Autism as a Public Health Problem

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- Increasing* incidence
- Large morbidity burden
- Unknown cause
- Heightened public anxiety

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The autism "epidemic"

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Autism Diagnoses Double In California

By SANDRA BLAKESLEE

Diagnoses of autism have nearly doubled in the last four years among children in California, state officials reported yesterday. They said they could not explain the increase.

New York Times, May 14 2003

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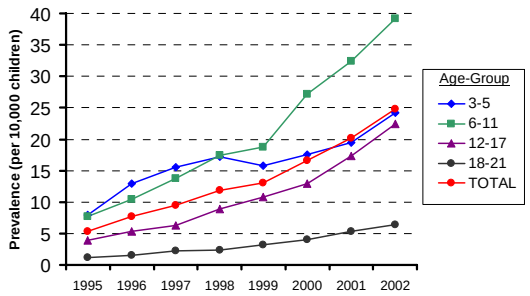
Prevalence* (per 10,000) of children with an autism special education classification in Maryland, by age and year



* Prevalence based on MSDE Special Education Censuses - Autism Classification

Source: MD State Department of Education

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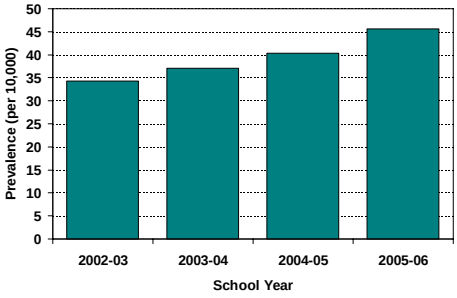
Prevalence* (per 10,000) of children with an autism special education classification in Philadelphia, by year



*Prevalence based on PDE Special Education Census - Autism classification

Source: PA State Data Center

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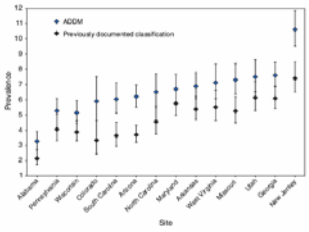
FIGURE 3. Overall prevalence* of autism spectrum disorders (ASDs) among children aged 8 years and prevalence of ASDs among children with a previously documented ASD classification,† by source type and order of ASD prevalence — Autism and Developmental Disabilities Monitoring (ADDM) Network, 14 sites, United States, 2002



* Per 1,000 population.
† Children were classified as having a previously documented ASD classification if they had 1) received a diagnosis of autistic disorder, pervasive developmental disorder (PDD)–not otherwise specified, Asperger syndrome, PDD, or ASD by a qualified professional that was documented in an evaluation record or 2) had special education services under an autism eligibility category.

Source: *MMWR* 56(SS-1); 2007

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Growing community & service system burden

Causes?

Increasing number of autism cases

Change in real risk
vs.
Change in diagnostic tendencies

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MEDICAL NEWS & PERSPECTIVES

"Epidemic" of Malignant Melanoma

True Increase or Better Detection?

Lynne Lamberg

NEW ORLEANS—In 1930, an American's lifetime risk of developing invasive malignant melanoma (MM) was estimated to be one in 1500. Today, the estimated risk is 1 in 68.

An estimated 53 600 Americans will be diagnosed as having invasive MM this year, and 7400 Americans are expected to die of this disease, according to the American Cancer Society (ACS). The ACS reports that MM is the fifth most common cancer in men and sixth most common in women. These data

specific antigen tests. No clinical test exists to detect MM in a preclinical state.

The incidence of thin invasive lesions (<0.1 mm) is increasing faster than that of thick ones (>1.0 mm) said Rigel, a past AAD president. This finding, he said, reflects earlier detection by physicians and greater awareness of warning signs of skin cancers by the public.

There have been no significant changes in histological criteria for the diagnosis of MM in recent years, Rigel said. A review of nearly 2700 pig-

The rise, she suggested, may at least in part reflect longer life expectancy, particularly in men. Efforts to detect MM earlier also are paying off, she said, with the identification of more and thinner lesions. Thin MMs may have a long latent period, she said, and may not reduce longevity.

Is it true that for every MM that is removed, she asked, a life is saved? Her answer: "Perhaps."

"We can't say that nonlethal MMs exist," Rigel countered. Even thin lesions, he said, have a 2% to 3% mortality rate.

