**

**ABBREVIATIONS.** DD, developmental disability; MR, mental retardation; CP, cerebral palsy.

Developmental disabilities (DDs) are a group of severe chronic conditions that are attributable to an impairment in physical, cognitive, speech or language, psychologic, or self-care areas and that are manifested during the developmental period. The need for supportive services is sometimes included in the definition.<sup>1</sup> Population-based prevalence rates for these conditions are generally not available for the United States; however, an estimated 10% of all US school-age children have some type of DD, representing an annual cost to state health departments of almost \$128 million for services.<sup>2,3</sup> Quantifying the magnitude of childhood morbidity from these disabilities is difficult because (1) developmental disabilities represent a large group of heterogeneous disorders, for which case definitions often vary; (2) the conditions are not uniformly recognized at birth or even before school entry; and (3) identification of cases often requires use of multiple data sources. Understanding the population-based prevalence of developmental disabilities can be useful to those who seek to judge the effectiveness of prevention strategies for these conditions, to those who need to plan for services for persons with these conditions, and to those who conduct epidemiologic studies searching for environmental and other causes of these conditions.

Much of the information on the descriptive epidemiology of DDs has been obtained from studies outside the United States and, therefore, generalization to the United States may not be appropriate.<sup>4-7</sup> Some investigations of the occurrence of DDs in children are hospital-based follow-up studies of graduates of neonatal intensive care units and, thus, may have been subject to selection bias.<sup>8-10</sup> Although the Collaborative Perinatal Project, conducted by the National Institute of Neurological and Communicative Disorders and Stroke, has provided useful information on risk factors associated with the occurrence of DDs prior to 1970, it did not produce population-based prevalence rates of DDs.<sup>11</sup> With the advent of changes in pediatric and obstetric care since the 1970s, it has become important to examine the effects of these changes on trends in the prevalence of DDs

From the \*Division of Birth Defects and Developmental Disabilities, Center for Environmental Health and Injury Control, Centers for Disease Control, US Department of Health and Human Services, Atlanta, GA and †Division of Epidemiology, Bureau of Public Health, Georgia Department of Human Resources, Atlanta, GA.  
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Reprint requests to (M.A.) Centers for Disease Control, MS F-37, 1606 Clifton Rd, Atlanta, GA 30333.  
PEDIATRICS (ISSN 0031-9085). Copyright © 1992 by the American Academy of Pediatrics.



# Prevalence

- The total number of cases of a condition in a given population at a specific time.
- Without qualification, usually refers to a situation at a specific point in time (**point prevalence**).
- Not a “rate”
- **Period prevalence**: total *number* of persons known to have the condition during a period of time.
- **Birth prevalence**: *number* of persons having the condition derived from (survivors of) a birth cohort.



# MADDs: Prevalence of Five Developmental Disabilities Per 1000 Ten-Year-Old Children, 1985-1987

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	<u>Total</u>		<u>Estimates from Previous Studies</u>
	<u>N</u>	<u>Rate</u>	
Intellectual Disability	1074	12.0	3.1-43.6
Cerebral Palsy	204	2.3	2.0-3.0
Visual Impairment	61	0.7	0.3-0.6
Hearing Loss	100	1.1	0.6-2.3
Epilepsy	538	6.0	4.0-9.0

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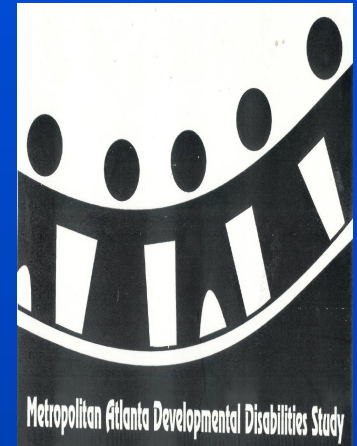


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# A Base of Support



## ■ State of Georgia

- Department of Education
- Department of Human Resources
  - ◆ Division of Mental Health/Mental Retardation/Substance Abuse
  - ◆ Division of Family and Children's Services
  - ◆ Division of Public Health
    - Children's Medical Services
    - Health Department
    - Vital Records
- Georgia Learning Resources System/Child Serve
- Georgia Psycho-educational Centers
- State schools

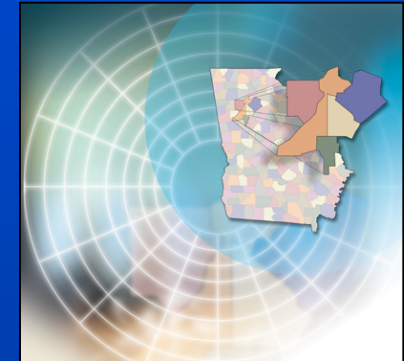
## ■ Other sources

- CDC- Metropolitan Atlanta Congenital Defects Program (MACDP)
- Hospitals, clinics, selected physicians
- Private schools
- Early education programs
- Social service agencies (private)





# Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP)



- Population-based
- Five counties in metro Atlanta
- Active surveillance based on record review
- **Intellectual disability, cerebral palsy, vision impairment and hearing loss; autism** added for 1996 study year
- Children aged 3-10, 1991-1994 and 1996 for autism; 8 year olds in future
- Multiple sources (schools, clinics/medical sources)



# MADDSP: Types of Data Collected

- Demographics: child and parent names, race, ethnicity, gender, residence, DOB
- School service data: school, spec ed eligibility category
- Psychometric test results: intelligence, adaptive, autism
- Hearing and Vision test results
- Physical findings (CP)
- Verbatim descriptions of behaviors (Autism)
- Associated medical conditions
- Other developmental disabilities





# Landmark Publications: MADDSP

Schendel DE, Berg CJ, Yeargin-Allsopp M, Boyle CA, Decouflé P. Prenatal Magnesium Sulfate Exposure and the Risk for Cerebral Palsy or Mental Retardation among Very Low Birthweight Children aged 3-5 years. Journal of the American Medical Association 1996; 276:1805-1810.

