

# Autism- A Guide to Diagnosis and Treatment

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## Goals and Objectives

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- Understand the current prevalence of Autism in the US and California
- Understand the diagnostic criteria for Autism
- Familiarize yourself with the genetics of Autism
- Identify children at risk for Autism in your practice
- Understand how to refer children with Autism for appropriate services

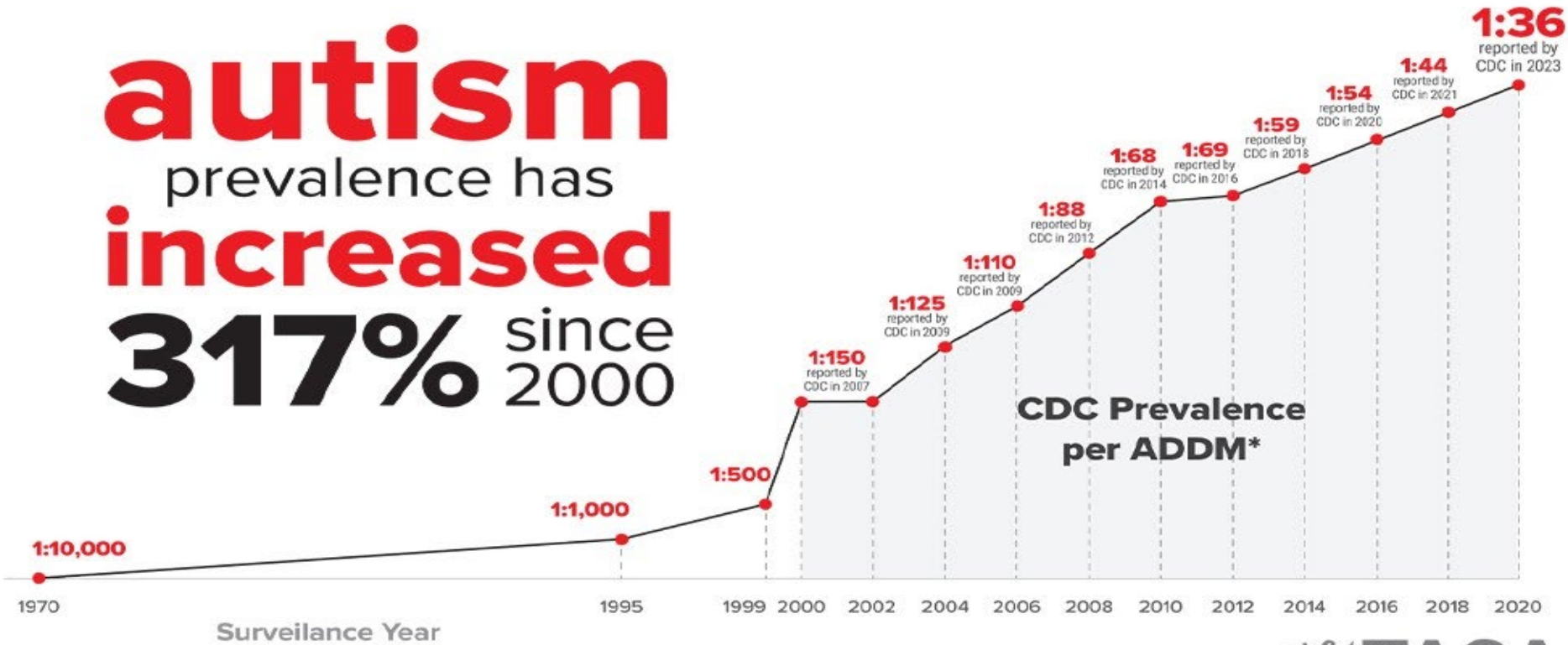


# Autism in the News



# Autism Epidemic

**autism**  
prevalence has  
**increased**  
**317%** since  
2000



\*ADDM (Autism and Development Disabilities Monitoring Network)



# More prevalent in boys but access to care affects diagnosis

## Which children were more likely to be identified with ASD?

Boys were 4.5 times more likely to be identified with ASD than girls.



White children were more likely to be identified with ASD than black or Hispanic children. Black children were more likely to be identified with ASD than Hispanic children.

**1.2x**  
MORE LIKELY among white vs black children

**1.5x**  
MORE LIKELY among white vs Hispanic children

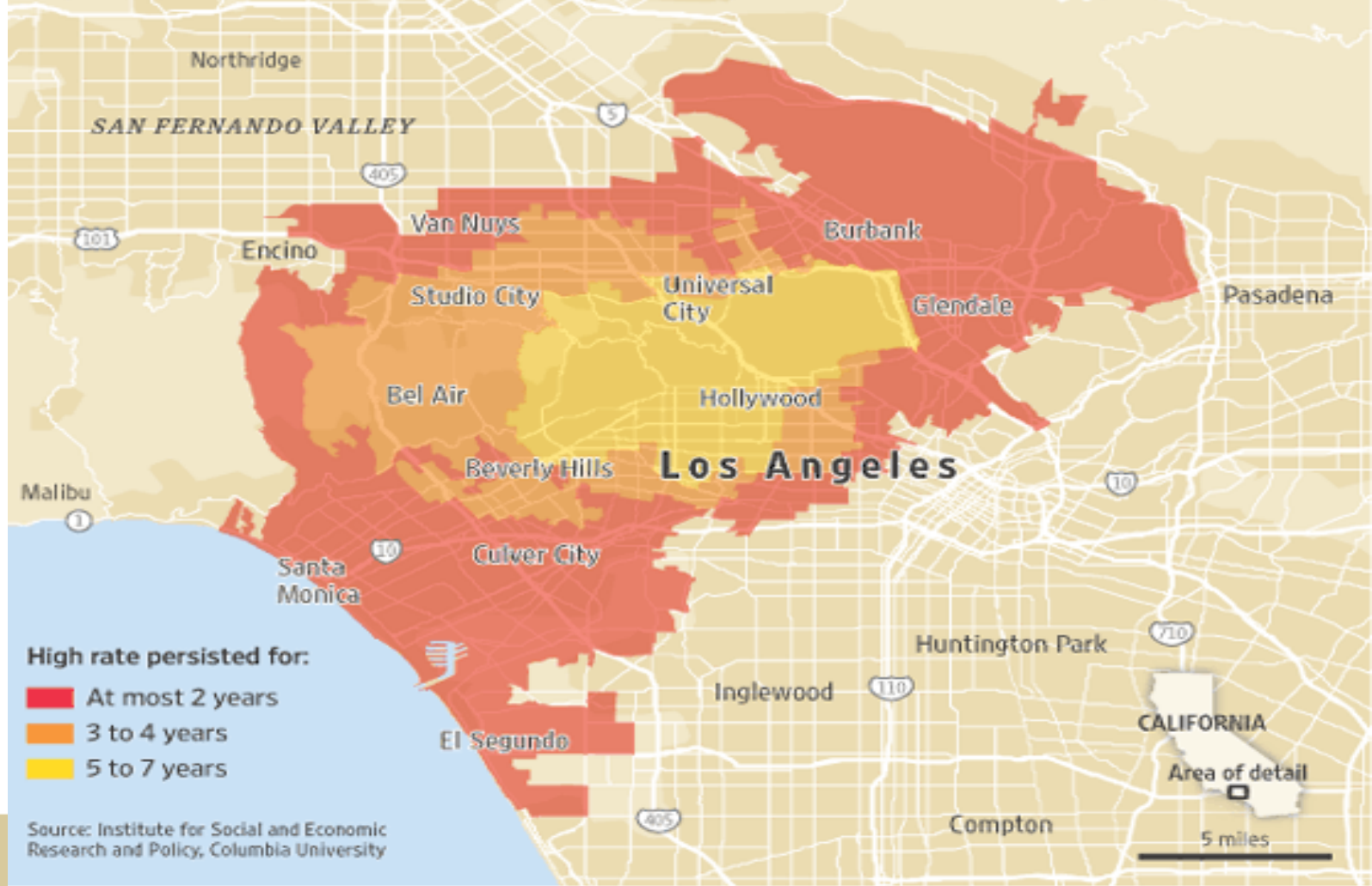
**1.3x**  
MORE LIKELY among black vs Hispanic children

