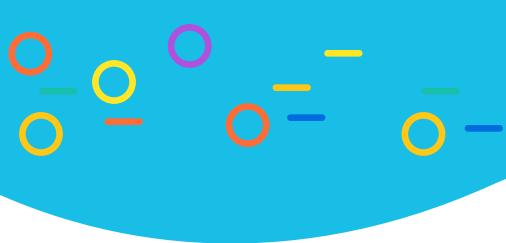




EHMT1-related syndrome





This guide is not meant to take the place of medical advice.

Please consult with your doctor about your genetic results and health care choices. The information in this guide was up to date at the time it was written in 2021. But new information may come to light with new research. You may find it helpful to share this guide with friends and family members or doctors and teachers of the person who has EHMT1-related syndrome.



What is EHMT1-related syndrome?

EHMT1-related syndrome happens when there are changes to the EHMT1 gene. These changes can keep the gene from working as it should.

EHMT1-related syndrome is also called Kleefstra syndrome. Kleefstra syndrome can also be caused by a larger genetic change that affects the EHMT1 gene and nearby genes.

Key role

The EHMT1 gene helps to control other genes.

Symptoms

Because the EHMT1 gene is important in the development and function of brain cells, many people who have EHMT1-related syndrome have:

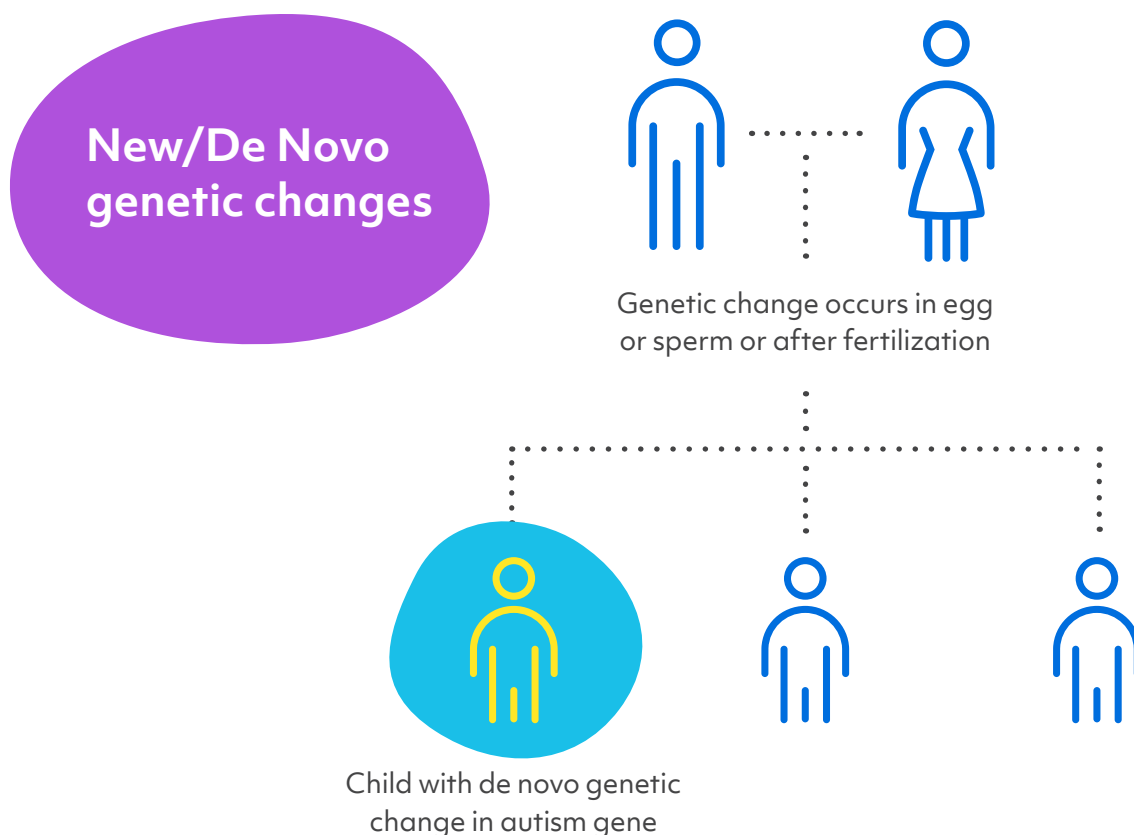
- Intellectual disability and developmental delay
- Low muscle tone
- Speech and motor delay



What causes EHMT1-related syndrome?