## 1997 CHARLES C. SHEPARD SCIENCE AWARD

Presented annually to CDC/ATSDR scientists for outstanding contribution to the scientific literature.



### Presented to:

Cynthia J. Berg, Coleen A. Boyle, Diana E. Schendel, Marshalyn Yeargin-Allsopp, and Pierre Decoufle  
Prenatal Magnesium Sulfate Exposure and the Risk for Cerebral Palsy  
or Mental Retardation Among Very Low-Birth-Weight Children Aged 3 to 5 Years  
*Journal of the American Medical Association* 1996; 276:1805-10



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# The Association between Cerebral Palsy or Mental Retardation and Prenatal Magnesium Sulfate Exposure in Atlanta Infant Survivors

	Prenatal Magnesium Sulfate Exposure		OR	95% CL
	Yes	No		
CP	1 (0.9%)	30 (7.7%)	0.11	0.02, 0.81
MR	2 (1.8%)	22 (5.8%)	0.30	0.07, 1.29

(Schendel et al. JAMA 1996;276(22);1805-1810)



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# Public Health Concerns: Autism Spectrum Disorders



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# Concerns Over Possible Raising Rates of Autism in the 1990s

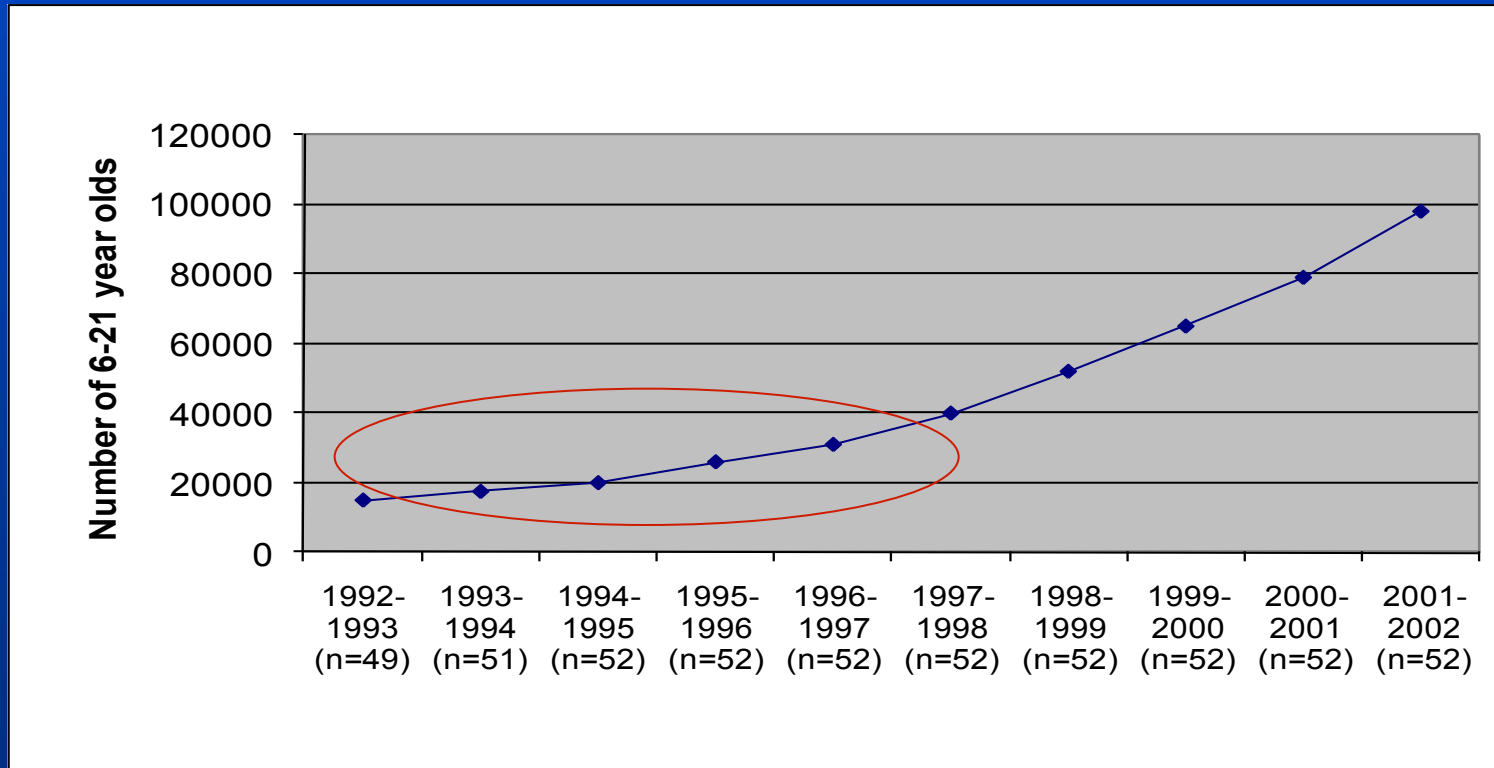
How many children are there with autism in the United States?

