Autistic Spectrum Disorders: Biomedical, Genetic and Intervention Advances in an Era of Scientific Promise and Community Scarcity

Michael E. Msall, M.D.
University of Chicago Comer Children’s Hospital
Section of Developmental and Behavioral Pediatrics
JP Kennedy Research Center on Intellectual and Neurodevelopmental Disabilities

November 8, 2012
ISBE Conference Oak Lawn IL
Understanding Autism

Why More Kids & Families Are Facing the...
Session Goals

• Describe the current epidemiology of ASDs.
• Increase awareness of early identification and developmental surveillance for children at risk.
• Describe advances in genetics and model disorders for underlie the complexity of ASDs.
• Discuss model early interventions and their impact on developmental processes.
• Increase partnerships between health and educational professionals to optimize outcome for children with ASDs.
Autism Spectrum Disorder

- Complex neurobehavioral disorder
- Affects 1 in 88 children.
- Affects 1 in 54 males.
- May affect 1 in 5 siblings.
- Can be diagnosed in the first three years of life
- Can be educationally identified in the first ten years of life
- Triad of impaired social, communicative, and behavioral processes
Criteria for Autism Spectrum Disorder: Wing’s Triad (DSM-IV)

- Developmental and behaviorally defined syndrome with complex etiologies
- Impairment of communication
- Impairment of social interaction
- Restrictive and stereotyped patterns of behavior, interests, and activities
The Spectrum of Autism (DSM4)

- Classical Autism
- Asperger's Syndrome
- Pervasive Developmental Disorder
- Disintegrative Disorder
- Rett's Disorder
Red Flags

- No babbling by 12 months
- No back and forth gestures by 12 months
- No words by 16 months
- No two-word phrases by 24 months
- Any loss of speech, babbling, developmental or social skills at any age
Clues to Autism

- Often no major concerns about motor or developmental delays in the first year
- Difficulty with verbal and non-verbal language, joint attention, social interaction
- Difficulty with symbolic play
- Some language regression in 20% of children
- Pediatrician can screen with the MCHAT, PDDST2, or ASQ:SE
Modified Checklist for Autism in Toddlers (MCHAT)

• Does your child enjoy playing peek-a-boo and other interactive games?
• Does your child ever use an index finger to point to something of interest?
• Does your child play with small toys beyond just mouthing or dropping them?
• Does your child imitate you?
• If you point at a toy across the room, does your child look at it?
Context of Autism

- Parents assume that all disorders have a straightforward etiology.
- Parents often distrust medical, educational, and behavioral professionals.
- Testimonials give hope, especially those for potential cures that use natural interventions or new therapeutic approaches.
Spectrum of Intellectual and Communicative Impairments

• High severity, low prevalence
  – Classical autism
  – Significant intellectual disability (IQ<50-55)

• Low Severity, High Prevalence
  – Mild intellectual disability (IQ 55-69)
  – Language disorders
  – Learning disorders
Intellectual Disability

• Mild Intellectual Disability
  – 20-30 per 1000
  – Detected in kindergarten and early grades
  – Independent in communication and all ADL
  – Capable of reading and writing to 5th grade level

• Moderate Intellectual Disability
  – 5 per 1000
  – Presents as preschool language delay
  – Prognosis includes independent in all ADL
  – Able to communicate basic needs
Is Autism “Genetic”?

• The etiology of autism is complex.

• Genetic contribution is well established from twin studies (Bailey et al, 1995; Lichtenstein et al, 2010; Liu et al, 2001).

• 60% of monozygotic twins concordant for definitive diagnosis and 90% for related social and/or cognitive abnormalities.

• Previously reported that the recurrence risk for families with one child with ASD is 2-8% (4% if child is female & 7% if child is male).