Centers for Disease Control and Prevention • Community Report on Autism • 2016

# Autism in Los Angeles

## Mapping a Disorder

Analyzing birth records, Columbia University researchers identified an area around Los Angeles where children were four times as likely to be diagnosed with autism as those born elsewhere in California. In the map below, the pattern persisted for varying numbers of years in the 1993 to 2001 study.



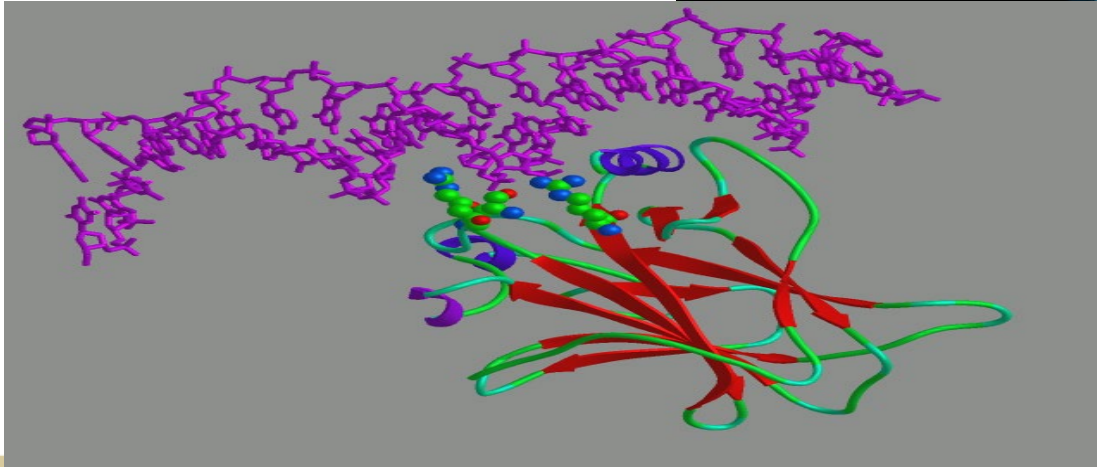
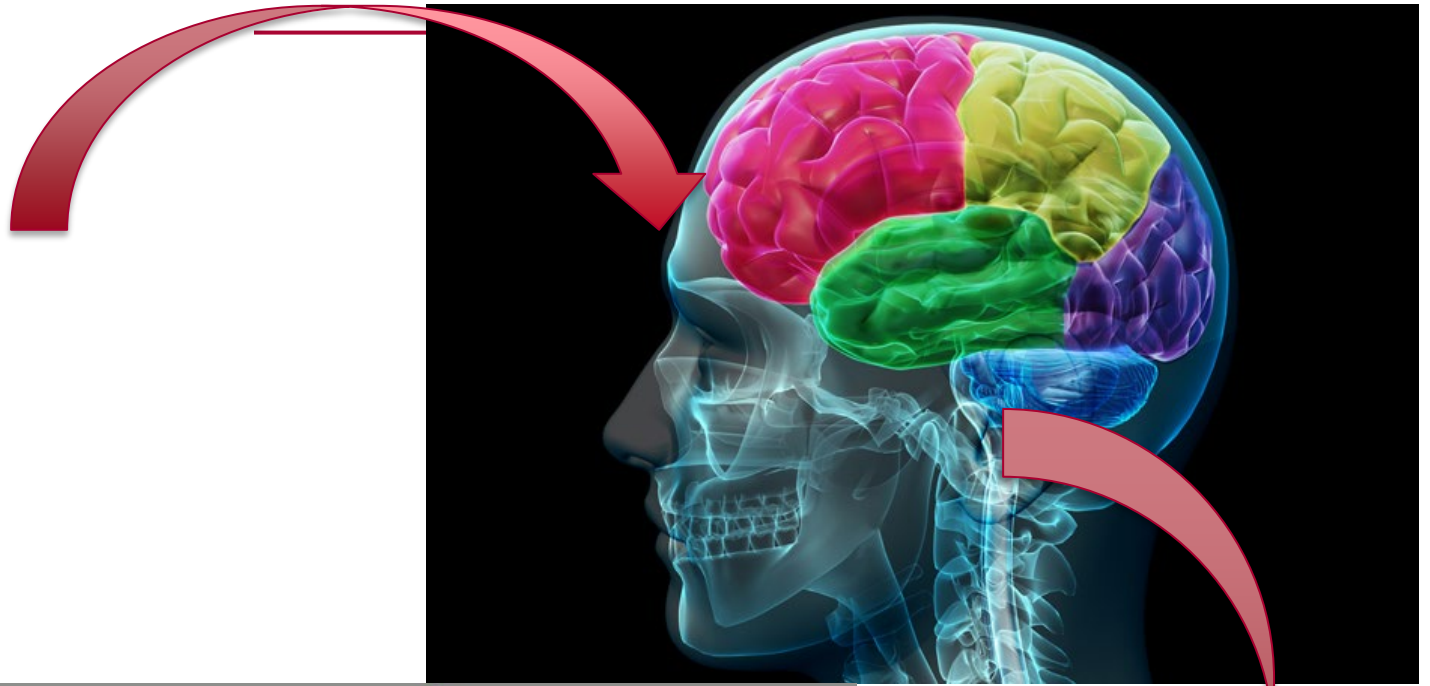
## Vaccines and Autism

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- Andrew Wakefield - original MMR study in Lancet – retracted - medical license revoked
- No epidemiologic evidence of vaccines causing Autism – includes Denmark study (Fombonne et al, 2006, Honda et al, 2005)
- Thimerisol was removed from Canadian vaccines in 1992 (except Hep B vaccine), and from US vaccines in 1999 with no decrease in Autism
- Clinical presentation of mercury toxicity and Autism differ greatly
- Japanese group shows no decrease in Autism when they stopped vaccinating