- Service provider data based on number of individuals
- Population-based surveillance to determine prevalence



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# Number of Children with Autism Served under IDEA, Part B, 1992-93 to 2001-02, 6-21 years



State DOE reporting of autism eligibility mandated in 1992

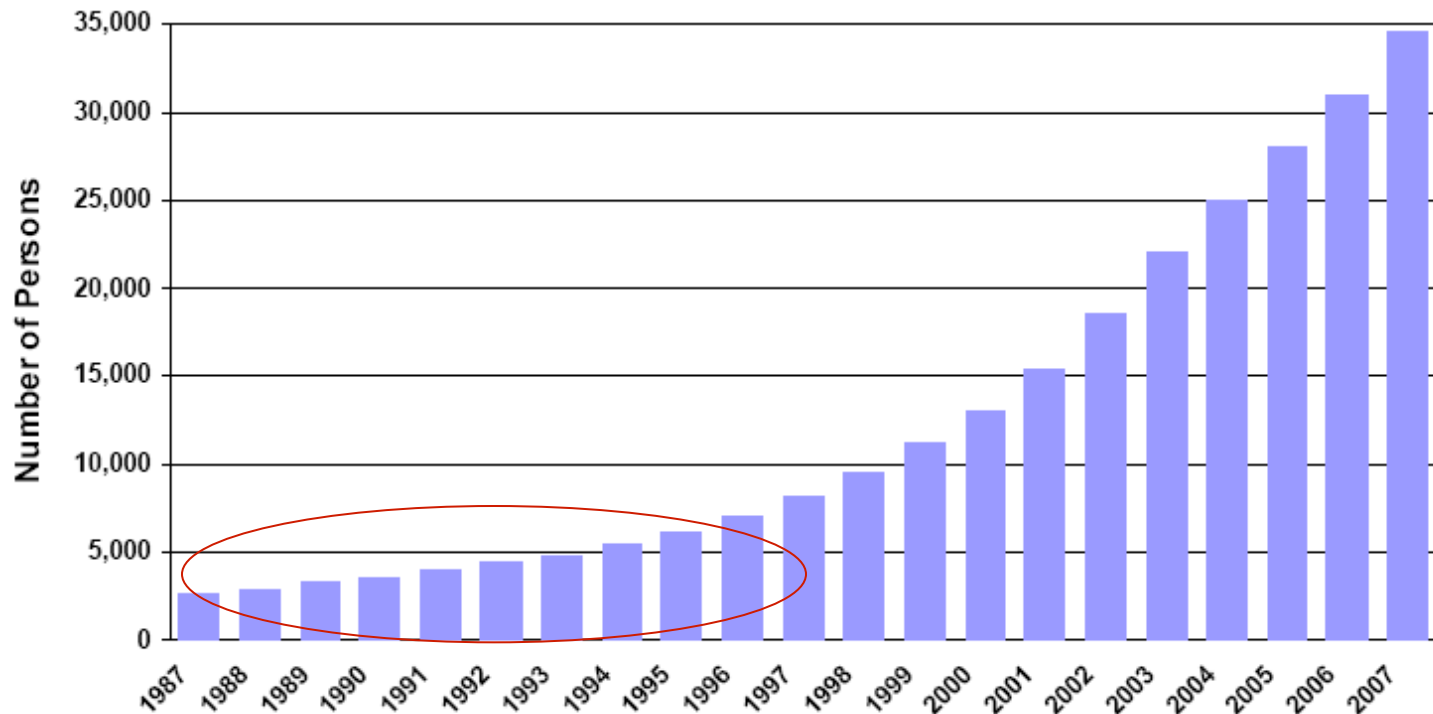
Source: U.S. Department of Education, Office of Special Education Programs, Data Analysis System (DANS)



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# California Department of Developmental Services

Figure 2: Annual Frequencies of Persons with Autism from  
June 1987 - June 2007



[www.dds.ca.gov](http://www.dds.ca.gov)



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## Issue in Brick

# CDC will advise on autism concerns

■ State, federal health officials will meet tomorrow to discuss parents group's findings.

By DAVID P. WILLIS  
TOMS RIVER BUREAU

BRICK TOWNSHIP — State officials will ask federal disease experts for help to determine if the township has a higher than normal number of autism cases.

State health officials will meet tomorrow with experts from the Centers for Disease Control and Prevention's developmental disabilities branch to discuss concerns raised by a parents group, Brick Parents of Special Services and Education, or Brick POSSE.

## In Brick

# Parents pursue autism answers

■ A group of Brick residents has managed to secure state and federal assistance in probing a potentially high number of autism cases among children.

By ALAN WHEELER  
Staff Writer

BRICK — State officials have asked a federal agency to investigate a potential "cluster of autism" among township children.

Len Fishman, the state Department of Health commissioner, wants help in responding to inquiries received by the department from a group of Brick residents.

Because of its expertise in autism, Fishman has contacted The National Institute of Child Health and Human Development in Bethesda, Md.

Initially, this issue was raised by a group of citizens from Brick Township

## Cluster suspected

# Autism research possible in Brick

By REGINA MCNEERY  
HEALTH WRITER

A FEDERAL official said yesterday the government might be willing to fund a study probing the roots of Brick Township's suspected autism cluster, an incurable developmental disorder once largely blamed on bad parenting.

Marie Bristol-Power, an autism expert with the National Institute of Child Health and Human Development in Bethesda, Md., an arm of the National Institutes of Health, said the agency is particularly interested in the unfortunate pairing

# Parents fear a cluster of autism in Brick Township

### Health officials call a meeting in Trenton to discuss the concerns

By Joq McCalfrey  
and Angela Stewart

STAR-LEDGER STAFF

Federal and state health officials plan to meet today in Trenton to discuss a possible concentration of childhood autism cases in Ocean County that have surfaced in a community neighboring one where a rare disorder raised fears last year.