• Baby Siblings Research Consortium Study (Ozonoff et al, 2011); Recurrence of 18.7% after first child with ASD and 30% after having 2 children with ASD.
Fragile X syndrome
Fragile X syndrome

• The most commonly know single-gene cause of autism and the most common inherited cause of intellectual disability.
• 2% of children with ASD have Fragile X mutation; approximately 1/3 of children with FXS also have some degree of autism.
• Incidence of FXS 1 in 3,600 males; approx 1 in 4,000-6,000 females (incidence of mutation is more common).
• Mutation in the FMR1 gene - mutation in which a DNA segment, the CGG triplet repeat is expanded - silences the gene and prevents gene from producing FMR1 protein (required for normal neural development).
• Normally repeated 6-50 times.
• Fragile X - repeated >200 times (full mutation).
• Premutation approx. 59-200 - typically asymptomatic - occasionally affected in later years with the development of Fragile X associated tremor/ataxia syndrome; recent evidence suggests at increased risk for specific LD and mental health issues.
Fragile X Phenotype

- Intellectual disability (full mutation females: minimally affected to severe)
- Elongated face, large or protruding auricles, flat feet, hyperextensible joints, post-pubescent macroorchidism, low muscle tone.
- Atypical speech - “cluttered”, nervous, echolalia.
- Stereotyped movements, atypical social skills (“shyness/social anxiety”), limited eye contact/gaze aversion, memory problems, difficulty with face encoding (ability to recognize a face that one has seen before).
- Decreased activation of the prefrontal regions of the brain - social cognition, increased risk of hyperactivity, anxiety, social deficits, hypersensitivity to sensory stimuli, difficulty with transitions, perseveration.
- Females: high frequency of mood disorder, avoidant behavior, social anxiety, depression.
- Premutation: current evidence for difficulties with mathematics, anxiety, attention and/or executive function.
FXS & ASD

- Prevalence of ASD in FXS: 21-50%.
- Females with FXS: prevalence of ASD 1-3%
Rett Syndrome
Rett Syndrome

- DSM V: RS will not be considered one of the ASD
- Clinically unique: developmental regression, acquired microcephaly, improved eye contact and social relatedness over time, midline stereotyped behaviors.
- Diagnosis of RS should be considered by clinicians who have diagnosed a child with ASD.
Rett Syndrome

• X-linked disorder that predominantly affects females.
• 1 in every 12,500 female live births.
• Affects grey matter of the brain.
• Second most common genetic cause of intellectual disability in females (1st: Down syndrome).
• Mutation in the methyl-CpG binding protein 2 (MECP2) gene (95% cases) (rarely - mutations in CDKL5 or FOXG1 genes).
• Hypothesize that locus coeruleus is a critical site at which loss of MECP2 results in CNS dysfunction.
Rett Syndrome Phenotype

• Progressive deficits typically between 1 & 2 years.
• Small hands and feet, deceleration of rate of head growth.
• Regression of verbal and motor skills, social withdrawal and “autistic features” (e.g., decreased eye contact), hand wringing, seizures, respiratory problems, scoliosis, growth failure.
Tuberous Sclerosis (Complex) TSC

- Multi-system autosomal dominant disease: non-malignant tumors of the brain, kidneys, heart, eyes, lungs and skin.
- Mutation of TSC1 (chromosome 9q34) or TSC2 (chromosome 16p13.3) genes, which code for the proteins hamartin and tuberin respectively (proteins act as tumor growth suppressors, agents that regulate cell proliferation and differentiation).
- Prevalence approx 7-12/100,000.
- 2/3 sporadic genetic mutations.
TSC Phenotype

• Criteria for TSC: 2 major or 1 major & 2 minor.

• Major: Facial angiofibromas or forehead plaque, ungual or periungual fibroma; >3 hypomelanotic macules; Shagreen patch (connective tissue nevus); multiple retinal nodular hamartomas; cortical tuber; subependymal nodule; subependymal giant cell astrocytoma; cardiac rhabdomyoma, lymphangiomyomatosis; renal angiomyolipoma.

• Minor: Pits in dental enamel; hamatomatous rectal polyps; bone cysts; cerebral white matter migration lines; gingival fibromas; non-renal hamartoma; retinal achromic patch; “confetti” skin lesions; multiple renal cysts.

• Seizures
• Learning difficulties - mild to severe (50-65%).
• Autism: 25-61%; PDD: >60%.
Current Research: Altered Brain Pathways, Disordered White Matter
(Peters, Sahin, Vogel-Farley, et al)

• Advanced MRI images – diffusion tensor images (traces the pathways of nerve fibers by measuring the diffusion of water in the brain) from the corpus callosum – comparisons of normal, TS and TS+autism.

