Rijksinstituut voor Volksgezondheid
en Milieu
*Ministerie van Volksgezondheid,
Welzijn en Sport*

The NIPT

Testing for Down's, Edwards' and Patau's syndromes

Contents

What can be tested?

You are pregnant. You can be tested to see if the baby you are expecting has a disorder or a physical abnormality.

We call this prenatal screening

There are two types of screening:

1. Screening for Down's syndrome, Edwards' syndrome and Patau's syndrome: the NIPT.
2. Screening for physical abnormalities: the 13-week scan and the 20-week scan.

It is entirely your decision whether or not to have these tests.

This brochure contains information about screening for Down's, Edwards' and Patau's syndromes. There is also a brochure about screening for physical abnormalities.

Making a decision

When you are pregnant you go to your obstetric care provider. During the first visit, you will be asked if you want to know more about screening for Down's, Edwards' and Patau's syndromes.

There are two possibilities:

1. You would rather not know anything about it. In that case, you will not receive any information and not have the screening scan.
2. You do want to know more about it. We will then make an appointment with you to provide you with in-depth information about the screening test for Down's, Edwards' and Patau's syndromes. After this appointment, you will decide what you want to do:
   - no prenatal screening,
   - screening for physical abnormalities or screening for Down's, Edwards' and Patau's syndromes,
   - or have both screening tests.

When we say obstetric care provider, we usually mean your midwife or gynaecologist. It may also be another care provider such as a sonographer or a nurse.

Would you like to have an appointment about the NIPT?

Visit www.pns.nl before your appointment about the test.
That way you can read about the screening test first. On this website, you will also find a short film that explains about the test. If you have any questions, ask them during your appointment.

The disorders

The NIPT is a blood test for Down's, Edwards' and Patau's syndromes

Down syndrome

What is Down syndrome?

Down syndrome is a disorder that a baby is born with. It does not go away. People with Down syndrome have an intellectual disability. They often look different. You don't know beforehand how severe the disability will be.

How does a child with Down syndrome develop?

Children with Down syndrome develop more slowly and to a more limited extent than the average child. But this varies from child to child. It is difficult to predict how a child will develop. It is good to stimulate a child with Down syndrome right from birth. Parents can get support to help their child to develop well.

Young children grow up in the family. Usually they are able to go to a normal children's day care centre. Very occasionally a special day care facility may be necessary. Most children with Down syndrome go to a normal primary school. A small group go to a special education school. On average, those children who go to a normal primary school learn to talk and to read better.

After primary school, most children go to a school for special secondary education. A few children go to a day centre. Some adolescent children with Down syndrome will realise that they cannot keep up with their peers. This may make them shy, insecure and withdrawn. As a result, they may sometimes respond differently than expected.

A quarter of adults with Down syndrome are still living with their parents at the age of 30. The rest live independently in supported accommodation. They usually live in residential projects for small groups.

The average life expectancy for people with Down syndrome is 60 years. They need guidance and support from their parents and families throughout their lives.

What do parents and siblings say?

Almost all parents say that they love their son or daughter with Down syndrome very much. They are also proud of their child. Eight out of ten parents feel that their child has given them a more positive outlook on life. The same goes for most siblings. They say that they want to stay involved in their brother or sister's life when they have all grown up. However, some families do encounter problems. They find it difficult to cope with these problems. To read more about this, go to www.downsyndroom.nl/home/levensloop/kwaliteit-van-leven

Heath problems among people with Down syndrome

The risk that a baby with Down syndrome will die before birth is higher than average. In addition, a child with Down syndrome may suffer from the following health problems:

- Almost half of them are born with a heart defect. In half of all cases it will disappear naturally. The other half will have surgery, after which they will usually have no more problems.
- One in ten children with Down syndrome may also have an abnormality of the stomach or intestines. This can also be treated by surgery.
- Children with Down syndrome are more at risk of having problems with their breathing, hearing, sight and speech. They are also more prone to getting infections. If these problems occur, how serious they are varies from person to person.
- Adults with Down syndrome tend to develop dementia more often and at a younger age than average.

What sort of support is available for children with Down syndrome and their parents?