# What is Autism?



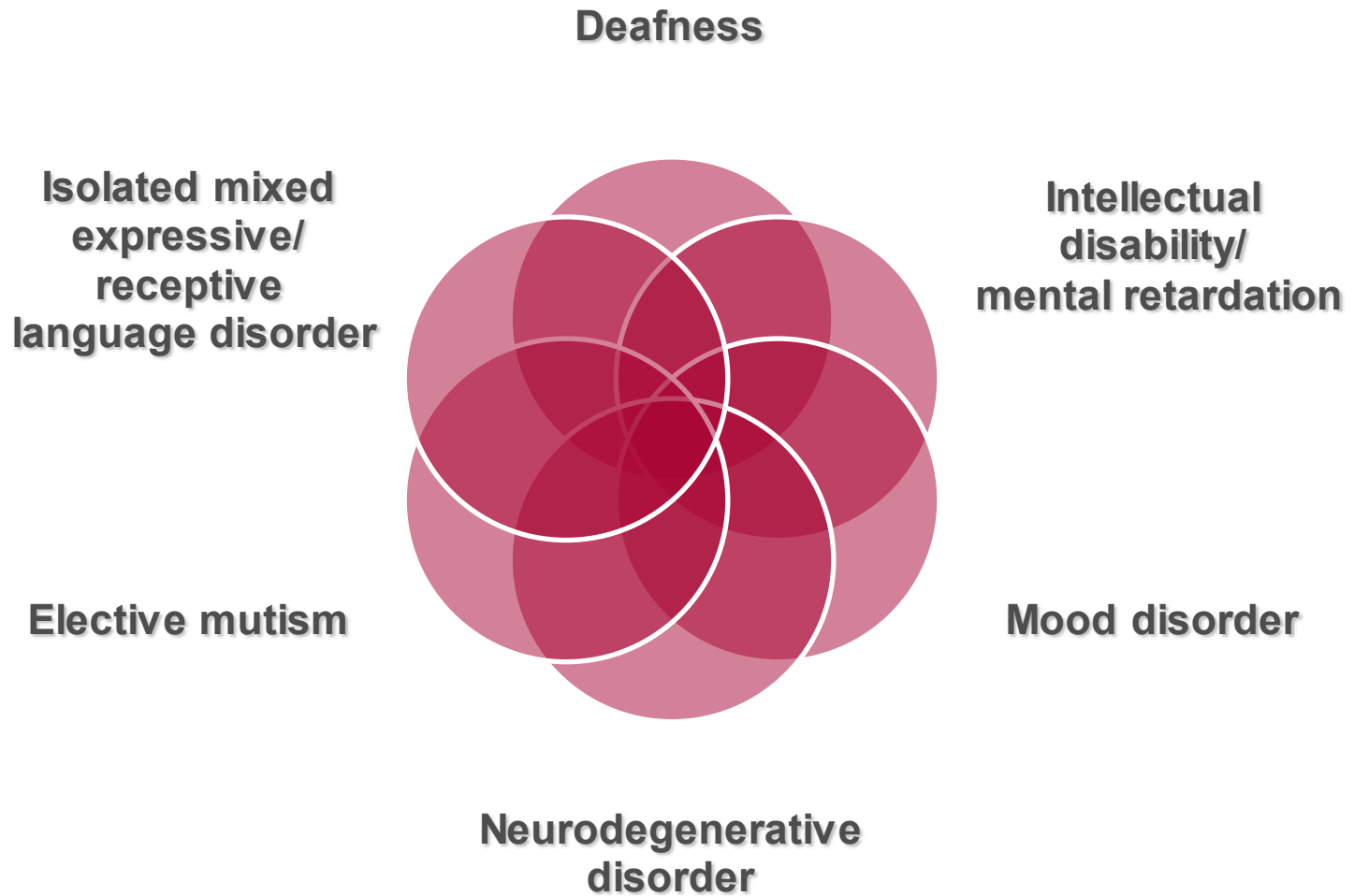
Delays or abnormal functioning  
in at least one of the following  
areas, with onset  
prior to age 3 years:

- (A) social interaction
- (B) language as used in  
social communication
- (C) symbolic or imaginative play



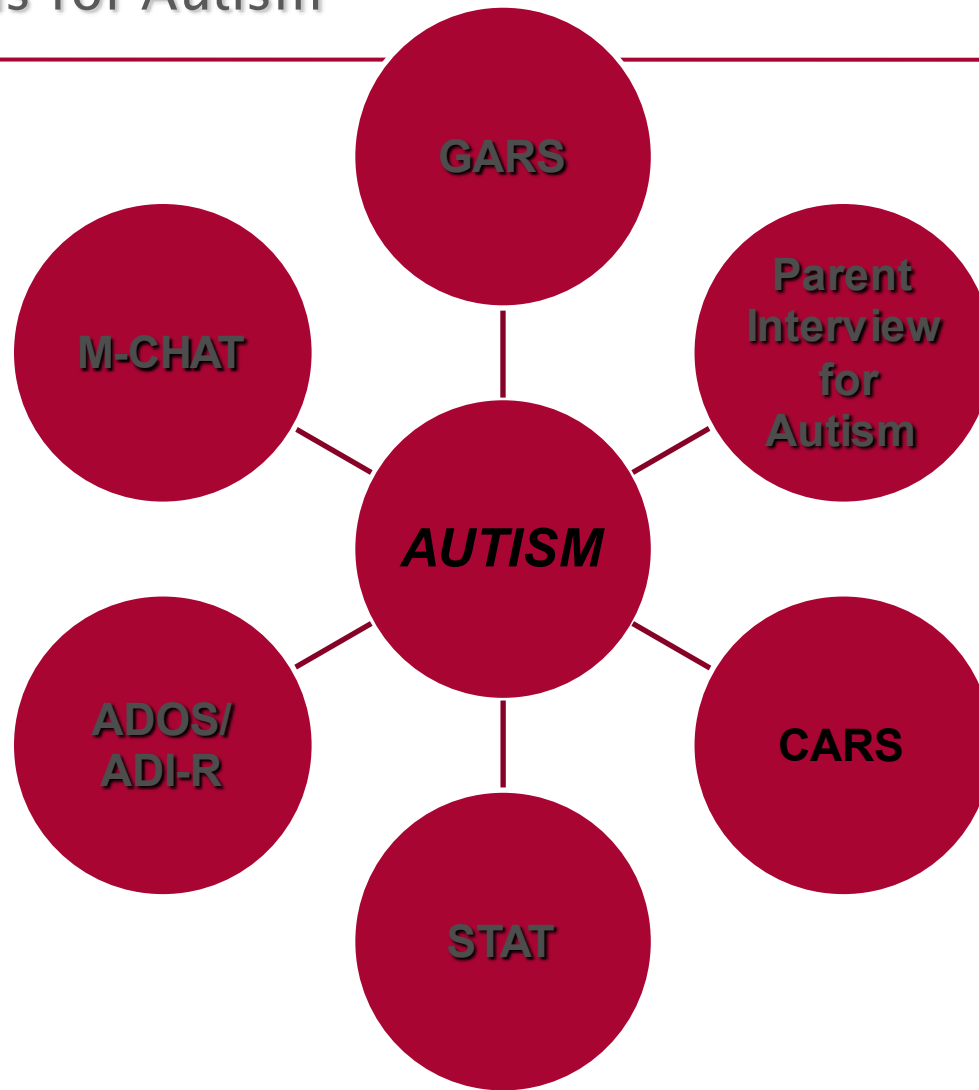
# DDX of Autism

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# Screening Tools for Autism