• Results: TS+autism: axons with extreme disorganization, greater water diffusion out of axons, indicating compromised myelin coating and white matter – features were much less in patients with TS alone.
Medical Risks for Autism

- Phenylketonuria
- Congenital rubella
- Lesch Nyland
- Tuberous Sclerosis
- Hypomelanosis of Ito
- de Lange Syndrome
- Goldenhar syndrome
- CHARGE
- Moebius
- Timothy
- Infantile Spasms

- Retinopathy of Prematurity
- Lead poisoning
- Down syndrome
- Fragile X syndrome
- Prader-Willi
- Duchenne Dystrophy
- Myotonic Dystrophy
- PTEN
- San Fillipo (MPS3)
- Thalidomide embryopathy
- Shank 3
- Rett Syndrome
BORN TOO SOON

The high-tech, high-risk drama of keeping the tiniest babies alive

Jason Michael Waldmann Jr., who weighed only 1.17 pounds at birth...
Prevalence of Autism Spectrum Disorder in Adolescents Born Weighting <2000 Grams

Neonatal Brain Hemorrhage Cohort

- To estimate the diagnostic prevalence of autism spectrum disorders (ASDs) in a low birth weight (LBW) cohort.
- Regional birth cohort of infants (N=1105), BW <2000g, between 10/01/1984 – 7/03/1989
- Periodic follow-up ASD assessments to 21y:
  - At 16y (n=623), 21y (n=189)
Neonatal Brain Hemorrhage Study (NBHS) Cohort

• 85% of births <2000g in 3 central New Jersey counties from 10/01/1984 – 07/30/1987.

• Demographics comparable to nation as a whole, excluding slightly higher per capita income and slightly lower proportion of minorities

• Cohort reassessed at ages 2y, 6y, 9y, 16y, and 21y.

• All enrolled families spoke English.
First Stage: Screening Procedure for ASD (at 16y)

- Assessed for ASD using Social Communication Questionnaire (SCQ) and Autism Spectrum Screening Questionnaire (ASSQ)
- Parents were also asked if a profession had ever diagnosed child of ASD
  - Autism, Asperger syndrome, or pervasive developmental disorder
Second Stage: Recruitment and Diagnostic Procedure

• Instruments used were:
  – Autism Diagnostic Interview-Revised (ADI-R)
    • Administered to parents
  – Autism Diagnostic Observation Schedule (ADOS, module 4)
    • Administered to young adults
  • Both ADIR and ADOS are well-validated and widely used in research.
NJ Neonatal Brain Hemorrhage Cohort and ASD at 21Y

623 Teens at age 16 Y were screened for ASDs.
189 Young Adults at age 21 Years were assessed.
Estimated prevalence rate of ASD = 5% (31 of 623)
11 of 70 Positive Screens had a confirmed ASD
3 of 119 negative screens had a confirmed ASD
This is significantly higher than current CDC estimate of 1.1% at age 8Y.
Preschool Children with Inadequate Communication: Developmental language disorders, autism, low IQ

Rapin I (Ed)
on behalf of the Autism and Language Disorders Nosology Project
1996 Mac Keith Press
Study Personnel

• Principal Investigators
  – St. Mary’s Hospital, Richmond, VA
  – Albert Einstein College of Medicine, Bronx, NY

• Co-investigators
  – Albert Einstein College of Medicine
  – Case Western Reserve School of Medicine, Cleveland, OH
  – Boston University School of Medicine, Boston, MA
  – Brown University School of Medicine, Providence, RI
  – Trenton State College, Trenton, NJ
  – North Shore University Hospital, Manhasset, NY

Rapin, 1996
Population

- 487 children ages 3-7 years
  - 201 with Developmental Language Disorders-DLD
  - 176 with Autism-AD
  - 110 in the Non Autism Low IQ-NALIQ
- Autistic Children were divided into 2 subgroups
  - 51 children with Non-Verbal IQ $\geq 80$ (high functioning-HAD)
  - 125 children with an NVIQ $< 80$ (low functioning-LAD)

Rapin, 1996
Goals

• To provide an empirically validated nosology in order to promote uniformity in subject selection and foster replicability of results, retrievability of data, and collaborative research and communication
• To provide a neuropsychological and behavioral foundation on which to
  – investigate the neurobiological basis of these disorders
  – provide a basis for rational intervention
  – improving the training of those who educate and care for these children

Rapin, 1996
Neuropsychological Measures

- Peabody Picture Vocabulary Test-Revised
- Expressive One-Word Picture Vocabulary Test
- Hiskey-Nebraska Test of Learning Aptitude
- McCarthy Scales of Children’s Abilities