A couple from Brick Township told Sen. Robert Torricelli (D-N.J.) earlier this week that two of their three children have been diagnosed as autistic and that they have identified at least 24 other youngsters from the township with the developmental disability.

"I'm from Brick I'm from Brick we began hearing over and over again," said Bobbie Gallagher, 36,

who explained her 5-year-old son and 6-year-old daughter were both diagnosed before they reached age 3.

Marcy Richardson, executive director of The New Jersey Center for Outreach and Services for the Autism Community in Edison Township, also known as COSAC, said rough estimates by her organization put the number of autistic children and children in New Jersey at 12,000.

Richardson, who has an adult son with autism and supports a "thorough investigation" of the Brick cases, was not able to positively say whether the 22 cited cases represent a higher than normal number in one town.

Autism is a lifelong disorder often characterized by impaired verbal and nonverbal communication, loss of speech and social isolation. The disorder is four times more common in males and its cause is unknown,

according to COSAC.

It was after Gallagher and her husband Bill enrolled their children in a special school and started attending parent support groups for autism that they became convinced there was a "cluster," a group far larger than the predicted statistical average of autistic children in Brick Township. They go together with other parents of autistic children and formed a group called POSSE, Parents of Special Services and Educa-

tion.

Bobbie Gallagher, thinking back to when she read last year's high childhood cancer boring Dover Town-

She also came to other cluster of an Leominster, Mass., about 60 miles west. Gallagher believes that elevated levels of drinking water is a

# Brick Township Prevalence Investigation

- Study Characteristics:
  - Children 3-10 years of age (N=8,896)
  - Residence in 1998 was Brick Township
- Case Identification:
  - Schools, special programs
  - Physician/other diagnosticians
  - Parent groups/self referrals
- Case Verification
  - Special examination- diagnosis of autism: ADOS
  - Review of available records



# Brick Township, New Jersey: Prevalence of ASD, 3-10 Year Old Children

	Prevalence	95% CI	Rate per 1,000
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Autism Spectrum

Disorders	60/8,896	5.1 – 8.7	6.7
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Autistic Disorder	36/8,896	2.8 – 5.6	4.0
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Bertrand J et al. (2001) Prevalence of Autism in a United States Population: The Brick Township, New Jersey, Investigation. *Pediatrics*, 108(5): 1155-1161.



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# Landmark Publications: MADDSP Prevalence of Autism in metro Atlanta

Age group	N	Prevalence rate per 1,000
3-10 year olds	987	3.4 (3.2-3.6)
3-5 year olds	346	3.1 (2.7-3.4)
6-10 year olds	641	3.6 (3.3-3.9) 4.2 (8 year olds)

Denominator: 289,456 3-10 year old children in metropolitan Atlanta in 1996

Yeargin-Allsopp M, Rice C, Karapurkar T, Doernberg N, Boyle C, Murphy C. Prevalence of autism in a US metropolitan area. *Journal of the American Medical Association*. 2003;289:49-55



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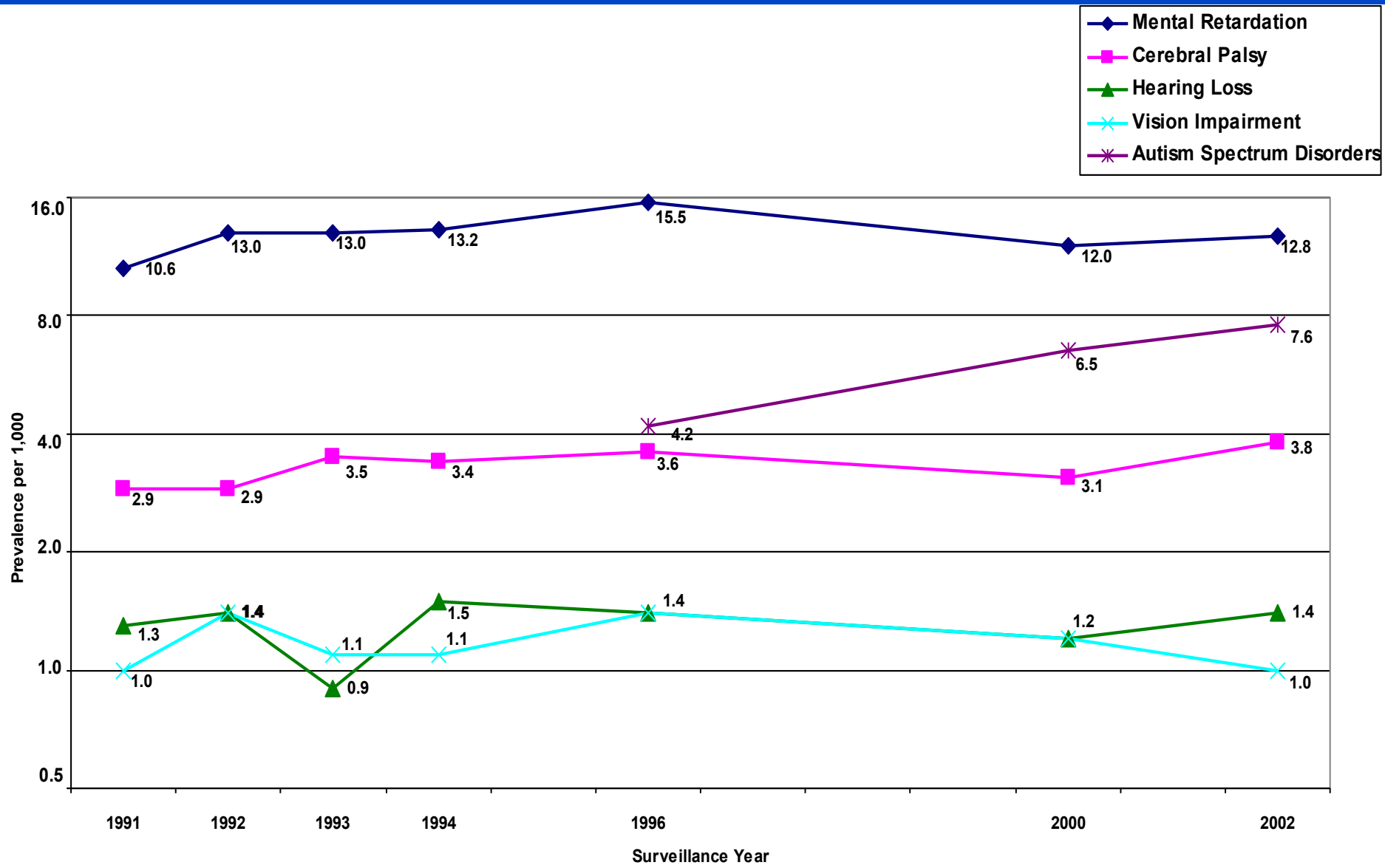
# Landmark Publications: MADDSP HHS Secretary's Award for Distinguished Service: The Autism Public Health Response Team