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# Autism – the clinical picture – DSM IV

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- (I) A total of six (or more) items from (A), (B), and (C), with at least two from (A), and one each from (B) and (C)
  - (A) qualitative impairment in social interaction, as manifested by at least two of the following:
    1. marked impairments in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body posture, and gestures to regulate social interaction
    2. failure to develop peer relationships appropriate to developmental level
    3. a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)
    4. lack of social or emotional reciprocity ( note: in the description, it gives the following as examples: not actively participating in simple social play or games, preferring solitary activities, or involving others in activities only as tools or "mechanical" aids )
- (B) qualitative impairments in communication as manifested by at least one of the following:
  1. delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
  2. in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
  3. stereotyped and repetitive use of language or idiosyncratic language
  4. lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
- (C) restricted repetitive and stereotyped patterns of behavior, interests and activities, manifested by at least two of the following:
  1. encompassing preoccupation with one or more stereotyped and restricted patterns interest that is abnormal either in intensity or focus
  2. apparently inflexible adherence to specific, nonfunctional routines or rituals
  3. stereotyped and repetitive motor mannerisms (e.g hand or finger flapping or twist complex whole-body movements)
  4. persistent preoccupation with parts of objects



# Autism DSM IV

## • A. **Social Interaction**

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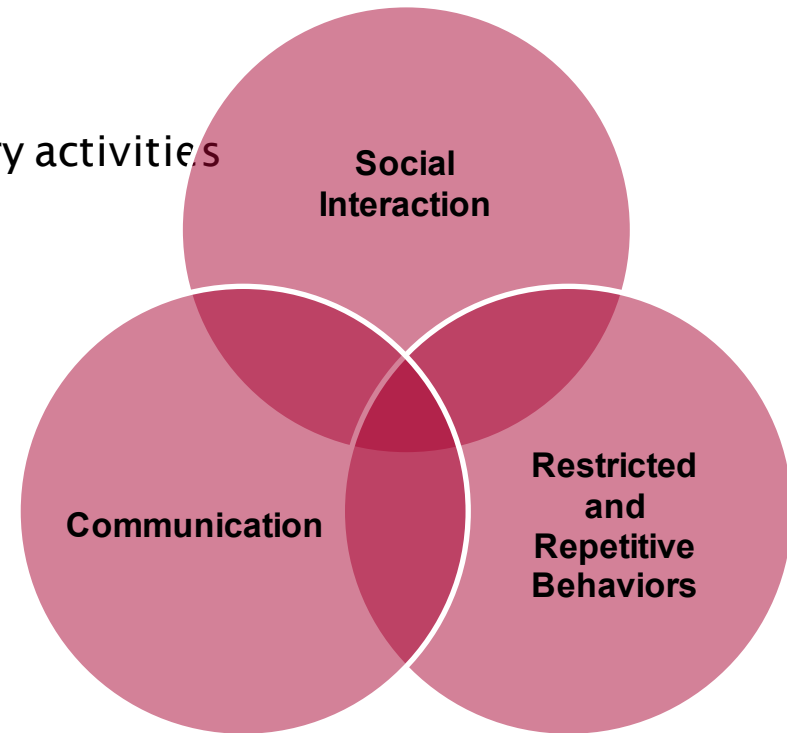
- Impaired non-verbal behaviors: eye gaze, facial expression, gestures
- Peer relationships
- Sharing interest and enjoyment
- Social or emotional reciprocity (preferring solitary activities or using others only as “mechanical” aids)

## • B. **Communication**

- Language
- Conversation
- Echolalia
- Play

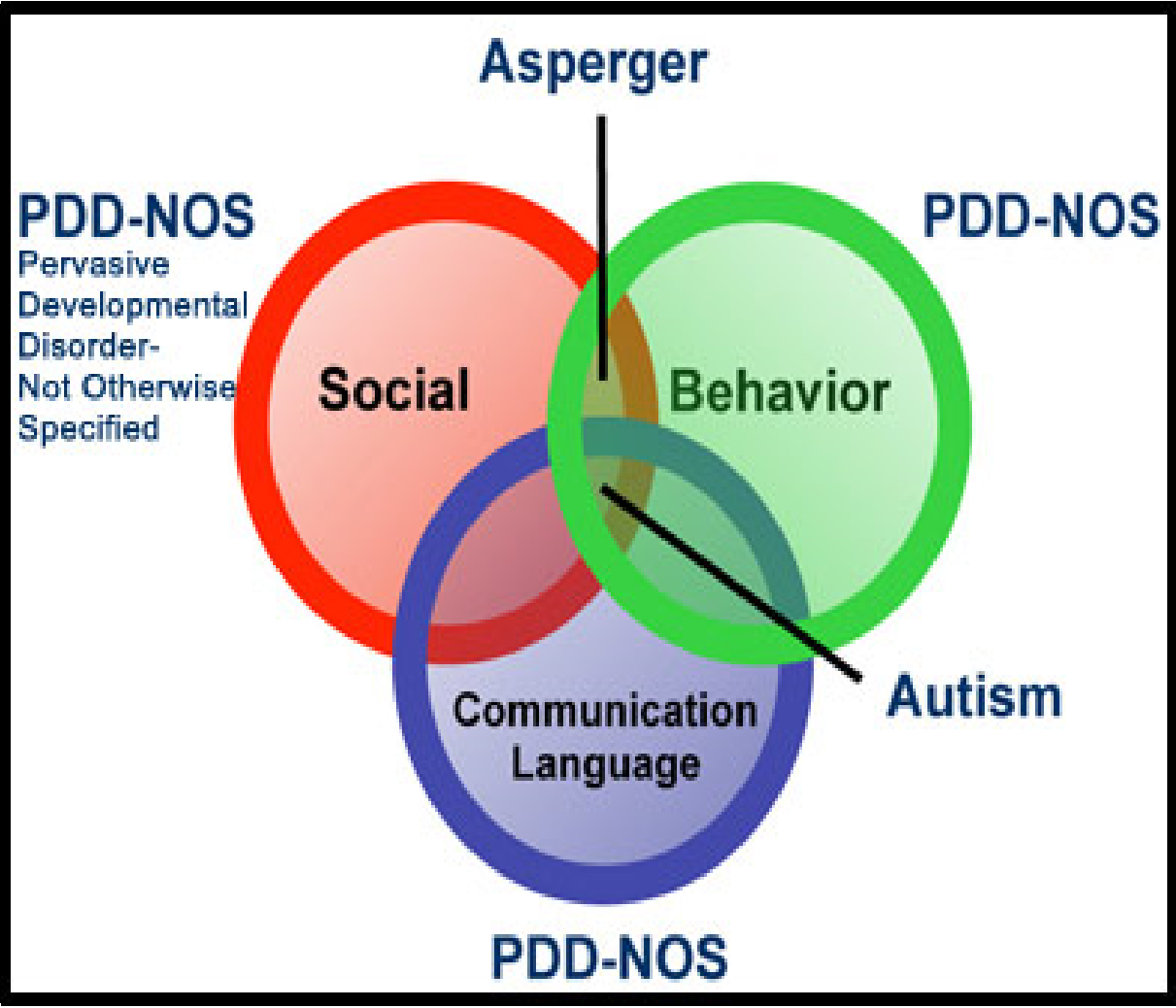
## • C. **Restricted and Repetitive Behaviors**