Source: Lamberg. JAMA; 2002

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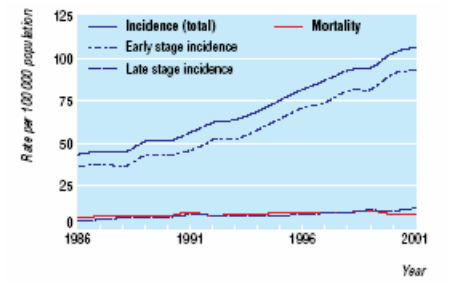
Melanoma incidence and mortality rates for individuals ≥ 65 years of age



Source: Welch, Woloshin and Schwartz. BMJ; 2005

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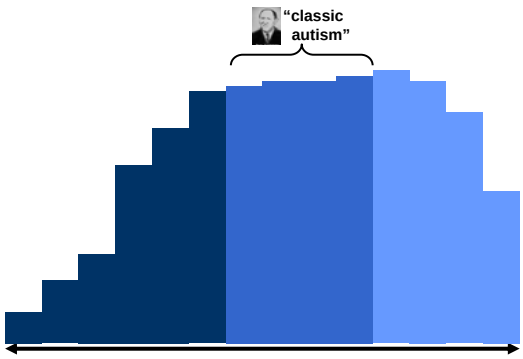
The autism spectrum…



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IMPOSSIBLE

TO QUANTIFY THE TOTAL EFFECT OF CHANGING DIAGNOSTIC TENDENCY THROUGH THE "RETROSCOPE"

Sources: Hertz-Picciotto and Delwiche *Epidemiol 2009*; Coo et al. *J Autism Dev Disorders* 2008; Skellern et al. *J Paediatr Child Health* 2005

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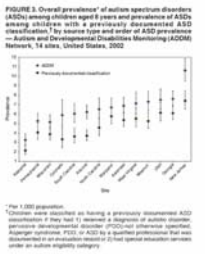
CDC

ADDM NET
Autism and Developmental Disabilities Monitoring Network



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Autism public health burden and system challenges

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Public health burden of autism

- 2nd most common serious developmental disability
- Lifelong impairment*
- $35 billion annual costs (direct and indirect)
- 70 new cases diagnosed per day

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Challenge 1: detect and diagnose early

- Improve general developmental screening *plus* autism-specific screening
- Time / reimbursement / false positives
- Standardized diagnostic tools have advanced research but are still impractical in the clinic
- Develop alternate diagnostic "pathways"

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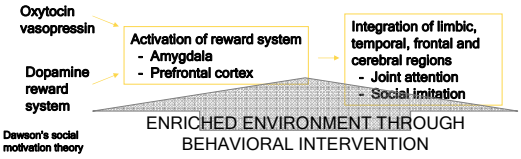
Challenge 2: increase access to early intervention

Early, behaviorally -based intervention is critical!

- As early as possible
- Intense (min 25 hrs wk)
- Systematic, planned, developmentally focused
- Individual attention
- Must focus on:
  Communication Social cognition
  Behavior management Develop.



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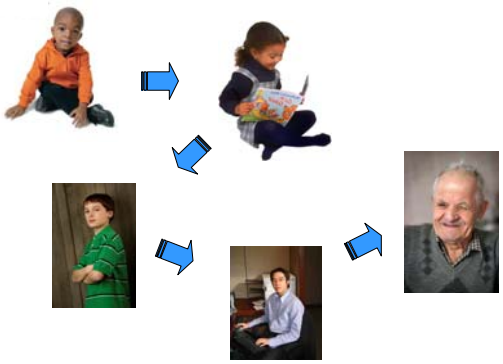
Challenge 3: improve services through the lifespan



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Innovation in Pennsylvania

PA Autism Insurance Act (ACT 62)

PA Autism Service Education Resources and Treatment (ASERT) Centers

aserteast@email.chop.edu
www.paautism.org

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Questions of cause…

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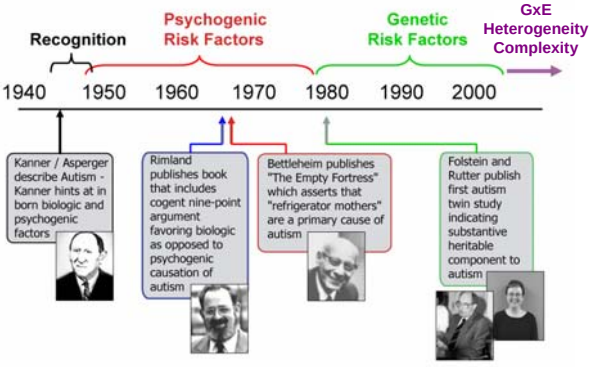
Conventional wisdom on autism's causes