DeStefano F, Karapurkar T,  
Thompson William, Yeargin-  
Allsopp M, Boyle C. Age at  
first Measles-Mumps-Rubella  
vaccination in children with  
autism and school-matched  
controls Pediatrics 2004;113(2):  
259-266.



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# Prevalence of ID, CP, HL, VI and ASDs Among Children in MADDSP 8 year olds (1991-1994, 1996, 2000, 2002)





# Impact of MADDSP



- Provision of data which served as an impetus for universal newborn hearing screening
- Examination of economic costs of developmental disabilities
- Evaluation of neuro-developmental status of children with a metabolic or endocrine disorder
- Understanding the long-term consequences of DD (e.g., follow-up on DD functioning as adults).
- Support early identification to decrease the number or severity of DDs (e.g. percent of children with a DD identified by EI/Part C)
- Autism and Childhood MMR Vaccine
  - Important contributor to the pool of population-based epidemiologic studies that have not, to date, demonstrated an association between MMR or any other measles-containing vaccine and autism
  - Public use data set created from the MMR vaccine and autism study-extending the study's value into the public realm



# Expansion of Efforts: MADDSP Serves as a National Model



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# Autism and Developmental Disabilities Monitoring (ADDMM) Network

- *ADDMM Network Mission:* Working together to understand the magnitude and characteristics of the population of children with autism and related developmental disabilities to inform science and policy.
- **Goals:**
  - Obtain as **complete a count as possible** of the number of children with an ASD in each project area
  - Provide **comparable, population-based ASD prevalence** estimates in different sites
  - Provide data to **characterize the ASD population**
  - Study whether autism is **more common in some** groups of children than in others and **whether rates are changing over time (trends)**
  - **Improve the consistency of identification** of people with ASDs