- Restricted interests/ preoccupations
- Routines/ rituals
- Parts of the whole
- Repetitive behaviors



# DSM V Autism and the DSM IV “Autism Spectrum”

- Released May 13, 2013
- Eliminates the Aspergers diagnosis
- NIMH announced May 3, 2013 that it will drop the DSM 5 (Thomas Insel – NIMH Director – “lack of validity”)



# Autism DSM 5 criteria

## ~~Diagnostic Criteria for 299.00 Autism Spectrum Disorder~~

Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):

- Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
- Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
- Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

*Specify* current severity:

**Severity is based on social communication impairments and restricted, repetitive patterns of behavior.**

Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):

- Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
- Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
- Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
- Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

## Autism DSM 5 continued

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- *Specify* current severity:
- **Severity is based on social communication impairments and restricted, repetitive patterns of behavior.**
- 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).
- Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.
- **Note:** Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.
- *Specify* if:
- **With or without accompanying intellectual impairment with or without accompanying language impairment**
- **Associated with a known medical or genetic condition or environmental factor**
- **(Coding note:** Use additional code to identify the associated medical or genetic condition.)

# Autism Symptoms

*Deficits in language, communication, and ritualistic/repetitive behaviors*

**ANXIETY**

**SLEEP**

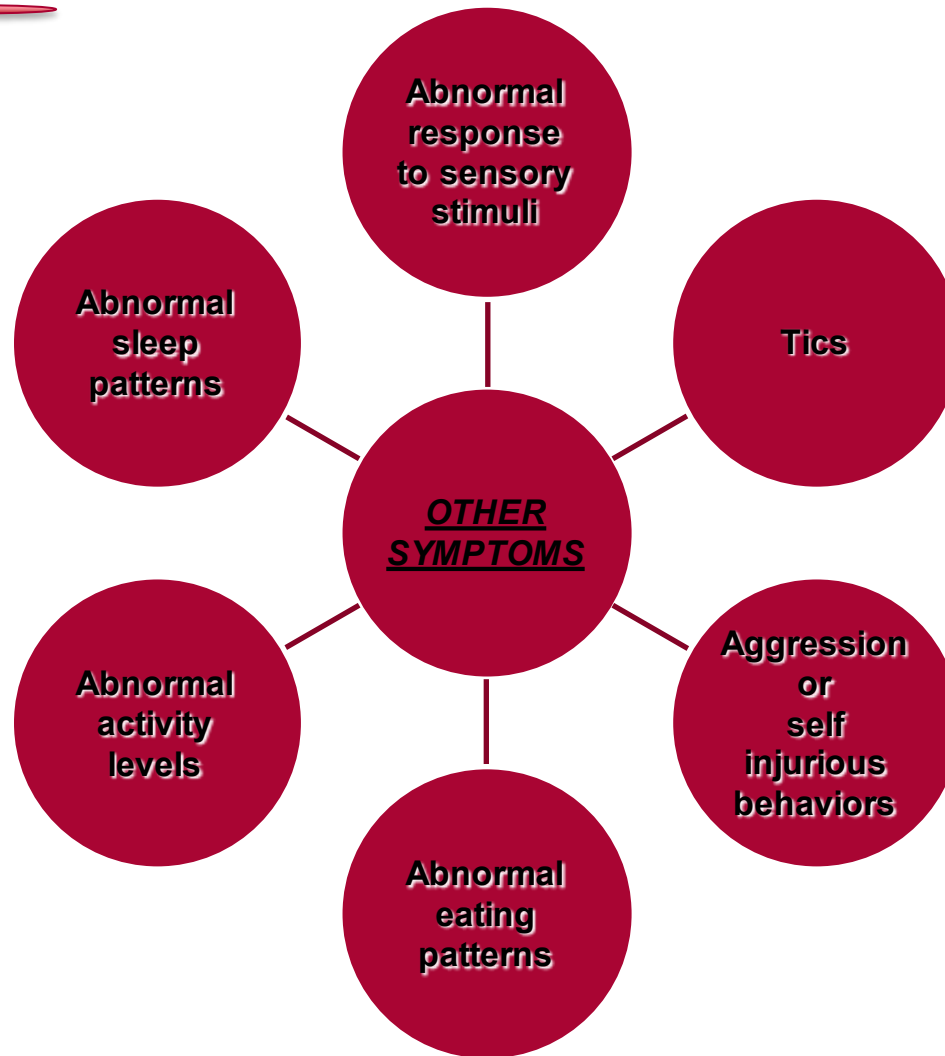
**BEHAVIOR**

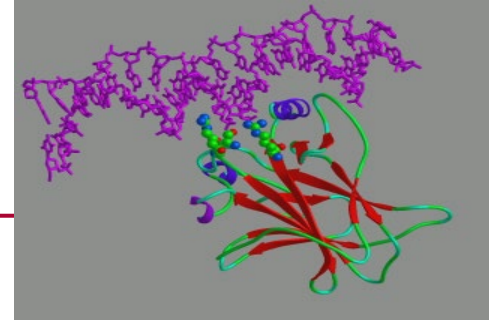
**ATTENTION**



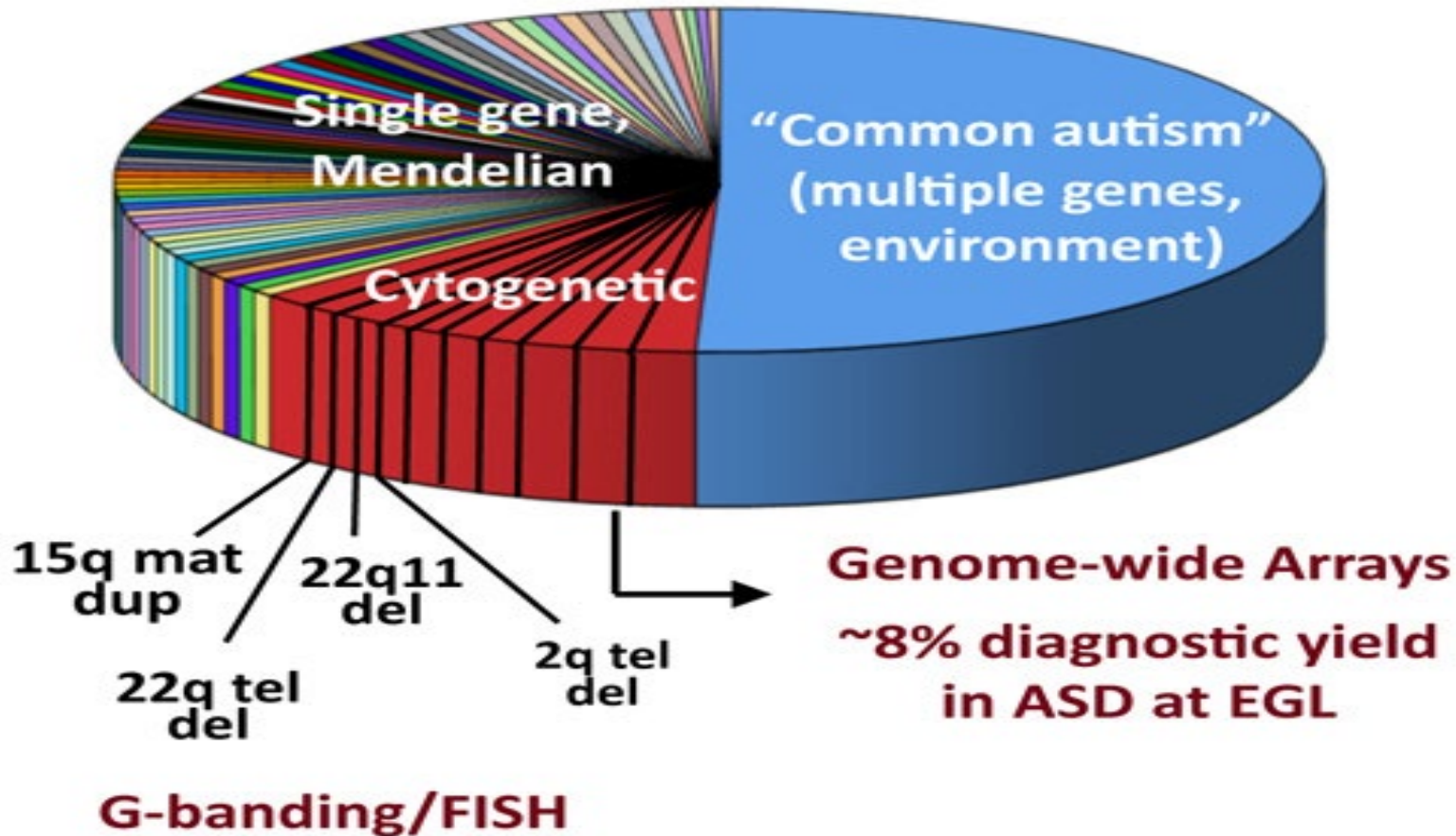
# Symptoms common in Autism but not part of the diagnostic criteria

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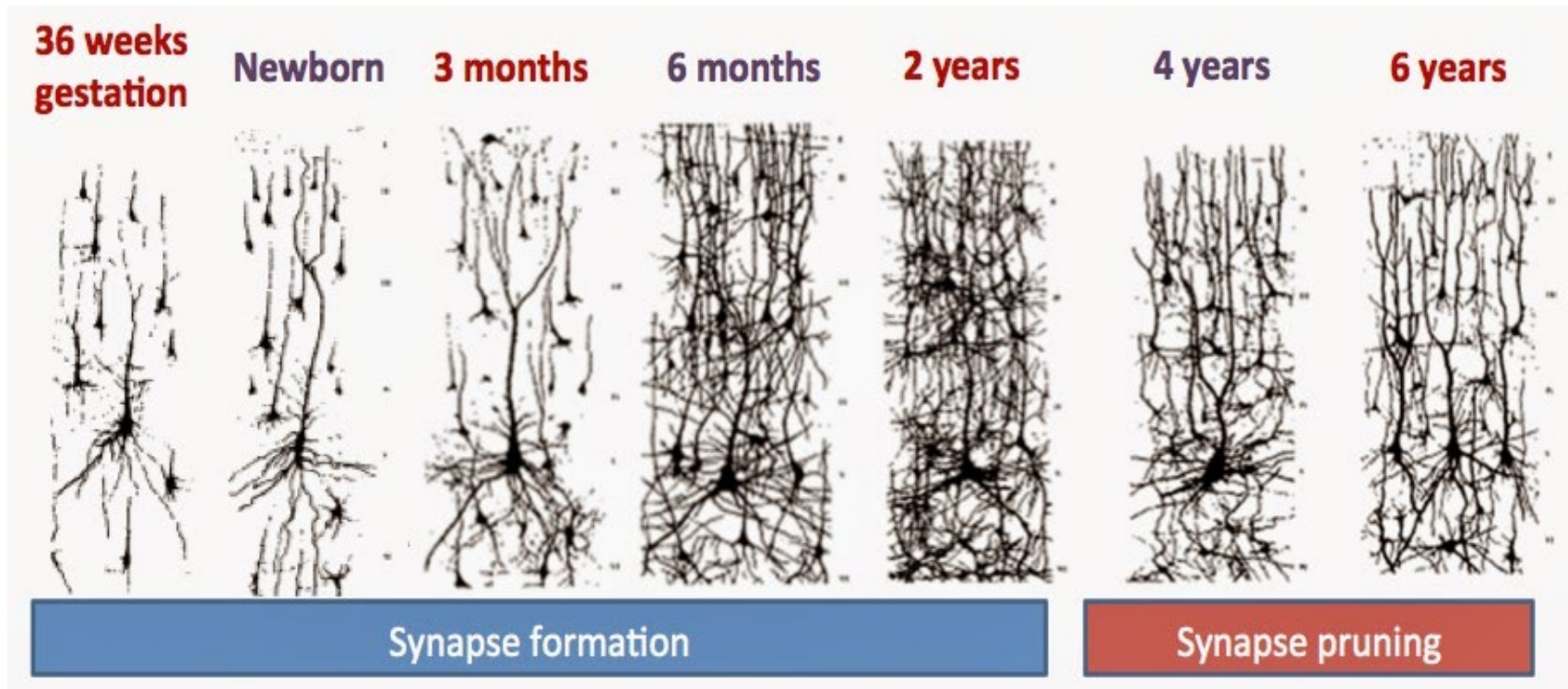




