It is recommended by the American Academy of Pediatrics and American College of Medical Genetics that all families of children with ASD be informed about and offered genetic testing. The decision to test is ultimately up to the family. We hope this information sheet will allow you to better inform families, and help them make the decision that is right for them.

Genetics of ASD

- A genetic cause can be identified in approximately 1/3 of children with ASD, but could change with advances in genetic testing.
- Many of these variations can be detected with Fragile X and chromosome microarray (CMA) testing.
  - Approximately 1-5% of children with ASD have Fragile X syndrome.
  - Approximately 7-10% of children with ASD have a chromosomal variation, such as a chromosome 16 deletion, which can either be inherited or de novo.
- Depending on the test results, the recurrence risk for further offspring ranges from 5% to 50%.
- The precision of genetic testing is changing rapidly; these figures are likely to change with new advances in genetic testing.

Why Testing is Recommended

Results of genetic testing may:

- Provide an explanation of why the child developed ASD.
- Determine the chances that family members, including future children, will develop ASD.
- Inform the medical management of the affected child as well as other at risk family members.

How to Order Genetic Tests

The preferred route for testing is to refer the family to genetic services upon diagnosis. The genetics team can provide a more thorough explanation about the role of genetic testing in children with ASD, determine the most appropriate tests based upon a child’s medical, developmental, and family history, and work with insurers to determine whether the tests are covered.

If the family is not interested in a genetics referral, it is possible to order a genetic test through your office.

The most common tests and CPT codes used for first tier ASD genetic testing are:

- Fragile X: CPT code 81243
- Chromosomal microarray analysis (CMA): CPT code 81229 (SNP Array Analysis)

Fragile X and chromosomal microarray testing do not test for all genetic conditions associated with ASDs. There are additional, rare genetic conditions associated with ASDs, which are not identified by first tier tests and can be associated with medical complications.
### Interpreting Test Results

#### Fragile X interpretation

<table>
<thead>
<tr>
<th>Results/Repeat Size</th>
<th>Meaning</th>
<th>Should I refer to Genetics?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (5-44)</td>
<td>Not affected.</td>
<td>Could be considered depending on family interest and/or history.</td>
</tr>
</tbody>
</table>
| Gray Area (45-54)   | Not affected.  
                     | Risk for premutation allele in offspring and other family members. | Should be consulted as this has implications for the family. Further genetic testing could be considered depending on family interest and/or history. |
| Premutation (55-200)| Not affected, but has significant medical implications for both adult men and women:  
                     | Women:  
                     | Risk of having offspring with Fragile X syndrome.  
                     | Risk of premature ovarian failure (20%).  
                     | Risk of having Fragile X tremor/ataxia syndrome (FXTAS), which is an adult onset neurological condition (17%).  
                     | Men:  
                     | Risk of having Fragile X tremor/ataxia syndrome (FXTAS), an adult onset neurological condition (40%). | Should be referred to for further counseling and evaluation. |
| Full Mutation (more than 200) | Affected with Fragile X syndrome. | Should be referred to for further counseling and evaluation. |

#### Chromosomal Microarray Analysis (CMA) interpretation

<table>
<thead>
<tr>
<th>Result and alternate wording</th>
<th>Meaning</th>
<th>Should I refer to Genetics?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>No genetic variations have been detected. This result does not rule out a genetic etiology for the child’s ASD.</td>
<td>May still be helpful depending on family history and if the family is interested in more detailed testing.</td>
</tr>
</tbody>
</table>
| Unclear Clinical Significance  
  - Variant of uncertain significance | A genetic variation (or variations) has been detected, but there is not enough information to determine whether this particular variation is pathogenic or a normal variation. | Could be useful to help further determine the meaning of a variant and the likelihood that it is related to the child’s ASD. Genetics will also determine appropriate follow-up and whether additional testing is indicated. |
| Abnormal                    | A genetic variation has been detected that has clinical significance. This is a diagnosis, but sometimes the diagnosis may not be related to the child’s ASD. | Should be referred to for further counseling and evaluation. |
Insurance Coverage

MassHealth Plans: First tier ASD genetic testing is usually covered by MassHealth products, such as BMC HealthNet, Neighborhood Health Plan, Tufts-Network Health, and the PCC program. However, some of these plans require prior authorization and/or a letter of medical necessity.