A paediatrician, Down syndrome outpatient clinic or Down syndrome team can support children or young people and their parents. A Down syndrome team may include the following people:

- A paediatrician
- A speech therapist. This is someone who helps with speech.
- A physiotherapist
- A social worker.

Adults with Down syndrome can get help from their GP, a doctor specialised in caring for people with intellectual disability (in Dutch: *arts voor verstandelijk gehandicapten* or AVG), a Down syndrome clinic or Down syndrome team.

Who pays for the care and support?

Healthcare insurers cover the cost of medical care for children with Down syndrome. And of other resources, if they are needed. There are various other financial aid arrangements available to parents to cover costs.

Edwards' syndrome

What is Edwards' syndrome?

Edwards' syndrome is a very serious congenital disorder. It is much less common than Down syndrome. The majority of babies with Edwards' syndrome will die either before or shortly after birth. Often they do not grow as well as they should before birth. Their health is very fragile, and they usually die during the first year of their life.

Children with Edwards' syndrome have serious health problems. However, exactly what problems they have, and how severe they are, varies from child to child. The following problems can occur:

- A very severe intellectual disability. This occurs in all children.

- Nine out of ten of these children will have a serious congenital heart defect.
- Problems with other organs, such as the kidneys and intestines. This is not very common.
- An open abdominal wall and oesophageal atresia (a condition where the gullet is not connected to the stomach). This is not very common.
- A small face with a large skull. This is not very common.

Patau's syndrome

What is Patau's syndrome?

Patau's syndrome is a very serious congenital disorder. It is much less common than Down syndrome. The majority of babies with Patau's syndrome will die either before or shortly after birth. Often they do not grow as well as they should before birth. Their health is very fragile, and they usually die during the first year of their life. Children with Patau's syndrome have serious health problems. However, exactly what problems they have, and how severe they are, varies from child to child. The following problems can occur:

- A very severe intellectual disability. This occurs in all children.
- Most children have problems with their brain and heart.
- Problems with the kidneys and abnormalities of the stomach and intestines. This is not very common.
- Extra fingers or toes. This is not very common.
- A cleft lip, jaw and palate (schisis). This is not very common.

An extra chromosome

All the cells in our body contain chromosomes. Chromosomes are made up of DNA. DNA determines what our body looks like and how everything in our body works. Every cell contains 23 pairs of chromosomes. Someone with Down syndrome, Edwards' syndrome or Patau's syndrome has an extra chromosome in every cell.

- A child with Down syndrome has three number 21 chromosomes instead of two. Another name for Down syndrome is trisomy 21.
- A child with Edwards' syndrome has three number 18 chromosomes instead of two. Another name for Edwards' syndrome is trisomy 18.
- A child with Patau's syndrome has three number 13 chromosomes instead of two. Another name for Patau's syndrome is trisomy 13.
- Do you want to know what the chances are of Down's, Edwards' or Patau's syndrome? Take a look at www.pns.nl

It’s entirely up to you whether or not you have a scan.

You don’t have to have the test for Down’s, Edwards’ and Patau’s syndromes. It is entirely up to you. You also decide how far you want to go with the screening test. You can withdraw from the screening test at any time.

Help with deciding

This may help you to decide:

- Fill in the questionnaire at www.pns.nl. This questionnaire will give you organise your thoughts and feelings.
- Talk about it with your partner or with other people.
- Ask any questions you may have during the counselling session with your obstetric care provider. It is possible that you have a higher chance. If you have previously had a child with Down’s, Edwards’ or Patau’s syndrome, for example. You may then visit a Prenatal Diagnostic Centre: which is a department of a university hospital. There you will be given in-depth information about the possibilities.

These questions can help you to decide whether you do or do not want a test:

- Do you want to know whether your baby has Down’s, Edwards’ or Patau’s syndrome before it is born? Or would you rather wait and see?
- How much do you want to know about your baby before it is born?
- Suppose that the result is that your baby possibly has a disorder. In that case, would you want to have follow-up diagnostic testing? So that you can be sure. Both are possible, it is up to you.
- The follow-up test will be chorionic villus sampling or an amniocentesis. This involves a small chance of a miscarriage. How do you feel about this?
- How would you feel about life with a child that has Down’s, Edwards’ or Patau’s syndrome?
- How would you feel about the possibility of terminating the pregnancy if your baby has one of these disorders?
- If you heard that your child had Down’s, Edwards’ or Patau’s syndrome, what would you want to do?