## Causes of Autism



# Synaptogenesis and synaptic pruning by age



Harvard – Center for the Developing Child

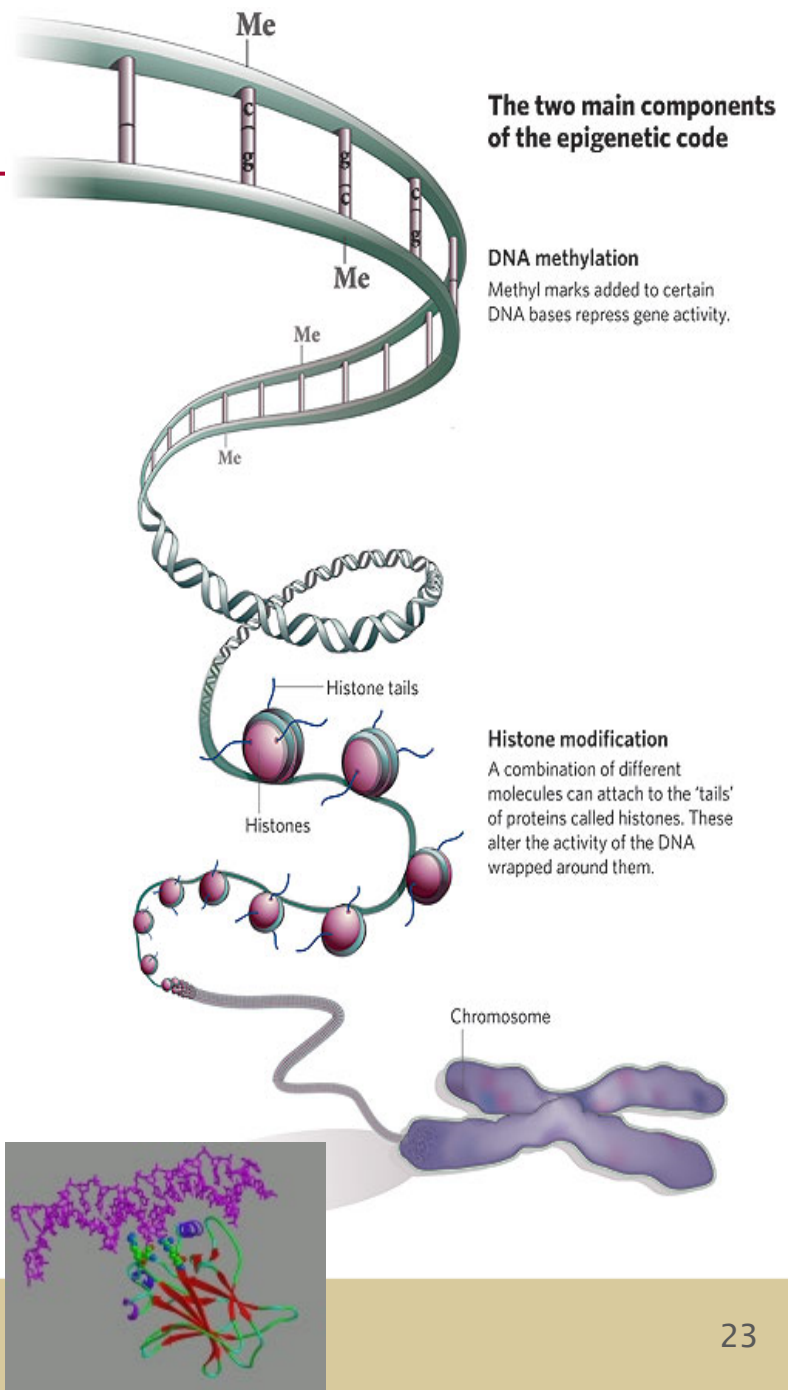
## Studies from 2017 your patients may ask about

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- **In autism, too many brain connections may be at root of condition - Learning, social issues may reflect neuronal miscommunication**
  - Nature Communications, Nov 2 2017
- **Folic acid may reduce autism risk, and may mitigate the increased risk from pesticide exposure** - UC Davis study using data from Childhood Autism Risks from Genetics and the Environment (CHARGE) study- Combined Prenatal Pesticide Exposure and Folic Acid Intake in Relation to Autism Spectrum Disorder - Schmidt, RJ et al - Environmental Health Perspectives - March 2017
- **Vitamin D in pregnancy may reduce autism risk - Vitamin D and autism, what's new?** - Rev Endocr Metab Disord. 2017 Jun

# Epigenetics in Autism

- Epigenetic factors:
  - DNA Methylation - influenced by folic acid
  - Histone modification
    - acetylation/ deacetylation
    - open chromatin – active transcription
    - closed chromatin – transcriptional silence
    - MeCP2 binding proteins
  - RNA Interference - binding of transcription factors



# What YOU can do in your practice:

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- **Why screen?**

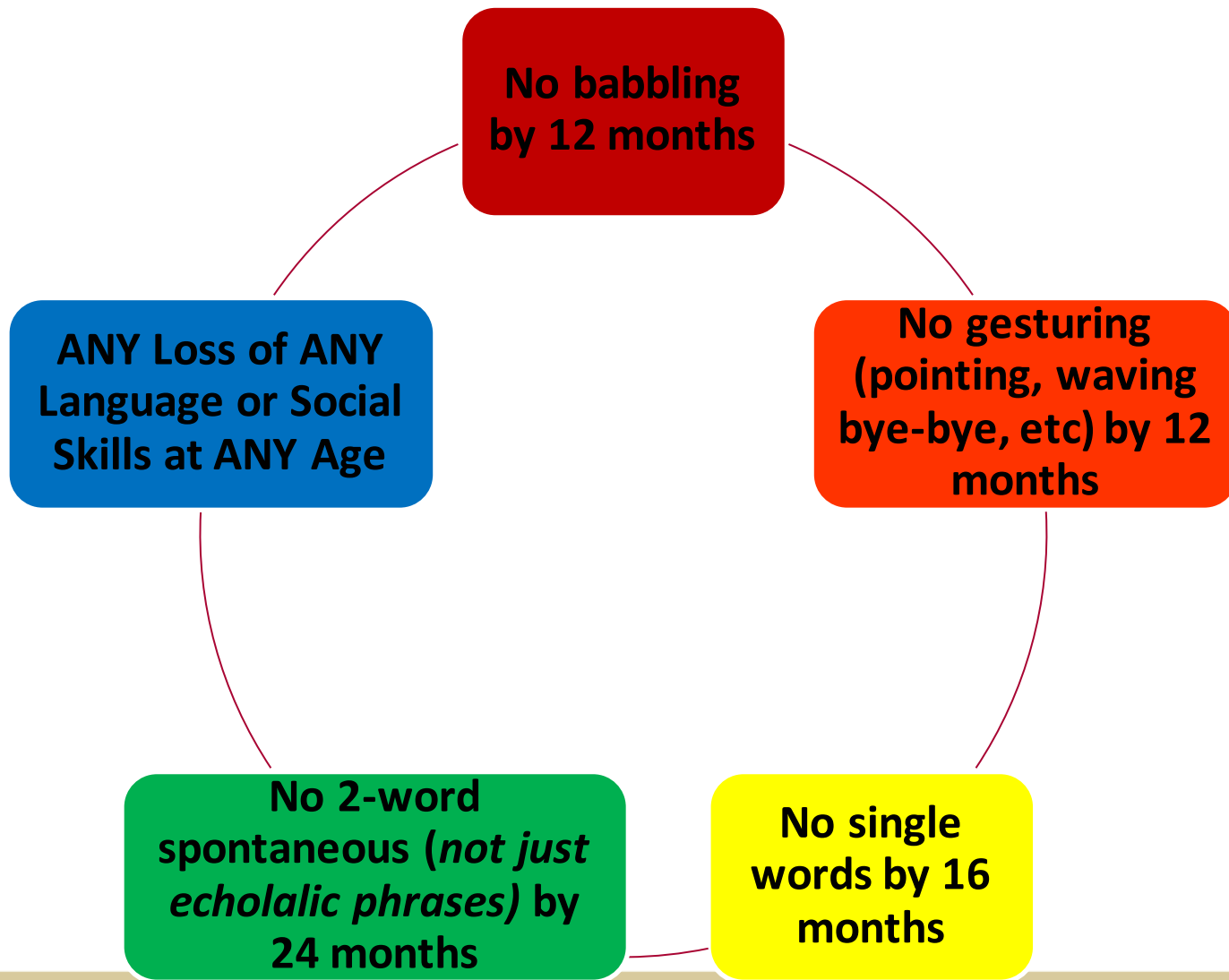
- Early detection and intervention leads to better outcomes for children with ASD (statement by a multidisciplinary consensus panel supported by the American Academy of Neurology and the Child Neurology Society and endorsed by the American Academy of Pediatrics)

- **How to screen?**

- MCHAT (Modified Checklist for Autism in Toddlers) – Level I screening (low risk) – at 16—30 mos (usually at 18 & 24 month visits per AAP)
- Very high sensitivity
- Uses parent report rather than brief observation
- 23 items
- fail 3/23 – at risk for autism – identifies 98.9% of screen positive cases for dev delay– March 2013 in J Pediatrics
- 6 critical items (fails 2/6 – at risk for autism)
  - Protodeclarative pointing, response to name, interest in peers, bringing things to show parents, following a point, imitation
- fail 7/23 – need immediate referral for evaluation and intervention
- bill using 96110
- **Level 2 eval indicated for children who fail MCHAT or younger siblings (at risk)**

# Absolute indications for immediate further evaluation – 12 mos

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## Early detection – is it possible by 6 mos of age?

