THE CHANGING FACE OF AUTISM

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Learning Objectives
- At the end of this presentation, the participant will be able to:

1. List the diagnostic criteria for autism spectrum disorder and understand the two domains of core symptom impairment.

2. Distinguish signs and symptoms of autism from those of language disorders or global developmental delay.

3. Develop a screening system to detect common comorbid health conditions in children with autism.

Overview
- What is it?
  - (definition, criteria)
  - What does it look like?
    - (behaviors, interest, communication)
  - How do we catch it?
    - (surveillance, screening)
  - How often do we see it?
    - (epidemiology, prevalence)
  - Why does it happen?
    - (etiology, pathogenesis)
  - How do we treat it?
    - (behavioral and pharmacologic management)
  - Are there other things to look for?
    - (Further evaluation)
  - What can we hope for?
    - (outcomes, adults with ASD)

What is autism?
- “Biologically-based neurodevelopmental disorder”
  - Impairment in two developmental “domains”
    - Social communication and interaction (SCI)
    - Restricted and repetitive behaviors (RRB)
**TYPICAL DEVELOPMENT**

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**Quick Detour**

**Joint Attention**

**Receptive Language**

1st year:
- Alert to voice
- Regards speaker
- Listen then vocalize
- Gesture games
- Orient to name
- Understands “no”

2nd year:
- 1-step command
- 1 body part
- Points to picture
- 6 body parts
- 2-step command

**Expressive Language**

1st 6 months:
- Social Smile
- Coos
- Laughs
- Raspberry
- Squeal
- Babble

2nd year:
- 1st word
- Immature jargon
- 4-6 words
- 2 word combo
- Pronouns
- Tells stories

**Pointing**

- 2mos: Distress, social smile, following eyes
- 4mos: Pleasure, sadness, recognizes mother, anticipates food, smiles spontaneously
- 6mos: Personality, fear
- 12mos: Sharing, solitary play
- 18mos: Self-conscious
- 24mos: Imitates others, parallel play

**Emotional/social**
Terminology

- "Autism" can still be confusing – getting better

- “autismus”: 1910, psychiatrists describing schizophrenia
- Morbid self-admiration
- “…autistic withdrawal of the patient to his fantasies, against which any influence from outside becomes an intolerable disturbance.”

1938, Hans Asperger

- “autistic psychopathy”
  - Difficulty with social integration
  - Poor nonverbal communication
  - Failed to demonstrate empathy with peers
  - Physically clumsy
  - Overly formal speech
  - All-absorbing interest in single topic
  - Normal intelligence

Pervasive Developmental Disorders

- Autism
- Asperger syndrome
- Childhood Disintegrative Disorder
- Rett syndrome

Autism Spectrum Disorder

- 2013, better research and observations revealed key deficits (SCI, RRB)
- Specified level of severity and presence or other conditions
DSM-5 Criteria

A. Persistent deficits in SCI across multiple contexts, currently or by history:
   1. **Deficits in social-emotional reciprocity**
   2. **Deficits in nonverbal communicative behaviors used for social interaction**
   3. **Deficits in developing, maintaining, and understanding relationships**

B. RRB, currently or by history:
   1. Stereotyped or repetitive motor movements, use of objects, or speech
   2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of behavior
   3. Highly restricted, fixated interests that are abnormal in intensity or focus
   4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment

C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life)

D. Symptoms cause **clinically significant** impairment in social, occupational, or other important areas of current functioning

E. These disturbances are **not better explained** by intellectual disability or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occurs; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level

**WHAT DOES IT LOOK LIKE?**

Behaviors, interests, and communication

When are differences first noticed?
- Social demand exceeds capacity ~15-18 months
- "Spectrum" of age and severity at presentation
- 2/3 don’t gain communication skills by age 2
  - Receptive language < expressive language
  - Poor pragmatic speech
- 25-33% gain early language milestones, but then regress
  - Gradual or sudden; can be associated with other delays

Theory Of Mind
- I am a different person than others
- My thoughts are different from another’s thoughts
- Others do not know my thoughts inherently without my ability to communicate them
- My thoughts about others (and the world) might not be correct because I don’t know others’ thoughts inherently without my ability to understand their communication
Idiosyncratic Speech

“I express my thoughts and I am sure about the words I use and the context I use them in. It doesn't occur to me that there are other ways to define the words intuitively. But when people hear or read these words and phrases they mean something slightly different to them…It often feels as if I say something and suddenly people, referring in detail to what I just said, start talking about something else entirely. It can be so very frustrating.”

Quotes from adult with ASD

HOW DO WE CATCH IT?