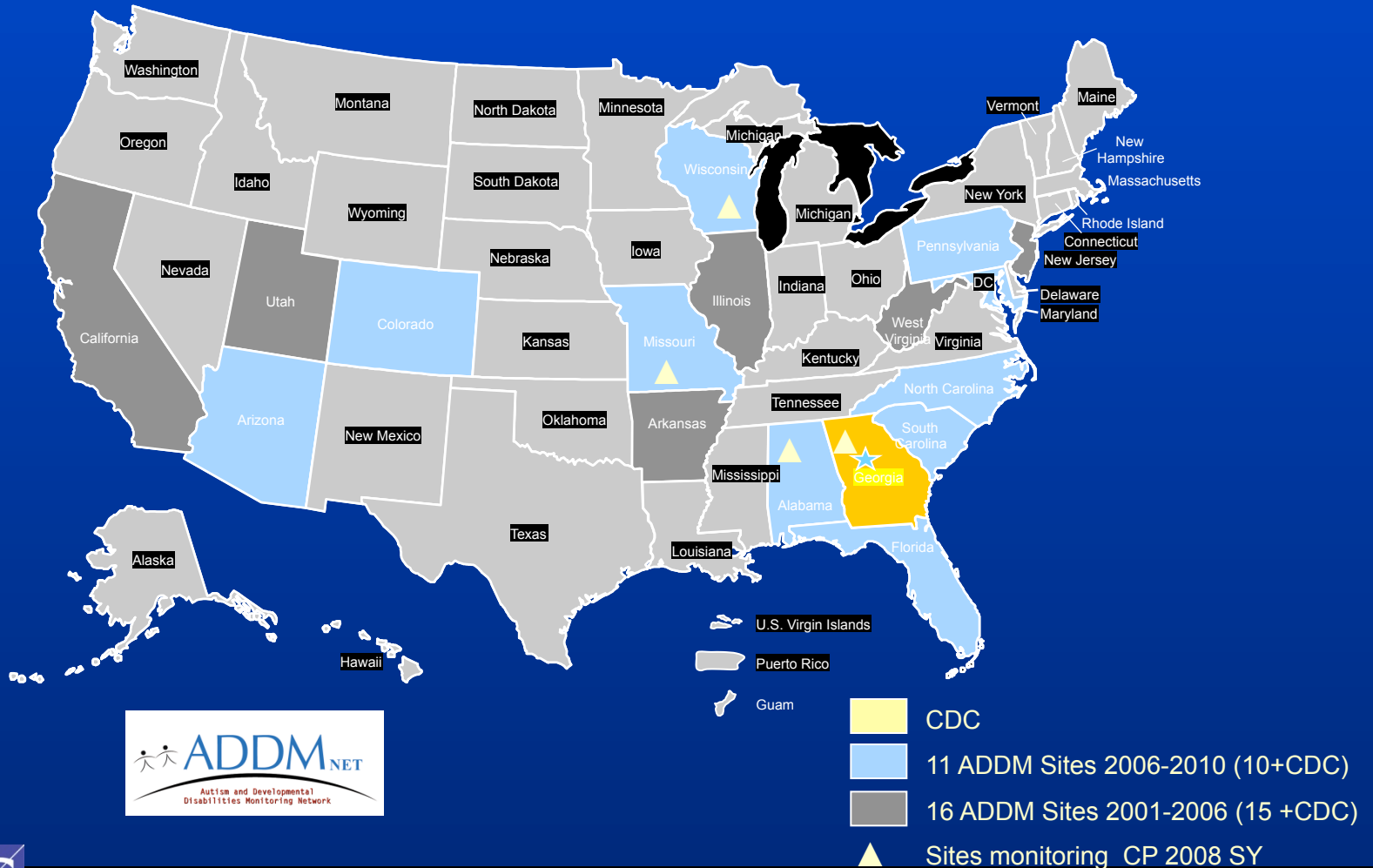


# ADDM Prevalence Estimates 2007

- Results from the largest US multi-site collaboration to monitor ASDs underscore that ASDs are conditions of urgent public health concern.
- For the majority of communities represented, ASD prevalence ranged from 5.2-7.6 per 1000 children
- Some variation
  - ASD prevalence significantly lower in 1 site (AL) and higher in 1 site (NJ).
  - **Average of 1 in 150 children**  
(range from about 1 in 100 to 1 in 300)
- **How many children in the U.S. have an ASD?**
  - Estimated: 560,000 children between 0-21 years



# ADDM: Expanded Cerebral Palsy Monitoring



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# The goals of the ADDM CP Network

- Obtain a complete count of the number of children with CP in each project area.
- Provide comparable, population-based CP prevalence estimates in different sites.
- Study if CP is more common in some groups of children than in others, and if rates are changing over time.
- Improve the consistency of identification of children with CP.



# ADDM: Expanded Cerebral Palsy Monitoring

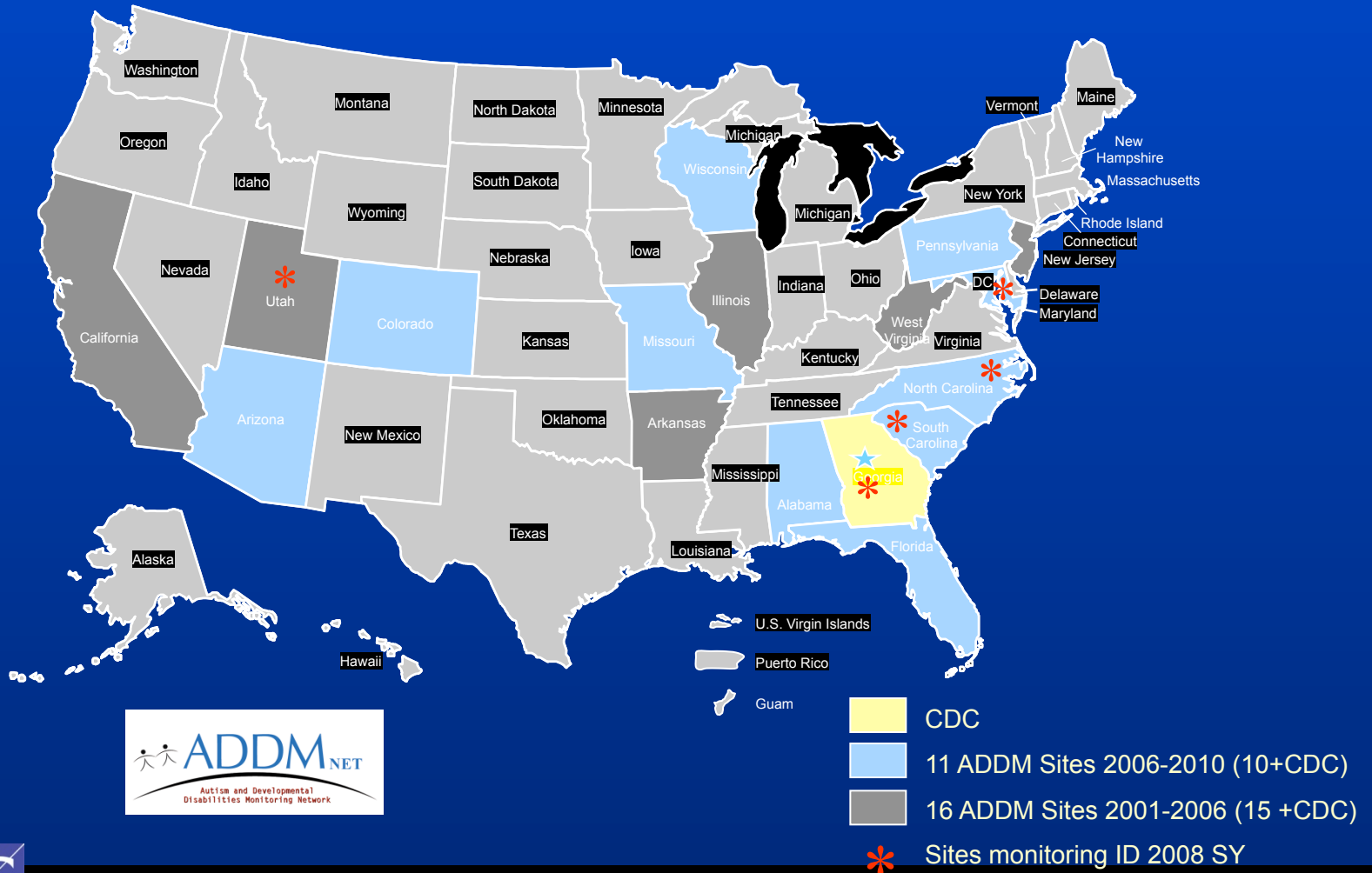
- 3 sites (AL, GA, WI) conducted CP surveillance in 2002.
- Site-specific rates were similar (3.3-3.8 per 1,000) with average of 3.6 per 1,000 8-year-old children.
- Male: female ratio was 1.1 (GA) to 1.6 (AL, WI).
- Spastic CP was the most common subtype (77% of all cases), primarily represented by bilateral spastic CP.