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- Filipek et al, presented at Child Neurology Society Oct 2012
- J Child Psychol Psychiatry. 2010 Mar;51(3):250-8. doi: 10.1111/j.1469-7610.2009.02150.x. Epub 2009 Oct 19.
- **Advancing early detection of autism spectrum disorder by applying an integrated two-stage screening approach.**
- By 6 mos, children who will develop autism show differences in the following skills:
  - Smiles spontaneously
  - Smiles when playing alone
  - Imitates facial expressions
  - Stops crying when spoken to
  - Discriminates between threatening/ friendly voices
  - Vocalizes feelings through intonation
  - Takes turns vocalizing
  - Babbles
  - Stops babbling when another person vocalizes
  - Initiates “talking”
  - Demonstrates sound play
  - Whines with manipulative purpose

## Level II Evaluation – Child Neurologist/ Neurodevelopmentalist

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- Expanded Neurological evaluation and hx to look for possible cause of acquired brain injury
- Hx: pregnancy, delivery, perinatal history
- Developmental history including milestones, any h/o regression or periods of encephalopathy
- Behavioral Hx: attention deficit disorder, depression or mania, troublesome behaviors such as irritability, self-injury, sleep and eating disturbances, and pica for possible lead exposure.
- Family Hx: autism, mental retardation, fragile X syndrome, and tuberous sclerosis complex
- Neurological examination – track head circumference, look for unusual features suggesting the need for genetic evaluation, neurocutaneous abnormalities, gait, tone, reflexes, cranial nerves, and mental status including verbal and nonverbal language and play.
- Speech–language–communication evaluation
- Eval for comorbid conditions such as sleep probs, seizures, anxiety, attention issues – and treat these
- Enrollment in research trial

# Autism Treatment

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**Medical workup  
or research studies**

**Developmental follow-  
ups and management of  
co-morbid conditions; ie-  
seizures, GI issues,  
nutritional support, etc**

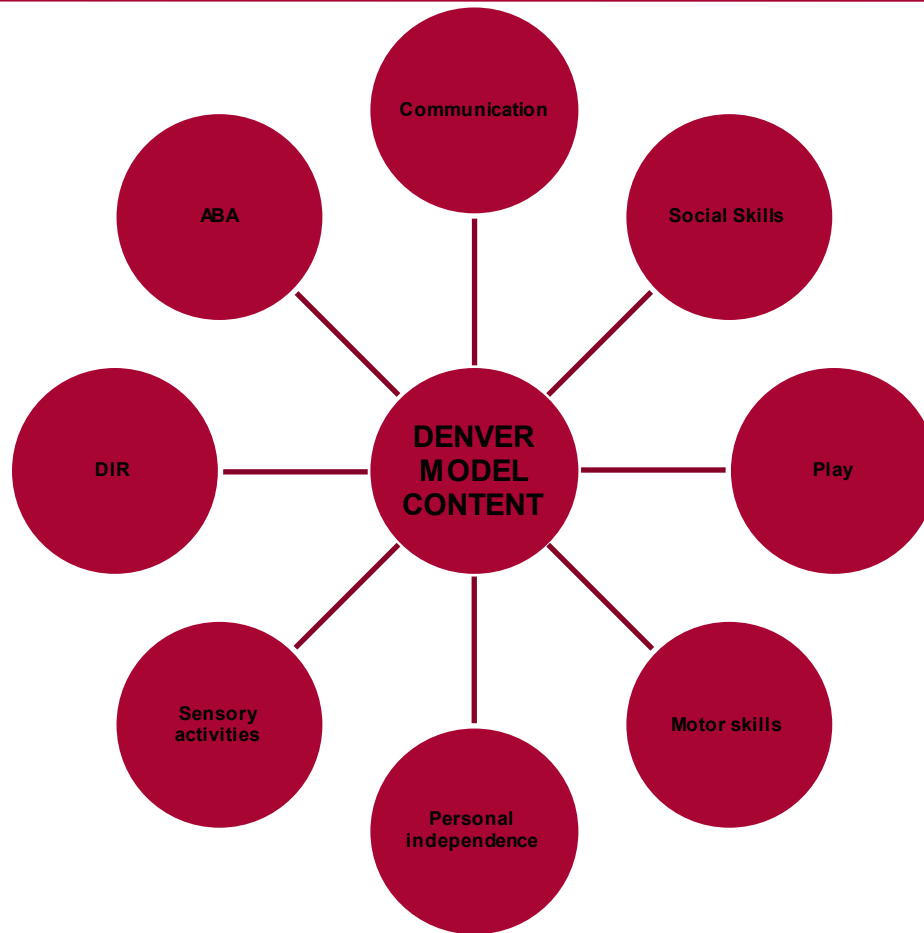
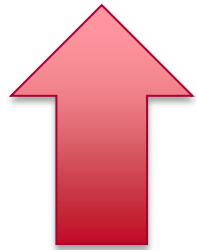
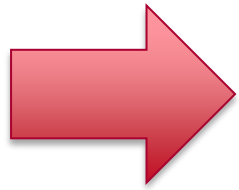
**Private therapies –  
ST, OT, PT, ABA, DIR,  
and/or other behavioral therapies**

**School-based programs**

**Teaching within family routines via  
day-to-day interactions at home**

# Early Start Denver Model for Children with Autism

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# Autism Treatment

*Deficits in language, communication, and ritualistic/ repetitive behaviors – **INTENSIVE THERAPY – EARLY INTERVENTION = BEST OUTCOMES***

Anxiety - **SSRIs**

Sleep - **MELATONIN**

Behavior – **ALPHA-2 AGONISTS, ANTIPSYCHOTICS; if COMORBID EPILEPSY chose med with mood stabilizing properties**

Attention - **STIMULANTS**



# Autism Prognosis

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- Milder form can be “outgrown”
  - “Quirky” kids
  - Encourage these kids to focus on their interests and find similar friends with similar interests – many of them may end up as our future engineers, scientists, etc
- More severe forms may improve, though many stay dependent for life (up to 70%)
- Better outcomes with earlier intervention
- Language is a strong predictor of outcomes –
  - No language by 3 is unfavorable
  - No language by 6 = extremely unlikely the child will ever develop language

Thank you – Questions?

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