What could the test results mean to you?
These three situations are possible after the test results:

You are reassured
The test found no indications of disorders. Or it found a disorder that will not pose a lot of problems in your child’s everyday life. Please note: your baby could still have a disorder, even if the test results are good. Because the test cannot detect all types of disorder.

You become worried
Suppose that the result is that your baby possibly has a disorder. Follow-up diagnostic testing is needed, just to be sure. You can choose whether or not to have this follow-up test.

You need to make a difficult decision
The follow-up test shows that your baby has Down's, Edwards' or Patau's syndrome, or another abnormality. You then have to think about what you are going to do.

An in-depth conversation about deciding to have screening or not: a counselling session.

At the first visit to your obstetric care provider, did you say that you would like to know more about the screening test? If so, you will have an in-depth conversation about this.

You will also be able to ask questions. This type of conversation is also known as counselling. The person you have the counselling session with is called a counsellor.

Take someone with you

Two people hear more than one. So it's a good idea to take someone with you to the counselling session. It could be your partner, a friend or one of your parents. Don't bring more than one person with you. And avoid bringing children with you, so that you can talk without being interrupted.

It's your decision

After the counselling session, you can decide if you do or don't want a test. Are you still in doubt? If so, you can discuss it again with your obstetric care provider. This may help to make things clearer for you. After the counselling session you can decide whether or not you want your baby to be screened for Down's, Edwards' and Patau's syndromes.

What does the NIPT involve?

The NIPT is a test in which a blood sample is taken from the pregnant woman. The blood is examined in a laboratory. If the blood test shows that the child may have Down's, Edwards' or Patau's syndromes, a follow-up test is necessary to be sure if the child has the disorder or not. The NIPT can be done from the 11th week of pregnancy.

Extra choice on NIPT

Have you decided to have the NIPT? If so, you need to make another decision. Namely, do you want to be informed about any other abnormalities in the chromosomes? We call these secondary findings. The laboratory cannot detect all abnormalities of the chromosomes. So, even if the results are good, there is a small chance that your baby could still have a disorder.

Has the laboratory detected a secondary finding? Then you can choose to have a follow-up test. This will tell you what the secondary finding will mean for you and your child. About 4 in every 1,000 women who opt for the NIPT are told that there is a secondary finding.

More information about the NIPT

For more information about the NIPT and secondary findings, go to www.pns.nl/nipt.

In the Netherlands, you can only choose to have the NIPT if you take part in a scientific study (TRIDENT-2). This means that researchers may use your data. To take part, you will need to sign an informed consent form. Do you want more information about the study? And about what happens to your data? Take a look at www.meerovernipt.nl.

Are you expecting twins or other multiple births? In that case, you can also choose to have the NIPT. Take a look at www.pns.nl

Does it matter how old you are? Older women have a higher chance of having a child with Down syndrome than younger women. Out of 10,000 pregnant women aged 30 years, an average of 19 will have a child with Down syndrome. Out of 10,000 pregnant women aged 40 years, an average of 155 will have a child with Down syndrome. The chance of having a child with Edwards' or Patau's syndrome is also higher in older women.

The results

What results can you obtain from the NIPT? And do the results provide certainty?

The results of the NIPT do not provide absolute certainty. However, the results are usually reassuring: if the result is not abnormal then the chance of an abnormality is very small. In that case, you will not have any follow-up diagnostic testing. Have you had an abnormal result? Then you can choose to have follow-up diagnostic tests. This will give you certainty. Would you like to know more about the reliability of the result? Take a look at www.pns.nl.

Who will tell you about the results?

Your obstetric care provider will give you the results. He or she will explain what the results mean to you. Did you also want to be informed about any other abnormalities in the chromosomes? In that case, you may be called about these results by an expert from a Prenatal Diagnostic Centre, or by a clinical genetics outpatient clinic of a university hospital.

When will you get the results?

You will get the results within 10 working days after the blood arrives at the laboratory.

What results can you obtain from the NIPT?