Prevalence of Cerebral Palsy in 8 Year-Old Children in three areas of the United States: A Multisite Collaboration. March 3, 2008 Pediatrics.



# ADDM: Expanded Intellectual Disability Monitoring



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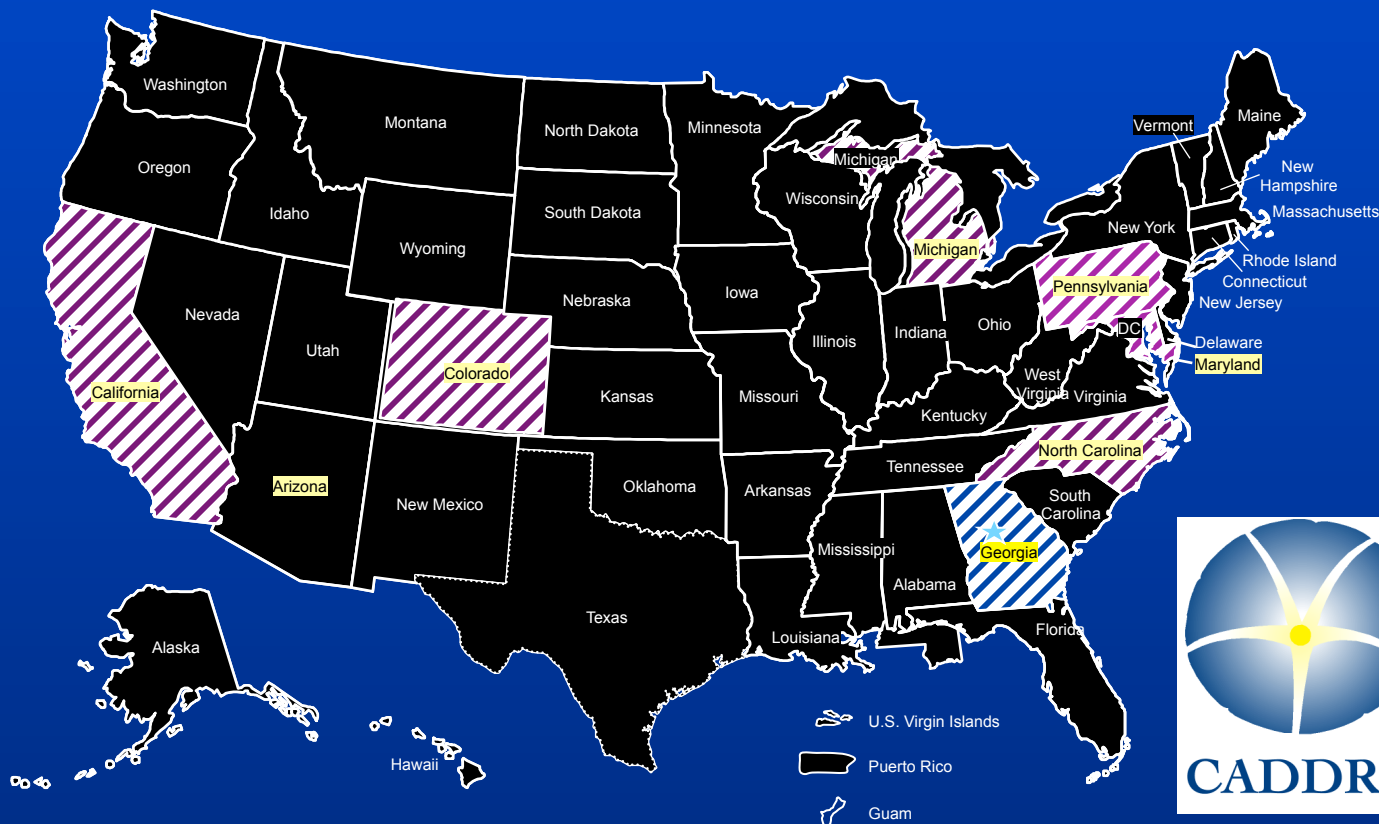
# Prevalence of ID across ADDM: 2002-2006 SY

