Autism Screening App

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Autism spectrum disorders (ASD)
A range of complex neurodevelopmental disorders
Disorders are characterized by social impairments, communication difficulties, and restricted, repetitive, and stereotyped patterns of behavior

- **Always**
- **Unique**
- **Totally**
- **Interesting**
- **Sometimes**
- **Mysterious**
About 1 percent of the world population has autism spectrum disorder. (CDC, 2014)

Prevalence in the United States is estimated at 1 in 68 births. (CDC, 2014)

Total Population 3.5 million Americans

Autism services cost U.S. citizens $236-262 billion annually.

Occurs four to five times more often in boys than girls

Cost of lifelong care can be reduced by 2/3 with early diagnosis and intervention.
Autism Prevalence & Annual Cost

Along with the rise in prevalence comes the increase in costs to society

2000 - ONE in 250
2002 - ONE in 150
2004 - ONE in 125
2006 - ONE in 110
2008 - ONE in 88
2010 - ONE in 68

Projected cost to society by 2025 to reach $1 trillion annually

$269 billion annual cost
$137 billion annual cost
$35 billion annual cost

## Autism Spectrum Disorder

<table>
<thead>
<tr>
<th>Autistic Disorder</th>
<th>PDD-NOS</th>
<th>Asperger’s Disorder</th>
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<td>Impaired social interaction and Impaired communication and Restricted repetitive and stereotyped patterns or behaviors, interests and activities.</td>
<td>Impaired social interaction or Impaired communication or Restricted repetitive and stereotyped patterns or behaviors, interests and activities.</td>
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Autism Characteristics

1. Social Development
   a) Unusual social development becomes apparent early in childhood
   b) Show less attention to social stimuli, smile or no eye contact,

2. Communication
   a) do not develop enough natural speech
   b) wont make requests or share experiences
   c) may have difficulty with imaginative play

3. Repetitive Behavior
   a) compulsive behavior patterns like flapping of hands, spinning, licking etc.
   b) fix or rearrange things
   c) Unexpected movements (running away on the road)
M-Chat (Modified checklist for Autism in toddlers) 2009 Diana Robins, Deborah Fein, & Marianne Barton

- Designed by Diana Robins, Deborah Fein, & Marianne Barton
- List of informative questions related to diagnosis
- Indicate if further investigation is required
- Note:
  - Sometimes doctors even dismiss these early onset signs as they are unaware of such conditions leading to delayed diagnosis.
Questions screenshots

Question #1
If you point at something across the room, does your child look at it?
- Yes
- No

(For example, if you point at a toy or an animal, does your child look at the toy or animal?)

Question #6
Is your child interested in other children?
- Yes
- No

(For example, does your child watch other children, smile at them, or go to them?)

Question #18
Does your child understand when you tell him or her to do something?
- Yes
- No

(For example, if you don’t point, can your child understand “put the book on the chair” or “bring me the blanket?”)

Question #20
Does your child like movement activities?
- Yes
- No

(For example, being swung or bounced on your knee)
M-Chat Scoring

M-CHAT Total Score 0-2:
No Follow-Up necessary. If child is younger than 24 months, screen again at 24 months (or after 3 months has elapsed). Continue developmental surveillance.

M-CHAT Total Score 3-6:
M-CHAT/F is important to evaluate risk. If child continues to score 3 or higher, refer immediately for clinical evaluation and to determine eligibility for early intervention services. Please note, if Follow-Up score is 2 monitor carefully, since child may need referral.

M-CHAT Total Score 7-23:
Child is at risk for ASD or other developmental delays. It is acceptable to refer immediately without completing the M-CHAT Follow-Up.
Research indicates that with early intensive intervention based on the principles of applied behavior analysis, substantial numbers of children with Autism can attain intellectual, academic, communication, social, and daily living skills within the normal range.

At varying rates of effectiveness and constant dollars, this model estimate that costs savings range from $187,000 to $203,000 per child for ages 3 - 22 years old and from $656,000 to $1,082,000 per child ages 3 - 55.
Future Work

- Looking for funding since this is the beta version.
- Implement the next version (for better accuracy of the results)
References

- https://www.autismspeaks.org/what-autism
- http://www.autism-society.org
Acknowledgement

- **Center for Autism and Related Disabilities** (University at Albany, State University of New York)

- Patient Data Science, LLC

- **M-Chat (Modified checklist for Autism in toddlers)** 2009 Diana Robins, Deborah Fein, & Marianne Barton