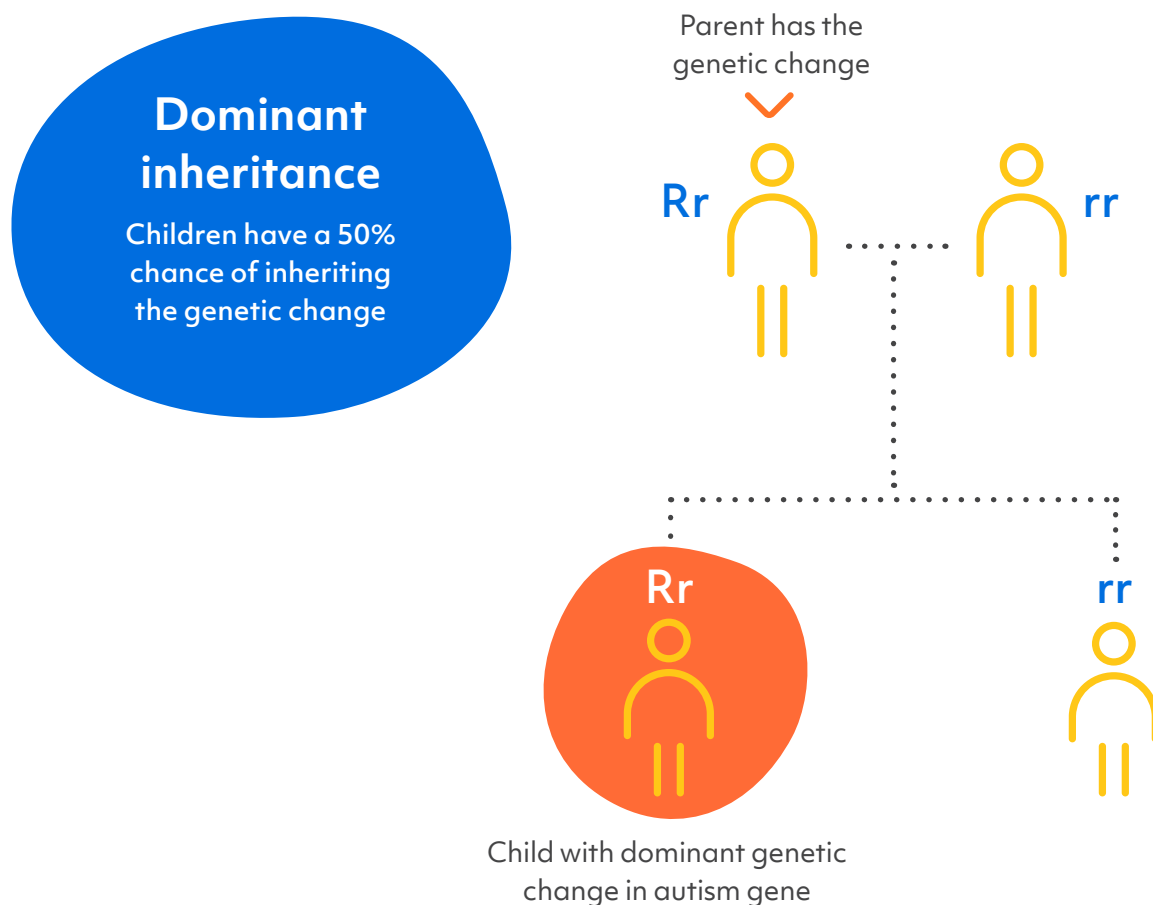
Our genes contain the instructions, or code, that tell our cells how to grow, develop, and work. Every child gets two copies of the EHMT1 gene: one copy from their mother, from the egg, and one copy from their father, from the sperm. In most cases, parents pass on exact copies of the gene to their child. But the process of copying genes is not perfect. A change in the genetic code can lead to physical issues, developmental issues, or both.

Sometimes a random change happens in the sperm or egg. This change to the genetic code is called a 'de novo', or new, change. The child can be the first in the family to have the gene change.



De novo changes can take place in any gene. We all have some de novo changes, most of which don't affect our health. But because EHMT1 plays a key role in development, de novo changes in this gene can have a meaningful effect.

Research shows that EHMT1-related syndrome is often the result of a de novo change in EHMT1. Many parents who have had their genes tested do not have the EHMT1 gene change found in their child who has the syndrome. In some cases, EHMT1-related syndrome happens because the gene change was passed down from a parent. This is called dominant inheritance.



Why does my child or I have a change in the EHMT1 gene?