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Autism twin studies

Study	MZ	(N)	DZ	(N)
Britain ('77)	36%	(11)	0%	(10)
U.S. ('85)	96%	(23)	24%	(17)
Nordic ('89)	91%	(11)	0%	(10)
Britain ('95)	**60%**	**(25)**	**5%**	**(20)**

Twin studies suggest:

- High heritability (but likely overestimated!)
- Multiple genes involved
- Potential for gene-environment interaction and other complex mechanisms influencing gene expression

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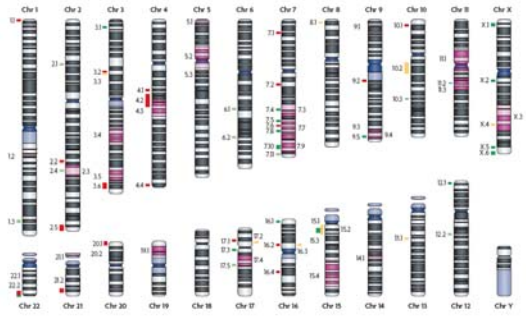
Summary of genetic findings across studies



Source: Abrahams and Geshwind, *Nat Rev Genetics*, 2008

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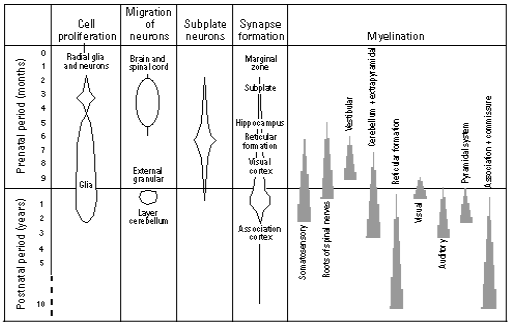

Source: Rice & Barone *Env Health Persp* 2000

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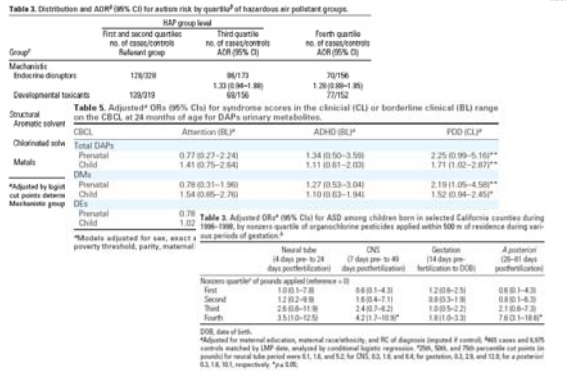

Sources: Windham et al *Env Health Persp* 2006; Eskenazi et al. *Env Health Persp* 2007; Roberts et al *Env Health Persp* 2007

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Immunization and autism

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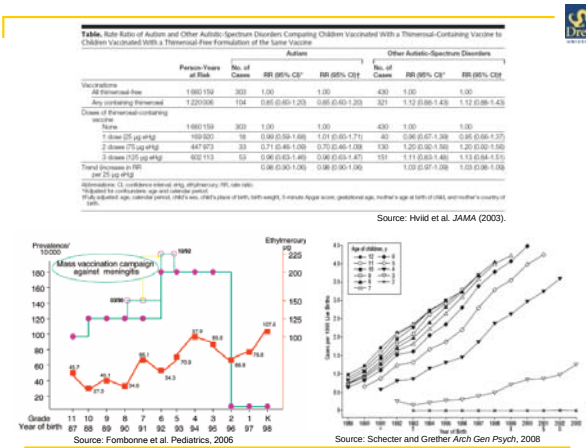

Source: Hviid et al. *JAMA* (2003).

Source: Fombonne et al. Pediatrics, 2006

Source: Schecter and Grether *Arch Gen Psych*, 2008

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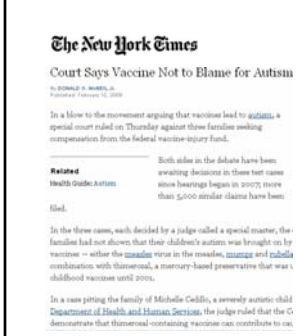

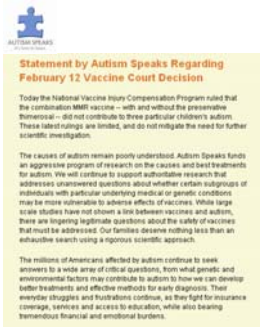

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SPECIAL ARTICLE

Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases

Saad B. Omer, M.B., B.S., Ph.D., M.P.H., Daniel A. Salmon, Ph.D., M.P.H., Walter A. Orenstein, M.D., M. Patricia deHart, Sc.D., and Neal Halsey, M.D.

