Foundation Australia
& New Zealand

22q11.2 Duplication Syndrome

What is 22q11.2 Duplication Syndrome?

22q11.2 duplication is a condition where there is an extra copy of a small piece of chromosome 22. This condition can cause features that vary widely amongst individuals, even members of the same family. Many people with 22q11.2 duplication have no apparent physical or intellectual disabilities. Others do exhibit features. 22q11.2 duplication occurs from a baby's conception.

22q11.2 duplication syndrome is also known as Chromosome 22q11.2 microduplication syndrome.

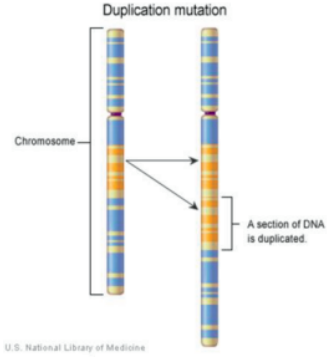
Approximately 70% of duplication cases are inherited from a parent, whereas others have a new genetic occurrence (de novo). If a person with 22q duplication has a child, there is a 50% chance of passing on the condition.

It is believed that it occurs 1:4,000 pregnancies, however this is expected to be higher as many cases go undiagnosed due to the variance in symptoms therefore the true number of cases is unknown.

How is 22q11.2 Duplication Syndrome Detected?

22q duplications are not detectable by karyotyping (an older method of genetic testing). Most individuals with 22q11.2 duplication are identified either by array genomic hybridization (array GH) testing or multiplex ligation-dependent probe amplification (MLPA) testing. Both tests are performed on blood samples.

22q duplications can also be diagnosed in pregnancy using cells from the placenta or the amniotic fluid.



Signs & Symptoms of 22q11.2 Duplication Syndrome

22q duplication symptoms vary amongst individuals. Symptoms can range from none to mild, moderate or occasionally severe. There is a wide variability in the types and severity of associated symptoms, including birth defects, medical problems, and developmental differences. 22q11.2 duplication can also result in very mild symptoms or none at all. Some of the reported symptoms of 22q duplication are:

Facial Features:

- Flat and broad nose
- Small-sized lower jaw and chin
- Widely spaced eyes
- Downslanting eyes
- Eye folds (epicanthal folds)
- Low-set ears with abnormal ear formation
- Cleft Palate
- Small or large-sized head and narrow face

Behavioural/Developmental Features:

- Global developmental delay
- Speech & Language Impairments
- Cognitive/Intellectual impairments
- Anxiety and obsessive-compulsive behaviour
- Depression
- Delayed toilet training
- Around 14 to 25% of individuals will have autism spectrum disorder

Physical Features:

- Weak muscle tone (hypotonia)
- Feeding difficulties
- Hearing impairment/loss
- Vision Impairments
- Underdeveloped heart; heart valve defects
- Growth delays/short stature
- Kidney abnormalities
- Differences in the thyroid and calcium levels
- Seizures/epilepsy
- Immunocompromised (absent or underdeveloped thymus)
- Delayed fine/gross motor skills

Symptoms are not limited to the above list as there is still a lot unknown about 22q duplication and research is still occurring. Medical evaluations may detect additional problems, but many therapies and interventions are available to manage them.

What specialists could be involved and what tests may be done?

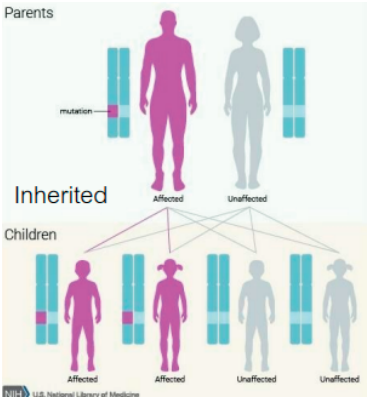
Everyone has a different set of symptoms, if any, when it comes to 22q11.2 duplication. As 22q11.2 duplication is still being studied each GP/paediatrician will have their own recommendations - currently there are no set criteria. Some will choose to do testing and refer to specialists without symptoms, whereas others will wait until symptoms
arise. Advocate for your needs.
The specialists and tests you may encounter during your 22q journey are:

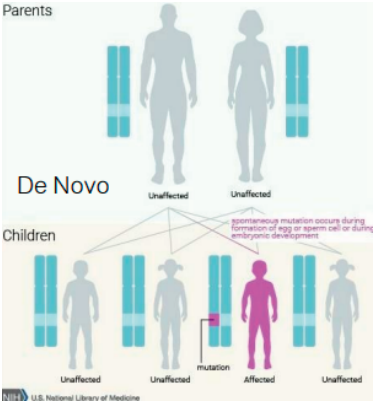
- Audiologist (check hearing)
- Cardiologist
- Child Development (overall check)
- Speech Pathologist
- Psychology - developmental assessments
- Geneticist/ Genetic Counsellor
- Immunologist
- Urologist (urinary system, kidneys, renal ultrasound)
- Neurology (seizures, epilepsy)
- Pathology (full blood count, overall wellbeing check)
- Ear, Nose & Throat (ENT)
- Physiotherapy (Low muscle tone, walking, fine/gross motor skills)
- Occupational Therapy (Low muscle tone, walking, fine/gross motor skills)

A closer look at the duplication mutation

To understand how 22q11.2 duplication occurs, you first need a basic understanding of what chromosomes are. Chromosomes, which are in every cell in our bodies, are made up of smaller structures — called genes — which are, in turn, made up of DNA.

Typically a person will have 23 pairs of chromosomes (46 total) with one of each pair coming from parent one and the other from parent two. If a parent has 22q11.2 duplication that means one copy of their chromosome 22 has an extra piece duplicated, therefore giving any child they have a 50% chance of also receiving that same duplicated chromosome.





In a de novo case, neither parent has a copy of the 22q11.2 duplication chromosome which means it is not inherited but instead occurs as a random event at conception/embryonic development. The extra duplicated part of chromosome 22 usually includes around 30 to 40 genes. In most cases, this extra genetic material consists of a sequence of about 3 million base pairs, also written as 3 megabases (Mb) – 3Mb. This specific duplication occurs near the middle of chromosome 22 at a location designated q11.2. For many of these genes, little is known about their function and how each one actually affects the person.

It can be overwhelming when you or a loved one is first diagnosed, however you are not alone in this journey. Let us be a resource for you to help navigate your way. We are here to help provide information and support where possible.

References/Sources:

The International 22q11 Foundation
The 22q11.2 Society
Parents & people living with 22q11.2 Duplication