No parent causes their child's EHMT1-related syndrome. We know this because no parent has any control over the gene changes that they do or do not pass on to their children. Please keep in mind that nothing a parent does before or during the pregnancy causes this to happen. The gene change takes place on its own and cannot be predicted or stopped.





What are the chances that other family members or future children will have EHMT1-related syndrome?

Each family is different. A geneticist or genetic counselor can give you advice on the chance that this will happen again in your family.

The risk of having another child who has EHMT1-related syndrome depends on the genes of both birth parents.

- If neither birth parent has the same gene change found in their child, the chance of having another child who has the syndrome is on average 1 percent. This 1 percent chance is higher than the chance of the general population. The increase in risk is due to the very unlikely chance that more of the mother's egg cells or the father's sperm cells carry the same change in the gene.
- If one birth parent has the same gene change found in their child, the chance of having another child who has the syndrome is 50 percent.

For a symptom-free sibling, a brother or sister, of someone who has EHMT1-related syndrome, the risk of having a child who has the syndrome depends on the symptom-free sibling's genes and their parents' genes.

- If neither parent has the same gene change found in their child who has the syndrome, the symptom-free sibling has a nearly 0 percent chance of having a child who has EHMT1-related syndrome.
- If one birth parent has the same gene change found in their child who has the syndrome, the symptom-free sibling has a small chance of also having the same gene change. If the symptom-free sibling has the same gene change as their sibling who has the syndrome, the symptom-free sibling's chance of having a child who has EHMT1-related syndrome is 50 percent.

For a person who has EHMT1-related syndrome, the risk of having a child who has the syndrome is about 50 percent.

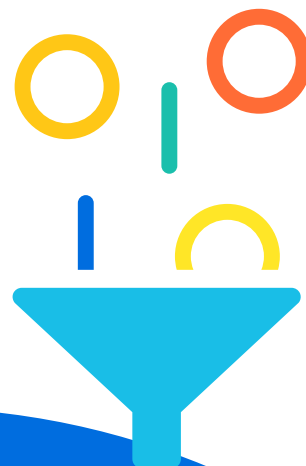
How many people have EHMT1-related syndrome?

As of 2021, about 100 people in the world with changes in the EHMT1 gene had been described in the medical literature. The first case of EHMT1-related syndrome was described in 2006. Scientists expect to find more people who have the syndrome as access to genetic testing improves.

Do people who have EHMT1-related syndrome look different?

People who have EHMT1-related syndrome may look different. Appearance can vary and can include some but not all of these features:

- Small head
- Wide forehead
- Fused eyebrows and widely spaced eyes
- Epicanthal fold: a skin fold covering the inner corner of the eye
- Short nose and low bridge of nose
- Changes in ear shape
- Tented upper lip





How is EHMT1-related syndrome treated?

Scientists and doctors have only just begun to study EHMT1-related syndrome. At this point, there are no medicines designed to treat the syndrome. A genetic diagnosis can help people decide on the best way to track the condition and manage therapies. Doctors can refer people to specialists for:

- Physical exams and brain studies.
- Genetics consults.
- Development and behavior studies.
- Other issues, as needed.

A developmental pediatrician, neurologist, or psychologist can follow progress over time and can help:

- Suggest the right therapies. This can include physical, occupational, speech, or behavioral therapy.
- Guide individualized education plans (IEPs).

Specialists advise that therapies for EHMT1-related syndrome should begin as early as possible, ideally before a child begins school.

If seizures happen, consult a neurologist. There are many types of seizures, and not all types are easy to spot. To learn more, you can refer to resources such as the Epilepsy Foundation's website: www.epilepsy.com/learn/types-seizures.

EHMT1-related syndrome is very rare. Doctors and scientists have just recently begun to study it. This section includes a summary of information from a major published article describing about 100 people who have the syndrome. It highlights how many people have different symptoms. To learn more about the article, see the [Sources and references](#) section of this guide.

Behavior and development concerns linked to EHMT1-related syndrome

Learning

Everyone studied to date that has EHMT1-related syndrome has **intellectual disability** or **developmental delay**.