Private Plans (Tufts Plan, Harvard Pilgrim, BCBS, etc.): For those with private insurance plans, coverage depends on the type of plan the patient has. It is best to work with the family and insurer to determine if the requested tests are covered. It is also important to determine the family’s out of pocket liability – either as a deductible or co-pay. These features of a family’s insurance plan can have a great impact on whether and how much the family is billed for testing.

Medical necessity letter: If a plan does not typically cover genetic testing for ASD, a letter of medical necessity can be used to obtain coverage. Some plans will routinely cover testing with such a letter; other plans require individual case review.

Insurance Coverage Worksheet for Families


Always get the name of the service rep that you speak with at the insurance company and ask for a call reference number.

Date of call: __________________________________________

Name of insurance rep: ________________________________

Call reference number: ________________________________

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Billing codes (CPT)</th>
<th>Diagnosis codes (ICD-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions to ask your insurance company:

1) Is genetic testing covered under my plan? Yes / No

2) Does it matter whether the testing is diagnostic or non-diagnostic? Yes / No

3) Do I need prior authorization for genetic testing? Yes / No → If yes, what is required to get prior authorization?

4) Do I have an annual deductible? Yes / No → If yes, have I met it? Yes / No

Will any of the charges for the testing be put towards my deductible? Yes / No

5) Do I have a co-pay for genetic testing? Yes / No → If yes, how much is the co-pay? $___________

6) Do I have co-insurance? Yes / No → If yes, what % of charges will I need to pay? ______%
Genetics of ASD:

- ACMG Guidelines
- BMC Pediatric Genetic Services
- Review of the literature

Insurance Coverage:

- Neighborhood Health: Payment Guidelines
- Tufts-Network Health: Genetic Testing Guidelines

Insurance Glossary

**Prior Authorization** Some insurance plans ask that you get consent from them before having a test or procedure. If they approve the test, it is called a prior authorization. Prior authorization does not mean that your insurance will pay for the test since your insurance plan may decide later that the test was not needed (not “medically necessary”).

**Co-payment** Many insurance plans make you pay a certain amount when you have a test, called a co-payment (co-pay). Even if you don’t have a co-pay for other tests, you may have one for genetic tests.

**Deductible** An annual deductible is an amount you need to pay during the year. Insurance starts paying for office visits and tests after you have paid this amount.

**Coinsurance** Co-insurance is a part of the bill, usually 20%, which you pay while insurance pays the rest. This is based on the contracted rate (see below).

**Contracted Rate** The amount the insurance plan has agreed to pay for the test your child needs, often less than the amount the lab charges.

**ICD-9 Code** An ICD-9 code tells the insurance plan the signs or features of your child’s illness.

**CPT Code** CPT codes tell the insurance plan how the test is done. Each genetic test often has a lot of CPT codes and each CPT code may be used many times. These are what the lab uses when it bills your insurance. The insurance rep should tell you if all of the CPT codes are covered for the number of times they will be billed.

**Genetic Test** A genetic test looks for changes in genes (instructions for how our body grows and works), chromosomes (packages that hold the genes), or proteins (what the genes make).

**Letter of Medical Necessity** A letter of medical necessity is used to explain to the insurance plan what test is being ordered, why it is being ordered for your child, and how the results will be used.

**Diagnostic Testing** Testing that is done when a person has symptoms or features of a specific disease or condition.

**Non-Diagnostic Testing** Testing that is done when a person does not have symptoms or features of a specific disease or condition.

This work was supported by The National Genetics Education and Consumer Network (NGECN) (Cooperative Agreement #U22MC04100), funded by the Genetics Services Branch of the Maternal and Child Health Bureau, Health Resources and Services Administration (HRSA).