The following results are possible:

The result is not abnormal.
This result is almost always correct. The chance that you are carrying a baby with Down's, Edwards' or Patau's syndrome is very small. Fewer than 1 in 1,000 pregnant women who get this result turn out to be carrying a baby with one of these disorders. No follow-up testing is necessary.

The result is abnormal.
About 5 out of every 1,000 women who take the NIPT will get this result. There is a chance that you are carrying a baby with Down's, Edwards' or Patau's syndrome. The result will indicate which of the three abnormalities your baby may have.

- About 90 out of every 100 women who get this result are actually carrying a baby with Down syndrome.
- About 90 out of every 100 women who get this result are actually carrying a baby with Edwards' syndrome.
- About 50 out of every 100 women who get this result are actually carrying a baby with Patau's syndrome. Are you thinking of terminating the pregnancy? In that case, you must first have follow-up tests. The result is abnormal. About 2 out of every 100 women who take the NIPT will get this result. You can choose to have the NIPT done again. You do not have to pay for this again.

You can have follow-up diagnostic testing. Then you will know for sure if you are carrying a baby with Down's, Edwards' or Patau's syndrome.

The result is inconclusive.
About 2 out of every 100 women who take the NIPT will get this result. You can choose to have the NIPT done again.
You do not have to pay for this again.

Did you also want information about secondary findings? Then you will be informed about these results.

The following results are possible:

No secondary findings were reported.
The letter with the results of the NIPT states that there were no secondary findings. No follow-up diagnostic testing will be needed. But please note: NIPT does not detect every possible type of chromosomal abnormality. *There is still a small chance that your baby may have a disorder.*

A secondary finding has been reported.
Someone will call you and explain what has been found and what this may mean for you or your child. You will receive an invitation for a conversation at a university medical centre's clinical genetics outpatient clinic where you will be given more information about the abnormality that has been found. *Follow-up diagnostic testing is always necessary, just to be sure.*

Deciding whether or not to have follow-up diagnostic testing

Are there indications that your baby has Down's, Edwards' or Patau's syndrome? If so, talk to your obstetric care provider who will be able to offer you support.

You have the following choices:

- You can do nothing. You can carry on with your pregnancy, have no more follow-up tests and give birth to your baby.
- You can have follow-up testing. Then you will know for sure if you are carrying a baby with Down's, Edwards' or Patau's syndrome. Are you considering terminating the pregnancy? In that case, you must first have follow-up tests.

It is entirely up to you

If you want more information about follow-up diagnostic testing, you can visit a Prenatal Diagnostic Centre for a conversation. After the session, you can decide what you want to do. You may also decide that you don't want to have any follow-up diagnostic testing.

Have you decided to have follow-up testing?

The follow-up test will be one of the following two tests:

- A chorionic villus sampling test. The doctor will take a small piece of the placenta and examine it. This can be done from 11 weeks of pregnancy.
- An amniocentesis. The doctor will take a some of the fluid surrounding the baby and examine it. This can be done from 15 weeks of pregnancy.

Then you will know for sure if your baby has Down's, Edwards' or Patau's syndrome. The disadvantage is that there is a small risk that the test may cause a miscarriage. This happens in 2 out of 1,000 women.

The results of the follow-up test

The doctor will give you the results of the follow-up test. The result could be that there is nothing wrong. But there is also a chance that the test will indicate that you are carrying a baby with Down's, Edwards' or Patau's syndrome, or another chromosomal abnormality. This news could make you feel anxious or sad. And you would probably have a lot of questions. For this reason, soon after getting the results you will have a counselling session with one or more medical specialists, such as a gynaecologist, a clinical geneticist or a paediatrician.

Exactly which specialists are involved will depend on the abnormality or disorder that has been found.

Extensive support

During the session, one or more doctors will be there to help you and give you more information. The following things will be discussed with you at this session:

- What life with your child could be like.
- The consequences the abnormality will have for you and your child.
- Whether the abnormality that your child has can be treated.
- Where you can find more information about the abnormality. More details about the most important organisations and websites can be found on page 15 of this brochure.

You and your partner can, of course, ask any questions you may have during the session.

Help in deciding what to do about the results

The next step is usually a difficult one – you have to decide what you want to do about the results. It goes without saying that the experts at the Prenatal Diagnostic Centre will help you with this.