ABSTRACT

Vaccines are among the most effective prevention tools available to clinicians. However, the success of an immunization program depends on high rates of acceptance and coverage. There is evidence of an increase in vaccine refusal in the United States and of geographic clustering of refusals that results in outbreaks. Children with exemptions from school immunization requirements (a measure of vaccine refusal) are at increased risk for measles and pertussis and can infect others who are too young to be vaccinated, cannot be vaccinated for medical reasons, or were vaccinated but did not have a sufficient immunologic response. Clinicians can play a crucial role in parental decision making. Health care providers are cited as the most frequent source of immunization information by parents, including parents of unvaccinated children. Although some clinicians have discontinued or have considered discontinuing their provider relationship with patients who refuse vaccines, the American Academy of Pediatrics Committee on Bioethics advises against this and recommends that clinicians address vaccine refusal by respectfully listening to parental concerns and discussing the risks of nonvaccination.

Source: *NEJM* May 2009

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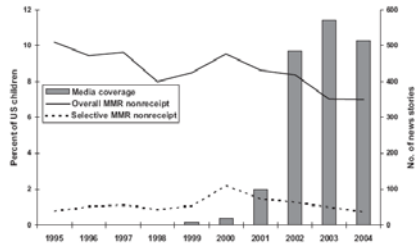

FIGURE 1
MMR nonreceipt and media coverage according to NIS survey year. Overall MMR nonreceipt indicates children who did not receive the MMR vaccine; selective MMR nonreceipt, children who received 3 hepatitis B, 3 polio, 4 diphtheria-tetanus-acellular pertussis, and 3 Haemophilus influenzae type b vaccines but not the MMR vaccine; news stories, all newspaper stories, television programs, and radio programs that reported the MMR-autism controversy to which children in each year's NIS may have been exposed.

Source: Smith et al *Pediatrics* 2009

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Next steps exploring autism risk factors…

- Larger studies to date capitalize on existing data systems (Scandinavian registries, Kaiser Permanente…)
- "First wave" of large studies (case-control) with primary data collection combining interview data, medical record data, genetics data, other biomarkers nearing completion…

CADDRE — Center for Autism and Developmental Disabilities Research and Epidemiology

C.H.A.R.G.E. study
UCDavis NIEHS

- Next "wave"?
  - Case-only designs / case-parent trio designs
  - International comparisons
  - Designs focusing on maternal genetic effects
  - Large birth cohorts (e.g., NCS, Norwegian cohort)
  - ***Enriched risk cohort designs***

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EARLI
Early Autism Risk Longitudinal Investigation

- One of 11 NIH Autism Centers of Excellence
- EARLI involves and administrative core, four field sites, data coordinating center, central receiving lab and biosample repository
- Collaborating institutions include: Drexel, CHOP, University of Pennsylvania, Johns Hopkins, Kennedy Krieger Institute, UC Davis MIND Institute, Kaiser Permanente

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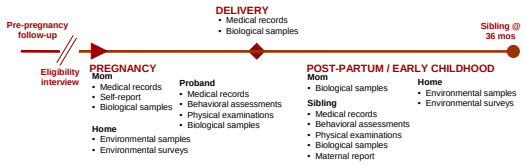
EARLI Prospective data collection plan



- Multiple mode exposure data collection on several key domains
- Collection in multiple exposure windows (potential critical periods)
- Comprehensive outcome assessment (dichotomous, continuous, markers for etiologic heterogeneity)

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EARLI Example exposure assessment options

Infection

- Maternal blood in pregnancy (3-4 samples): Ig, PCR, CRP
- Maternal urine in pregnancy: PCR
- Symptoms in pregnancy (diary report)
- Placenta: histology, immunohistochemistry
- OB and L&D medical record
- Newborn heelstick: Ig
- Cord blood: Ig, PCR, CRP
- Breast milk: Ig
- Sibling blood (2 samples)
- Sibling urine (2 samples)
- Sibling symptom diary
- Pediatric medical record

Organophosphates

- Maternal urine in pregnancy: (3-4 samples): OP metabolites
- Housing characteristics – pregnancy
- Household dust samples
- Questionnaire – insecticide exposure in pregnancy; organic vs. nonorganic fruit and veg
- Meconium: OP metabolites
- Chord blood: chlorpyrifos levels
- Sibling urine (2 samples)
- Questionnaire – insecticide use postnatally; organic vs. nonorganic fruit and veg
- Housing characteristics – postnatal
- Household dust sample - postnatal

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www.earlistudy.org

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THANK YOU!

Any questions, or for a pdf copy of this presentation, you can reach me at:

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