Rapin, 1996
Measures

• Motor
  – Seguin Formboard
  – Annett Pegboard
  – UCLA Handedness Measure
  – Illinois Test of Psycholinguistic Abilities

• DLD-Specific Language
  – Photo Articulation Test
  – McCarthy Scales of Children’s Abilities
  – Curtiss-Yamada Comprehensive Language Evaluation
Parents and Siblings with Developmental Disorders (%)

<table>
<thead>
<tr>
<th></th>
<th>DLD (N=192)</th>
<th>HAD (N=51)</th>
<th>LAD (N=120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent with DLD</td>
<td>19.4</td>
<td>7.8</td>
<td>10.4</td>
</tr>
<tr>
<td>Sib with DLD</td>
<td>22.8</td>
<td>19.4</td>
<td>22.0</td>
</tr>
<tr>
<td>Sib 1&lt;sup&gt;st&lt;/sup&gt; words &gt;19 m</td>
<td>9.4</td>
<td>0.0</td>
<td>8.8</td>
</tr>
<tr>
<td>Sib 1&lt;sup&gt;st&lt;/sup&gt; sentence &gt;25 m</td>
<td>15.6</td>
<td>6.5</td>
<td>12.1</td>
</tr>
<tr>
<td>Parent with AD</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Sib with AD*</td>
<td>1.7</td>
<td>6.5</td>
<td>6.6</td>
</tr>
</tbody>
</table>

* = difference between groups p < .05

Rapin, 1996
<table>
<thead>
<tr>
<th></th>
<th>DLD (N=189)</th>
<th>HAD (N=50)</th>
<th>LAD (N=116)</th>
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</thead>
<tbody>
<tr>
<td>Intensive care (n=482)</td>
<td>14.1</td>
<td>13.7</td>
<td>13.7</td>
</tr>
<tr>
<td>Ventilator (n=480)</td>
<td>3.5</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Neonatal seizures (n=482)</td>
<td>0.5</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Other problems (n=468)*</td>
<td>20.3</td>
<td>21.6</td>
<td>30.8</td>
</tr>
<tr>
<td>Not discharged with mother (n=481)</td>
<td>16.2</td>
<td>15.7</td>
<td>16.9</td>
</tr>
</tbody>
</table>

* = significant difference between groups p<.05

Rapin, 1996
### Delayed Developmental Milestones (%)

<table>
<thead>
<tr>
<th></th>
<th>DLD (M=49 mo)</th>
<th>HAD (M=58 mo)</th>
<th>NALIQ (M=56 mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Walking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At 18 mo (N=60)*</td>
<td>4.0</td>
<td>0.0</td>
<td>26.4</td>
</tr>
<tr>
<td><strong>Pretend Play</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At 36 mo (N=225)*</td>
<td>24.4</td>
<td>70.6</td>
<td>49.1</td>
</tr>
<tr>
<td>At interview (N=93)*</td>
<td>5.0</td>
<td>15.7</td>
<td>16.4</td>
</tr>
</tbody>
</table>

* = significant difference between groups p<.001

Rapin, 1996
## Mean Age (mo) of Language Development

<table>
<thead>
<tr>
<th></th>
<th>DLD M (SD)</th>
<th>HAD M (SD)</th>
<th>LAD M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Words</strong>*</td>
<td>18 (8.3)</td>
<td>17 (10.5)</td>
<td>20.4 (13.1)</td>
</tr>
<tr>
<td><strong>Phrases</strong>*</td>
<td>27.2 (9.4)</td>
<td>29 (11.7)</td>
<td>36 (16.3)</td>
</tr>
<tr>
<td><strong>Intelligibility</strong></td>
<td>30 (10.8)</td>
<td>29 (123)</td>
<td>30.6 (17.2)</td>
</tr>
<tr>
<td><strong>1 step commands</strong>*</td>
<td>23.4 (9.4)</td>
<td>33 (12.5)</td>
<td>37.4 (14.7)</td>
</tr>
</tbody>
</table>

* = significant difference between groups p < .05  
** = significant difference between groups p < .001  

Rapin, 1996
## Parents’ View of Child’s Behavior (%)