Speech

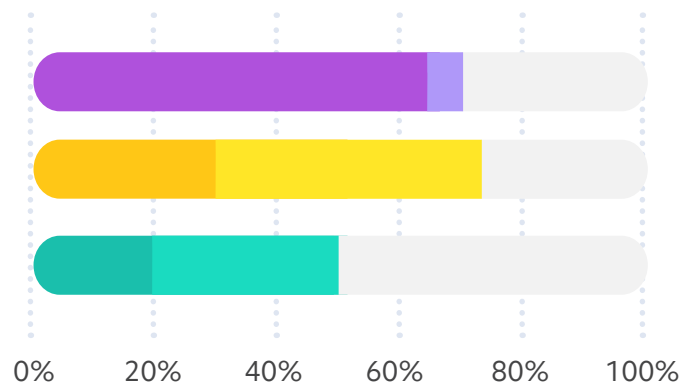
Speech delay is common.

Behavior

65 to 70 percent have **behavior issues**.

30 to 75 percent have **autism**.

20 to 50 percent have **sleep issues**.



Medical and physical concerns linked to EHMT1-related syndrome

Brain

50 to 60 percent have **changes in the brain structure.**

20 to 50 percent have **epilepsy.**

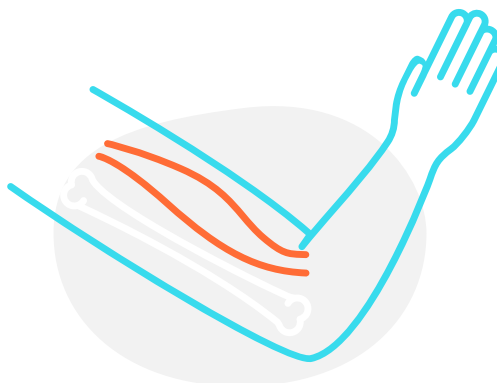


Sitting and walking

Motor delay is common. But most children **walk by 2 or 3 years old.**

Muscle tone

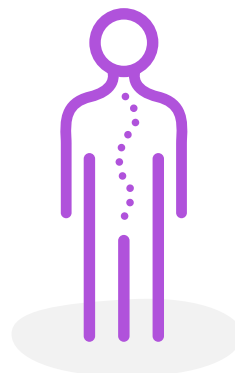
60 to 80 percent have **low muscle tone.**



Medical and physical concerns linked to EHMT1-related syndrome

Joints and spine

30 to 50 percent have **skeletal** issues.

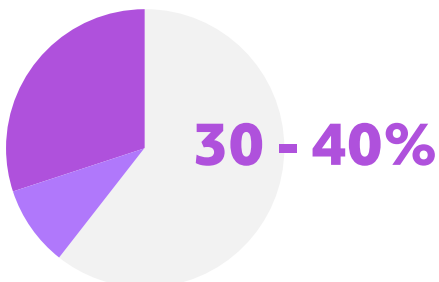
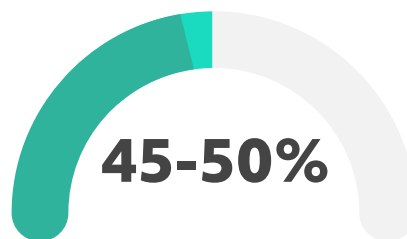


Birth defects

40 to 45 percent have a **heart** issue.

Genital

45 to 50 percent of **males** have genital changes.



Growth

30 to 40 percent are **obese**.



Where can I find support and resources?

EHMT1-related syndrome is also called *Kleefstra syndrome*.

IDefine

www.idefine.org

KleefstraSyndrome.org

www.kleefstrasynndrome.org



Simons Searchlight is another research program sponsored and run by the Simons Foundation Autism Research Initiative, also known as SFARI. As part of the next step in your research journey, Simons Searchlight offers you the opportunity to partner with scientists and other families who have the same gene change. Simons Searchlight is a registry for more than 200 genetic changes that are associated with neurodevelopmental conditions, including autism spectrum disorder. Simons Searchlight makes it easier for researchers to access the information they need to advance research on a condition.

To register for Simons Searchlight, go to the Simons Searchlight website at www.simonssearchlight.org and click “Join Us Today”.

- **Learn more about Simons Searchlight**
www.simonssearchlight.org/frequently-asked-questions
- **Simons Searchlight webpage with more information on EHMT1**
www.simonssearchlight.org/research/what-we-study/ehmt1
- **Simons Searchlight EHMT1 Facebook community**
www.facebook.com/groups/399944964205059

Sources and References

The content in this guide comes from a published study about EHMT1-related syndrome. Below you can find details about the study, as well as a link to a summary.

- Ciaccio C. *et al. Cytogenetic and Genome Research*, **156**, 127-133, (2018). New insights into Kleefstra syndrome: Report of two novel cases with previously unreported features and literature review.
www.pubmed.ncbi.nlm.nih.gov/30448833



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