- You can continue with the pregnancy and give birth to the baby. You will then be able to prepare for the arrival of a baby with a disorder or abnormality. You can also organise extra care for your pregnancy and the birth.
- With some abnormalities the baby may die before, during or shortly after birth. Your obstetric care provider will give you careful guidance on this.
- You may also choose to terminate the pregnancy. Then the baby will die. Talk about this with your midwife, gynaecologist, paediatrician or clinical geneticist, and put your questions to them. You may also want to talk to other experts, a social worker for example. If you choose to terminate the pregnancy, this can be done up to 24 weeks of pregnancy.

Costs and reimbursements

What does the screening test cost? And are these costs covered by healthcare insurance?

Costs of counselling

Your healthcare insurer will pay the costs for counselling. Counselling is an in-depth conversation about the possibilities of screening for Down's, Edwards' and Patau's syndromes. You do not pay anything yourself. It will not be taken off your obligatory deductible excess.

Costs of the test

You have to pay for the test yourself. You cannot claim the money back from your healthcare insurer. The NIPT costs around €175.

Costs of the test if you have an increased chance of a baby with Down's, Edwards' or Patau's syndrome

If you have an increased chance because you have previously had a child with Down's, Edwards' or Patau's syndrome, then your healthcare insurer will pay for the test. However, you will usually have to pay an amount from your obligatory deductible excess. Ask your healthcare insurer about this.

Costs of follow-up diagnostic tests

Did you receive an abnormal result from the NIPT? If so, you can choose to have follow-up testing. Your health insurer will pay for this. The costs of this care are covered by your basic health insurance package. However, you will usually have to pay an amount from your obligatory deductible excess. Ask your healthcare insurer about this. An expert from a Prenatal Diagnostic Centre will be able to give you more information.

The terms and conditions of your healthcare insurer may affect your reimbursements. The costs and reimbursements described above may also change. For up-to-date information on the costs, see www.pns.nl/dep/kosten.

More information about diagnostic screening

There are a number of organisations, websites and brochures where you can get more information about your pregnancy, as well as various abnormalities and disorders.

Internet

You will find more information on this subject at www.pns.nl. There is also a questionnaire. If you are finding it difficult to decide whether or not you want your baby to be screened for Down's, Edwards' and Patau's syndromes, then maybe the questionnaire will help you. The questionnaire also contains tips on how to discuss this topic with other people.

You will find more information on prenatal screening on the following websites: www.meerovernipt.nl
www.erfelijkheid.nl
www.deverloskundige.nl
www.thuisarts.nl
www.degynaecoloog.nl

The Dutch Down Syndrome Foundation
This is an organisation for parents who have a child with Down syndrome. The organisation strives to promote the interests of people with Down syndrome, and their parents. The foundation offers the following help:

- They support women who are carrying a baby with Down syndrome.
- If they want to decide for themselves whether they can handle life with a child with Down syndrome, the foundation will provide information about living with Down syndrome, allowing the parents to make a decision that is right for them.
- They also support parents who have a newborn baby with Down syndrome.
- The website of the Dutch Down Syndrome Foundation is www.downsyndroom.nl.

The book '*Downsyndroom – Alle medische problemen op een rij*' ('Down syndrome - A summary of all the medical problems involved'; 2010) by *Artsen voor Kinderen* (Doctors for Children), includes an overview of the medical problems that commonly affect people with Down syndrome, from birth up to and including the teenage years. You can also download this book as an app, which is called '*Downsyndroom – Medisch op weg*' ('Down syndrome - Medical route map').

The Cyberpoli (Cyber outpatient clinic)
This is a website with a lot of information for children and young people with a chronic disorder or disability. You will find a lot of information and people's stories, and you can ask questions. The website is www.cyberpoli.nl/downsyndroom.

The Dutch Patient Alliance for Rare and Genetic Diseases (VSOP)
The VSOP is an association in which 81 parent and patient organisations work together. The VSOP promotes the interests of everyone with rare and hereditary disorders. They influence policy, stimulate research and make doctors and others aware of rare conditions. The website is www.vsop.nl.

