Phelan-McDermid syndrome
-or-
22q13.3 deletion 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 2020. 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 Phelan-McDermid syndrome.
What is Phelan-McDermid syndrome?

Phelan-McDermid syndrome, also called 22q13.3 deletion syndrome, can affect communication, social, and learning skills. People who have Phelan-McDermid syndrome may have:

- Low muscle tone
- Developmental delay
- Speech problems
- Autism or symptoms of autism
- Decreased sensitivity to pain
What causes Phelan-McDermid syndrome?

Phelan-McDermid syndrome is caused when someone is missing a piece of chromosome 22, one of the body’s 46 chromosomes. Chromosomes are structures in our cells that house our genes. The missing segment spans a gene called SHANK3, which has been linked to autism.

We inherit chromosomes from our parents. When the sperm from the father joins the egg from the mother, they form a single cell with 46 chromosomes — 23 from the mother and 23 from the father. This cell then makes many copies of itself.

**New/De Novo genetic changes**

Genetic change occurs in egg or sperm or after fertilization

Child with de novo genetic change in autism gene
Some people inherit a genetic change from a parent. In other people, small mistakes can occur when genes are being copied. Parts of the chromosomes can break off, make extra copies, or end up in a different order than expected. When this happens, it is called a “de novo”, or new, change. The child can be the first in the family to have the genetic change.

**Dominant inheritance**

Children have a 50% chance of inheriting the genetic change

![Diagram showing dominant inheritance](image)
Why does my child or I have Phelan-McDermid syndrome?

No parent causes their child's Phelan-McDermid syndrome. We know this because no parent has any control over the chromosome 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 genetic 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 Phelan-McDermid 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 Phelan-McDermid syndrome depends on the chromosomes of both birth parents.

- If neither birth parent has the same chromosome 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 chromosome change found in their child, the chance of having another child who has the syndrome is about 50 percent.

For a symptom-free sibling, a brother or sister, of someone who has Phelan-McDermid 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 chromosome 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 Phelan-McDermid syndrome.

- If one birth parent has the same chromosome change found in their child who has the syndrome, the symptom-free sibling has a small chance of also having the same chromosome change.

- If the symptom-free sibling has the same chromosome change as the child who has the syndrome, the symptom-free sibling's chance of having a child who has Phelan-McDermid syndrome is about 50 percent.

For a person who has Phelan-McDermid syndrome, the risk of having a child who has the syndrome is about 50 percent.
Do all people who have Phelan-McDermid syndrome have symptoms?

Yes, almost all people who have Phelan-McDermid syndrome have symptoms.

Will all of the people in a family that have Phelan-McDermid syndrome have the same symptoms?

Not necessarily. Family members who have the same chromosome change can have different symptoms.
How many people have Phelan-McDermid syndrome?

As of 2020, about 1,500 cases of Phelan-McDermid syndrome had been reported. There are likely many more undiagnosed people who have the syndrome. Scientists expect to find more people who have the syndrome as access to genetic testing improves.

Do people who have Phelan-McDermid syndrome look different?

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

- Long eye lashes
- Large or unusually shaped ears
- Large hands
- Changes to the toenails
- Full brow
- Full cheeks
- Round or bulging nose
- Pointed chin
- Longer than usual head, called dolichocephaly
How is Phelan-McDermid syndrome treated?

At this point, there are no medicines designed to treat Phelan-McDermid 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.
- Developmental 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).

Oral-motor therapy may be helpful for treating chewing and swallowing problems.

Specialists advise that therapies for Phelan-McDermid 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: epilepsy.com/learn/types-seizures.
Phelan-McDermid syndrome is rare, with about 1,500 reported cases. Doctors and scientists have just recently begun to study it.

This section includes a summary of information from published articles. It highlights how many people have different symptoms. See the Sources and references section of this guide for a list of articles.

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**Behavior and development concerns linked to Phelan-McDermid syndrome**

**Learning**
More than three-quarters of people who have Phelan-McDermid syndrome have developmental delay.

**Speech**
More than three-quarters have severely delayed speech or lack speech altogether.

**Behavior**
More than three-quarters have autism or autism-like behavior, such as poor eye contact, stereotyped behaviors, and self-stimulation.
About one-quarter show aggressive behavior, such as biting, hair pulling, or pinching.
Medical and physical concerns linked to Phelan-McDermid syndrome

**Muscle tone**
More than three-quarters of people who have Phelan-McDermid syndrome have low muscle tone at birth.

**Pain**
More than three-quarters of people who have Phelan-McDermid syndrome have low sensitivity to pain. Because of low sensitivity to pain and poor verbal skills, many have injuries, ear infections, acid reflux, or other painful medical conditions without showing that they are in pain. Some people may act aggressively when they are in pain.

**Sitting and walking**
Because of low muscle tone, motor milestones are often delayed. Children who have Phelan-McDermid syndrome roll over at an average age of about 8 months, crawl around 16 months, and walk around 3 years old. The way that people walk may be broad and unsteady.

**Mouth**
Chewing and tooth grinding are common.

**Joints**
More than one-half have hyperextensible joints, meaning that they can stretch their joints more than usual.
Medical and physical concerns linked to Phelan-McDermid syndrome

**Feeding and digestion issues**
More than one-half have feeding difficulties. More than one-quarter has acid reflux. About one-quarter has cyclic vomiting, or repeated episodes of nausea and vomiting.

**Other**
More than one-half sweat less than is typical and may be prone to overheating.

**Brain**
More than one-quarter has seizures. In many cases, these are linked to fevers and do not require medication.

**Eyes and eyesight**
More than one-quarter has strabismus, or eyes that do not look in the same direction at the same time.

**Ears and hearing**
Most people have normal hearing. But they may have a slow response to spoken words and have trouble telling words from background noise.

**Kidneys**
More than one-quarter has issues with the kidneys.
Where can I find support and resources?

Phelan-McDermid Syndrome Foundation website
www.pmsf.org

Phelan-McDermid Syndrome Foundation Facebook page
www.facebook.com/PMSF22q13
Sources and References

The content in this guide comes from published studies on Phelan-McDermid syndrome. Below you can find details about each study, as well as links to summaries or, in some cases, the full article.

- Phelan MC. Orphanet Journal of Rare Diseases, 3, 14, (2008). Deletion 22q13.3 syndrome
  www.ncbi.nlm.nih.gov/pmc/articles/PMC2427010