<i>Study Year</i>	<b>Georgia</b>	<b>North Carolina</b>	<b>South Carolina</b>
<b>2002</b>	<b>13/1000</b>	<b>15/1000</b>	<b>20/1000</b>
<b>2004</b>	<b>11/1000</b>	<b>17/1000</b>	<b>17/1000</b>
<b>2006</b>	<b>11/1000</b>	<b>17/1000</b>	<b>20/1000</b>





# Centers for Autism and Developmental Disabilities Research and Epidemiology (CADDRE)



 CADDRE grantees, including Data Coordinating Center

 CDC, 6th CADDRE site



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# Study to Explore Early Development (SEED)



- Multi-state collaborative study to help identify factors that may put children at risk for autism spectrum disorders and other developmental disabilities.
- Case-cohort study design: population-based ascertainment (2700 children):
  - ASD cases
  - Neurodevelopmentally Impaired Comparison Group (NIC)
  - Sub-cohort

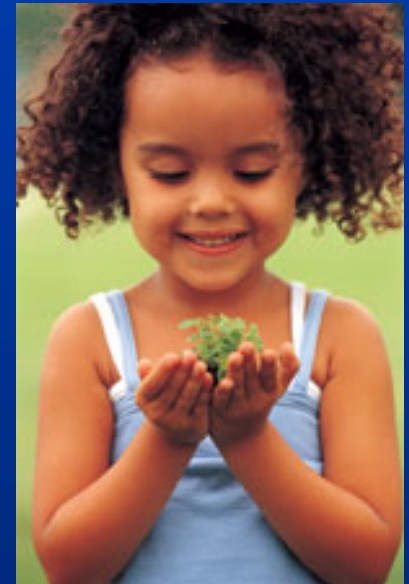




# Study to Explore Early Development (SEED)



- Main research areas
  - ASD phenotypic variation
    - ◆ Subgrouping for etiologic analysis
  - Infection and immune function, including autoimmunity
  - Reproductive and hormonal features
  - Gastrointestinal features
  - Genetic features
  - Sociodemographic features



## **CADDRE/SEED Research Partners**

- Kaiser Foundation (California)
- California Department of Health
- Colorado Department of Public Health
- University of Colorado
- Johns Hopkins University
- Drexel University
- Kennedy Krieger Institute
- University of North Carolina
- University of Pennsylvania
- Michigan State University

## **National Advocacy Partners**

- American Academy of Pediatrics
- American Academy of Cerebral Palsy and Developmental Medicine
- National Institutes of Health
- Autism Speaks
- Autism Society of America
- First Signs
- Organization for Autism Research
- Reaching for the Stars: A Foundation of Hope for Children with Cerebral Palsy
- Parents of Infants and Children with Kernicterus

# Developmental Disabilities Branch

## **Metropolitan Atlanta Partners**

- Metro Atlanta School Systems
- Atlanta Area School for the Deaf
- Georgia Academy for the Blind
  - Georgia School for the Deaf
    - Georgia DHR
  - Children's Medical Services
  - Child Neurology Associates
- Children's Healthcare of Atlanta
- Emory Autism Resource Center
  - Emory Children's Center
    - Emory Clinic
  - Grady Health System
    - Marcus Institute
  - Psychological Sciences Institute
- Woodlawn Developmental Pediatric Center
- Georgia Department of Vital Statistics

## **Metropolitan Atlanta Advocacy Partners**

- Georgia Walk for Autism
  - ASA-GA Chapter
- CADEF: The Childhood Autism Foundation

## **ADDM Surveillance Partners**

- Alabama Autism Surveillance Program
- Arizona Developmental Disabilities Monitoring Program
- California Department of Health
- Colorado Department of Public Health
- University of Miami
- Johns Hopkins University
- Missouri Autism and Developmental Disabilities Monitoring Project
- University of North Carolina
- University of Pennsylvania
- South Carolina Developmental Disabilities Surveillance Program
- Utah Registry of Autism and Developmental Disabilities
- Wisconsin Autism and Developmental Disabilities Monitoring Project
- Florida State University

## **International Research Partners (Denmark)**

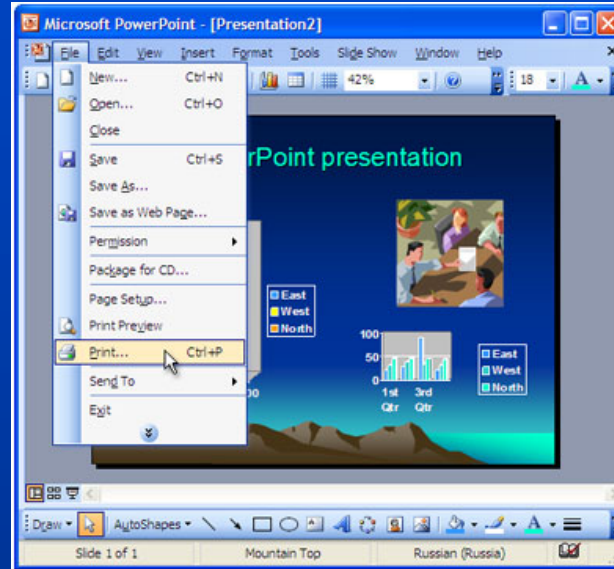
- Ministry of Science, Technology and Innovation
- University of Aarhus
- Staten Serum Institute
- University of Odense/Odense University Hospital
- University of Copenhagen







# 2009: How many children have a developmental disability?



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# Acknowledgements



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# Thank You!



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