<table>
<thead>
<tr>
<th>Behavior</th>
<th>DLD (N=201)</th>
<th>HAD (N=51)</th>
<th>NALIQ (N=110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lines up, spins toys</td>
<td>22.9</td>
<td>70.6</td>
<td>35.5</td>
</tr>
<tr>
<td>Prefers puzzles, blocks</td>
<td>28.9</td>
<td>60.8</td>
<td>32.7</td>
</tr>
<tr>
<td>Prefers machines to toys</td>
<td>30.4</td>
<td>54.9</td>
<td>40.0</td>
</tr>
<tr>
<td>One line pretend play</td>
<td>13.3</td>
<td>51.4</td>
<td>15.7</td>
</tr>
</tbody>
</table>

* = significant difference between all groups p<.001

Rapin, 1996
# Vineland Adaptive Behavior Scales

<table>
<thead>
<tr>
<th></th>
<th>DLD M (SD)</th>
<th>HAD M (SD)</th>
<th>LAD M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>79 (12)</td>
<td>80 (20)</td>
<td>53 (13)</td>
</tr>
<tr>
<td>Daily Living</td>
<td>84 (15)</td>
<td>70 (15)</td>
<td>51 (16)</td>
</tr>
<tr>
<td>Composite</td>
<td>79 (13)</td>
<td>68 (14)</td>
<td>49 (11)</td>
</tr>
</tbody>
</table>

All four-way group differences significant at $p < .05$

Rapin, 1996
# Social Challenges of Children (%)

<table>
<thead>
<tr>
<th></th>
<th>DLD (N=37)</th>
<th>HAD (N=50)</th>
<th>LAD (N=121)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignores people</td>
<td>0</td>
<td>8</td>
<td>43</td>
</tr>
<tr>
<td>Difficulty with needs of others</td>
<td>5</td>
<td>43</td>
<td>78</td>
</tr>
<tr>
<td>Withdraws from touch</td>
<td>3</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Never initiates interaction</td>
<td>8</td>
<td>34</td>
<td>69</td>
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All four-way group differences significant at p < .05

Rapin, 1996
<table>
<thead>
<tr>
<th>Category</th>
<th>DLD (N=174)</th>
<th>HAD (N=50)</th>
<th>LAD (N=121)</th>
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<tbody>
<tr>
<td>Friendships</td>
<td>98</td>
<td>67</td>
<td>39</td>
</tr>
<tr>
<td>Social Play</td>
<td>98</td>
<td>80</td>
<td>55</td>
</tr>
<tr>
<td>Self-recognition</td>
<td>98</td>
<td>100</td>
<td>66</td>
</tr>
<tr>
<td>General sociability</td>
<td>93</td>
<td>54</td>
<td>28</td>
</tr>
</tbody>
</table>

*HBSS=Handicaps, Behavior and Skills Schedule: Percent judged to have age-normal skills

Rapin, 1996
## Middle Ear Problems

<table>
<thead>
<tr>
<th>Frequency per Year</th>
<th>DLD (n=201)</th>
<th>HAD (n=51)</th>
<th>LAD (n=125)</th>
<th>NALIQ (n=110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2 times per year</td>
<td>49%</td>
<td>47%</td>
<td>50%</td>
<td>54%</td>
</tr>
<tr>
<td>3-6 times per year</td>
<td>30%</td>
<td>17%</td>
<td>18%</td>
<td>17%</td>
</tr>
<tr>
<td>&gt; 6 times per year</td>
<td>26%</td>
<td>33%</td>
<td>31%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Rapin, 1996
Summary

• Most pre-, peri- and postnatal events did not differentiate among the four groups.
• There were many positive developmental, educational and adaptive outcomes across the spectrum of these children’s strengths and challenges.
• This study highlighted the need for more systematic developmental surveillance and the need to identify children in early childhood.

Rapin, 1996
Autism Family Support and Treatment Program
Advocate IL Masonic Pediatric Developmental Center

Carol Rolland, PhD
Valeria Nanclares, PsyD
Meghan Di Quatro, Ph.D.
Amy Francis, MD
Janet Paterson, MD
Michael Cupoli, MD
Michael E. Msall, MD
Underlying Principles of the Advocate Illinois Masonic DBP Treatment Model

• Collaboration among parents, schools, human services system
• Significantly expand the role of parents and intervene in the home environment
• Utilize an integrated, data-based treatment approach
• Move from one-to-one treatment to social group interaction as quickly as possible
• Provide a system for on-going collaboration with the family.
Overall Goal at PDC

To develop a clinically effective treatment program that is accessible to a large number of families in need

To address the needs of multicultural families with limited resources
Economic Realities

• Need to provide intensive treatment for these children in a time of diminishing resources (25-40 hours weekly)

• Intensive behavioral approaches (ABA) are prohibitively expensive ($30,000-50,000 per year - New York Times, 2002).