Surveillance, screening, evaluation, diagnosis

• Onset of parent concerns to seeking help: 6 mos
• Medical attention to diagnosis: 13 mos
• Average age of diagnosis: 4 years
• Reasons?
  • Time
  • Vague complaints
  • Variability
  • Access
  • Communication / Parent understanding

How do we catch it?

• Surveillance
• Screening

Tools

• ASQ (up to age 5)
• M-CHAT-R (16-30 months)
• STAT (24-36 months)
• SRS-2 (2.5+ years)
• SCQ (4+ years)
• ADOS-2 (2+ years)
• CARS-2
• GARS-2
### Pediatrics Grand Rounds – UT Health SA

#### HOW OFTEN DO WE SEE IT?

**WHY DOES IT HAPPEN?**

**Epidemiology, prevalence, etiology, pathogenesis**

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<thead>
<tr>
<th>HOW OFTEN DO WE SEE IT?</th>
<th>WHY DOES IT HAPPEN?</th>
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<tbody>
<tr>
<td><strong>Epidemiology</strong></td>
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<tr>
<td><em>M&gt;&gt;F</em></td>
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<td>Prevalence has been increasing since 1970s, much more since 1990s</td>
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<td>Global prevalence of 1 in 132 (2010)</td>
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- Europe, Asia, and US: cumulative prevalence of 1:50 to 1:500
- 2010 Autism and Developmental Disabilities Monitoring Network
  - Estimates 1:68 for all children
  - 1:42 for boys
  - 1:189 for girls
- Recurrence in sibs of child with non-syndromic ASD
  - 3-20%

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<thead>
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<th>Unclear why the increase</th>
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<tbody>
<tr>
<td><em>Thoughts?</em></td>
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<td>Changes in diagnostic criteria</td>
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<td>Study methodology</td>
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<td>Increased public awareness</td>
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<td>Earlier detection</td>
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<td>More specialized services available</td>
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<td>True increase in disease</td>
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<tr>
<th>We Don't Know</th>
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<tr>
<td>Many clues, no smoking gun</td>
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<tr>
<td>Phenotypic variability</td>
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<td>Age of presentation</td>
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<td>Core symptoms</td>
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<td>Comorbid conditions</td>
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<td>Neuroscience and neuropsychiatric studies</td>
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<td>Probable...</td>
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<td>Multigenic factors that have epigenetic modification</td>
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<th>Genetic Clues</th>
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<td>Unequal sex distribution (4:1 M&gt;F)</td>
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<td>Identifiable genetic cause in &lt;20%</td>
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<td>Increased prevalence in siblings</td>
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<td>High concordance in monozygotic twins</td>
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<td>Increased risk with increasing relatedness</td>
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<td>3% for cousins, 7% for paternal half-siblings, 9% for maternal half-siblings, 13% for full siblings and DZ twins, 59% for MZ twins</td>
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HOW DO WE TREAT IT?
Behavior, therapy, pharmacology

**Management**
- Chronic conditions require comprehensive treatments
- Individualized according to age and specific needs
- Multidisciplinary approaches to optimize strengths and weaknesses

**Goals**
- Improve social function and play skills
- Improve communication skills (functional and spontaneous)
- Improve adaptive skills
- Decrease non-functional or negative behaviors
- Promote academic functioning and cognition

- Early intervention can strongly influence outcome
  - Behavior
  - Functional skills
  - Communication
- No cure, but symptoms can decrease over time
- Optimal Outcomes

**Educational Programs**
- High staff-to-student ratio
- Individualized programming
- Teachers with expertise
- Time in services (hours/week)
- Ongoing program evaluation and adjustment
- Predictability, structure
- Functional behavior analysis
  - Behavior intervention plan
  - Transition planning

- Treatment settings:
  - Home
  - Center
  - School
  - Clinic
- Interventions:
  - Educational
  - Specific skill practice
  - Behavioral
  - Pharmacology
  - Complementary/alternative therapies
Social Skills
- Different goals
  - Joint attention
  - Modeling (real-life and video-based)
  - Peer training (peer networks, peer initiation training, and peer-mediated social interventions)
  - Story-based intervention (including Social Stories™)
- Improve frequency of engaged imitation (imitation paired with eye contact) in toddlers with ASD from 17% to 42%
- Generalized to unfamiliar contexts and maintained for six months after cessation

Intense Behavioral Intervention
- Targets core symptoms (SCI, RRB)
- Principles of behavior modification
- Applied Behavior Analysis – natural setting, reinforces desirable/undesirable behaviors, teaches new skills, generalizes learned skills
- Repeated reward-based trials
- Low student-to-therapist ratio, variety of settings