The Erfocentrum
The Erfocentrum provides information about hereditary conditions. See the websites www.erfelijkheid.nl and www.zwangerwijzer.nl

Vereniging VG-netwerken
This association is for people with an intellectual disability or learning difficulties due to a very rare syndrome, and for their parents. The website is www.vgnetwerken.nl.

Platform ZON
Platform ZON is an organisation for the parents of children who have a very rare disorder, such as Edwards' or Patau's syndrome, or an unknown disorder. The website is www.ziekteonbekend.nl.

Dutch Heart Foundation
You can find more information about congenital heart defects at www.hartstichting.nl.

Fetusned
At www.fetusned.nl you can find information about abnormalities of the bones, arms and legs, as well as information about possible treatment.

RIVM
RIVM coordinates everything concerning the organisation of prenatal screening. For example, information and research. RIVM does this on behalf of the Ministry of Health, Welfare and Sport. See www.rivm.nl.

Regional Centres for Prenatal Screening
The Regional Centres for Prenatal Screening are responsible for good quality prenatal screening in your region. For more information, see www.pns.nl.

Brochures containing information about other pregnancy screening tests

You can read more in these brochures:

The 13-week scan and the 20-week scan. This brochure can be found at www.pns.nl/folders.

Pregnant! This is a general brochure about pregnancy. It also provides information about the blood test you will have when you are 12 weeks pregnant. This is a test to determine your blood group and to check whether you have any infectious diseases. This brochure can be found at www.pns.nl/folders.

You can also obtain these brochures from your midwife, GP or gynaecologist. Ask for them!

What happens to your data?

Have you decided to have prenatal screening? Then your healthcare providers will store your data in a healthcare file. Some of this data will be entered into a national database called Peridos. This is necessary to ensure that the screening tests run smoothly.

Your data can only be accessed by healthcare professionals, such as your midwife, gynaecologist, laboratory technician, nurse and sonographer.

What will your data be used for?

1. To check that the screening tests run smoothly, and to ensure that healthcare professionals do their jobs properly. This is done by a Regional Centre. This centre is responsible for good quality prenatal screening in your region. The centres are licensed to do this work by the Ministry of Health, Welfare and Sport. A member of staff at the Regional Centre is able to access and check the data. The system is well safeguarded.
2. To further improve screening tests. The figures on the studies and on the effects of the studies are used for this purpose. These include figures on how many pregnant women opt for prenatal screening, and what the results of the various tests are. The researchers cannot see who the data belongs to. Sometimes it is necessary for researchers to know this, for example when investigating new methods. If we want to use your data for this, then we will first ask you if you agree.

What if you do not want us to use your data?

If you do not want us to use your data for quality control and scientific research, please tell your obstetric care provider. Your data will then be removed from the database. This will be done after the date on which your obstetric care provider expects that you will give birth (due date). All that will remain in the database is an anonymous report that you have had prenatal screening so that you can be included in the statistics. However, no one will be able to see your personal data.

Want to know more?

Do you want to know more about how we protect your data? Your obstetric care provider can tell you more about this. You can also find more information at www.peridos.nl and www.pns.nl. TRIDENT-1 and TRIDENT-2 studies Have you decided to have the NIPT? Then you will be taking part in a scientific study. We need your personal data for this. If you want more information about this, take a look at www.meeroverpnipt.nl.

Who has compiled this brochure?

This brochure has been compiled by a working group. This working group includes a number of organisations:

- The organisation of sonographers (BEN)
- The Regional Centres for Prenatal Screening
- The Erfocentrum
- The organisation of midwives (KNOV)
- The organisation of paediatricians (NVK)
- The organisation of gynaecologists (NVOG)
- The National Institute for Public Health and the Environment (RIVM)
- The organisation of clinical geneticists (VKGN)
- VSOP: an association of 90 patient organisations for rare and genetic disorders.

Acknowledgements

This brochure is based on our current knowledge. The people and organisations responsible for compiling this leaflet accept no liability for any errors or inaccuracies. You can get personal advice from your midwife or gynaecologist.

This brochure is also available at www.pns.nl, the website containing information about tests both during and after pregnancy (prenatal and neonatal screening tests). Are you an obstetric care provider? You can order extra brochures from the webshop at www.pns.nl/webshop.

RIVM, October 2021