• Cost is out of reach for most families and severely burdens educational and human services systems.
Expert Panel on Interventions for Children with Autism (Lord and McGee, 2001)

• Emphasis on early intervention
• Involvement of parents
• 25 hours of planned intervention weekly
• Comprehensive treatment goals
• Programming across settings
• Strategies to address problem behaviors
Parents as Active Collaborators in their Child’s Treatment

- Parent contract
- 20 hours of didactic center-based instruction
- 8 hours “hands on” parent-child groups
- 10 hours of weekly therapy with child
- Monthly group meeting with parents and team
Parent Training Modules

- Characteristics of Autism
- Communication Disorders and Alternative Communication Modes
- Structured Teaching Approaches
- Applied Behavioral Analysis and Discrete Trial Teaching
- Social Interactive Approaches
- Sensory Integration
- Assessment and data collection
Skill Areas Addressed

- Attending and Compliance
- Imitation Skills
- Communication: Receptive & Expressive Skills
- Self Help & Daily Living
- Social Development and Play
- Academic Skills
- Behavior Problems
Neuropsychological Findings

- Lowered responding to auditory cues in spite of adequate hearing
- Poor sequential memory
- Heightened arousal levels
- Regulatory problems with poor attention, restlessness and distractibility
- Strength in responding to visual cues and in visual learning
- Good motor coordination, gross better than fine
- Good rote learning and memory
Addressing Challenges

- Lowered responses to auditory cues
- Poor sequential memory
- Heightened arousal
- Regulatory problems with self-modulation, attention, and distractibility

Use visual, verbal & motor cues

- Picture schedules for time+sequence
- Sensory “diets” to modulate arousal
- Schedules+ sensory modes for self-regulation and attention
Pre and Post Outcome measures

- Children were assessed prior to and immediately following the four-month intervention period using a standardized battery:
  - Psychoeducational Profile-R (PEP-R)
  - Vineland Adaptive Behavior Scales
- Testing was performed by staff psychologists or doctoral students, blind to child’s phase of treatment.
Curriculum based behavioral objectives:
4 month follow-up
Lessons from the Past

• All children with autism learn

• Children with autism require a framework of quality family supports and intensive quality communication, behavioral, and educational interventions

• Medical advances have occurred in classification, genetics, neurology, development, and criteria for effective interventions
Lessons from the Past

• Parents and professionals working in partnership and advocacy can ensure that best practices are implemented, accessible, and critically evaluated.

• Best developmental practices build on children’s and family’s strengths, comprehensively specify at key developmental stages, provide quality curricula and supports, maximize community participation, and enhance caring and fun.
Autism Speaks

• Dedicated to funding global biomedical research into the causes, prevention, treatments, and cure for autism.

• Committed to raising public awareness about autism and its effects on individuals, families, and society.

• http://www.autismspeaks.org/
DBP Chicago Model

Examine sequential outcomes after implementing translational science and community interventions so that disability is prevented, function optimized, and we create systems of care that strive to eliminate health care disparities for vulnerable children.
Where We Have Been

• Autism is a rare disorder
• Only child psychiatrists should be involved with management
• Until children talk, they cannot learn
• Early intervention, preschool special education, and community supports are accessible and comprehensive.
Perspective

- We need to critically ask how we promote communication, regulatory behaviors, adaptive skills, and social skills.
- We need to critically evaluate our advocacy efforts for family supports, early childhood and educational EBM audits, and community participation.
- Advances in genetics, neuroscience, and protocolized interventions are able to make a difference in child learning and family well being. All children with autism learn.
- Despite the diversity of the autistic spectrum disorders, we can make a difference
Acknowledgements

• Dr. Msall is supported by NICHD P30 Kennedy Research Center in Intellectual & Developmental Disabilities and IL LEND.

• C Roland, V Nanclares, M DiQuattro, S Soloman, M Cupoli an the teamwork of fellows and professionals at IMPDC;

• T. LaNier, Berger, S Troyke, C Gatling, P Huddleston, B Prendergast at U Chicago Early Intervention Outreach.

• The children and families who have helped inform us of the strengths and challenges of living on the spectrum.