ABA Therapy
- Not a cure
  - Most benefit in first 12 months
  - How many hours?? 6-8, or 30-40 hrs/wk?
  - Target specific behaviors
  - Involves parents
  - Older kids

Older Kids
- Not much research about educational programs
- Empirical support for behavioral services
- Focus on social competence, emotional and behavioral regulation, educational success, and functional skills
- Transition planning
  - IEP transition to adult-oriented activities
  - Child, parents, teachers, medical home, community agencies
  - Medicaid, SSI, adult services, guardianship, extended schooling, vocational/life skills training

Psychopharmacology
- Targeted symptoms
  - Hyperactivity, inattention, impulsivity
  - Aggression, outbursts, self-injury
  - Anxiety
  - Obsessive compulsive behaviors, rigidity, repetitive behaviors
  - Depressive symptoms
  - Sleep dysfunction

Complimentary and Alternative Medicine
- Herbs, supplements, natural products, nutriceuticals, probiotics, etc
- Diet changes (e.g. GFCF)
- Energy medicine
- Mind-body medicine
- Questionable stuff?
Role of the PCM
- Medical home
- Routine health maintenance
- Preventive care
- Care coordination
- Support, guidance, advocacy

Office Visits
- Can be challenging
- Not OK to not interact with child
- Have “practice” visit
- Social stories
- Allow child to play with instruments
- Keep instructions simple
- Use visual cues
- Have familiar staff/family available
- Minimize portions of exam that might be overwhelming or overstimulating***

ARE THERE OTHER THINGS TO LOOK FOR?
Further medical/psychological evaluation

Differential Diagnosis
- Global developmental delay/intellectual disability
- Social communication disorder
- Language-based learning disability
- Hearing impairment
- Anxiety disorder
- Obsessive-compulsive disorder

Comorbid Conditions
- Global Developmental Delay/Intellectual Disability
- Specific Learning Disability
- Language Impairment
- Gross and Fine Motor Delays
- ADHD
- OCD
- Anxiety/Mood Disorders
- Seizures
- Schizophrenia

Intellectual Disability
- Rote, mechanical, visuospatial, or perceptual processes
  >> conceptual processes, reasoning, interpretation, integration, or abstraction
- Rates of ID between 45-60%
- <25% of cases of ASD are associated with medical condition or known syndrome
  - More common with comorbid GDD/ID
Fragile X Syndrome

- FMR1 at Xq27.3, CGG repeat
- Most common inherited form of ID
- Macrocephaly, GDD, ADHD, or specific learning disability
- Dysmorphic features
- 30-50% of patients with FRX have features of ASD
- With current genetic testing, FRX is rarely found in patients with ASD

Tuberous Sclerosis Complex

- TSC1 (at 9q34) or TSC2 (at 16p13.3)
- Behavioral and psychosocial difficulties
- >50% with cognitive and learning disabilities
- 17-60% of TSC also have ASD
- Only 0.4 to 4% of patients with ASD also have TSC
- If both, frequently have epilepsy

Recommended Studies

- Microarray? Probably
- Fragile X PCR? Probably (for now)
- Specific tests for dysmorphic features, micro/macroecephaly, cognitive impairment, or suspicious medical/family history
  - MECP2
  - PTEN
- Routine MRI? No
- Routine EEG? No
- Yeast metabolites, gut permeability, heavy metals, trace elements, micronutrients, immune abnormalities? No
- CBC, lead, iron, thyroid, Vit D? Maybe

Future Outcomes

- Difficult to predict, especially for young kids
  - Some retain diagnosis with improvement in sx; optimal outcomes

  - Factors with less favorable outcomes:
    - Lack of joint attention by 4 years
    - Lack of functional speech by 5 years
    - IQ <70
    - Late identification
    - Seizures or other comorbid medical neurodevelopmental conditions
    - Severe ASD symptoms
• Common social isolation
  - 55% had not gotten together with friends in past year
  - 64% had not received phone calls from friends in past year

• Decreased education/employment
  - 9% had attended vocational/technical education program
  - 35% attended college
  - 55% had paid employment during first 6 months after high school

• Living
  - 12-50% achieved high level of independence
  - Decreased rates of marriage or reciprocal relationships

• Generally…
  - Modifying behaviors does not increase prosocial activity and inclusion in community
  - Encouraging social engagement does improve prosocial behavior

What About…?
• Residence?
• Transportation?
• Employment?
• Relationships?
• Adult health issues?
• Adult health care providers?

QUESTIONS?