Bumrungrad International HOSPITAL
โรงพยาบาลบำรุงราษฎร์

Consent for Non-Invasive Prenatal Testing (NIPT)

Name:.....

HN:..... **Date**:.....

Birth Date:..... **Age**:.....

Room:..... **Sex**:.....

Physician:.....

Allergies:.....

Consent for Non-Invasive Prenatal Testing (NIPT)

I (Mrs./Ms.)……..……..…Gestational age: ……..……..……..weeks consent to Dr.……and Bumrungrad Hospital's personnel to draw my blood for the purpose of Non-Invasive Prenatal Testing (NIPT) that is planned for me;

☐ **Plan 1 NIPT** : screen for chromosomal abnormalities including;
- Trisomy 13, Trisomy 18 and Trisomy 21
- Sex chromosome aneuploidy
- Genome-wide aneuploidy detection (optional)
- Sex determination (optional)

☐ **Plan 2 NIPT plus microdeletion:** screen for chromosomal abnormalities including;
- Trisomy 13, Trisomy18 and Trisomy 21
- Sex chromosome aneuploidy
- Microdeletions
- Genome-wide aneuploidy detection
- Sex determination

I have already received information about the NIPT test including what the test is for, the test method, and the limitation of the NIPT test.

My signature below indicates I have read and understood the information of the test on this form, have been given the opportunity to ask any questions and receive appropriate counseling about this type of testing by a healthcare provider and give my consent for my sample to be analyzed NIPT test. I agree that the information provided will be held confidentially and may be used for auditing and quality control and that my data will be anonymized for such purposes.

Signature……..……..……..……..

(……..……..……..……..)

Witness 1 ……..……..……..……..……..

(……..……..……..……..……..)

Physician's Signature……..……..……..……..

(……..……..……..……..……..)
(Physician provides explanation)

Witness 2 ……..……..……..……..……..

(……..……..……..……..……..)
(Fingerprint/consent over telephone)

…….……..…..…… ……..
Date Time

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Interpreter's Statement

I have given a translation of Consent for Non-Invasive Prenatal Testing (NIPT) including information that physician has explained to patient/patient's representative.

Translate to Language ..... Interpreter .....

(.....)

Status of Signer *(According to Thai Civil and Commercial Code)*

- ☐ 1. Patient who is major and capable of giving consent
- ☐ 2. Legal husband or wife in case that the patient is not capable of giving consent (unconscious)
- ☐ 3. Holder of parental responsibility in case that the patient is minor (under 20 years old)
- ☐ 4. Curator in case that the patient is quasi incompetent person (adjudged by the court)
- ☐ 5. Guardian in case that the patient is incompetent person (adjudged by the court)

For no. 2-5, please obtain certified true copy of the patient's representative's identification card/passport/document issued by governmental authority, which religion and blood type information are covered.

Relationship with the patient .....

Identification number of the patient's representative .....

Telephone number.....

Email.....

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Non-Invasive Prenatal Testing (NIPT) is a non-invasive test for pregnant women which estimates the risk of a fetus having chromosomal abnormalities. The non-invasive prenatal testing (NIPT) is an advanced screening test using next - generation sequencing technology that is carried out on a small maternal blood sample. During pregnancy, the placenta leaks cell-free DNA (deoxyribonucleic acid) which circulates in the maternal bloodstream. As a result, a maternal blood sample contains a mixture of fetal-placental and maternal circulating cell-free DNA. The non-invasive prenatal testing (NIPT) directly measures the amount of this cell-free DNA and can detect chromosomal abnormalities.

People usually have 23 pair of chromosomes or 46 chromosomes (23 from mother and 23 from father). There are many different types of chromosome abnormalities such as numerical abnormalities (trisomies, monosomies) structural abnormalities (microdeletions, translocations) and mosaicism.

Some fetal chromosome abnormalities may relate to advanced maternal age, but may occur as a result of errors in cell division, inheritance of abnormalities or by multiple factors.

The non-invasive prenatal testing (NIPT) can detect fetal chromosomal abnormalities as following;

<u>Program 1:</u> Non-invasive prenatal testing (NIPT): screening for chromosomal abnormalities including;

1. Trisomy 13, trisomy18 and trisomy 21
   - Trisomy 13 (Patau syndrome): A chromosomal disorder that causes serious problems with the brain and heart
   - as well as extra fingers and toes, cleft palate and lip, and other defects. Most infants with trisomy 13 die within the first year of life.
   - Trisomy 18 (Edwards syndrome): A chromosomal disorder that causes severe intellectual disability and serious physical problems such as a small head, heart defects, and deafness. Most of those affected with trisomy 18 die before birth or within the first month of life.
   - Trisomy 21 (Down syndrome): A chromosomal disorder that causes abnormal features of the face and body, medical problems such as heart defects, and intellectual disability. Many children with Down syndrome live to adulthood.
2. Sex chromosome aneuploidy
   - Monosomy X or XO (Turner syndrome): A chromosomal disorder that affects development in female, common feature is short stature, extra folds of skin on the neck, early loss of ovarian function, infertility. Developmental delay, learning disabilities and heart defects may present.
   - XXX (Triple X syndrome): Signs and symptoms can vary from no noticeable effect to delayed development of speech and language skill, learning disabilities and hypotonia. Normal sexual development and fertility are typical.
   - XXY (Klinefelter syndrome): Signs and symptoms often subtle, primary features are infertility and small testis. Intelligence is usually normal but reading difficulties and speech problems may present.
   - XYY (Jacob's syndrome): Signs and symptoms are few, may taller than average and increased risk of learning and speech problems, no problem with fertility.
3. Genome-wide aneuploidy detection including chromosome 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20 and 22. (optional)
4. Sex determination (optional)

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<u>Program 2:</u> Non-invasive prenatal testing (NIPT) plus microdeletion: screening for additional chromosomal abnormalities including;

1. Microdeletions

- DiGeorge syndrome (22q11.2 deletion syndrome): A chromosomal disorder that causes heart defects, poor immune system function, cleft palate and delayed development.
- 1p36 deletion syndrome: A chromosomal disorder that causes structural abnormalities of the brain, weak muscle tone, swallowing difficulties, seizures and severe intellectual disability.
- Prader-Willi syndrome/Angelman syndrome (15q deletion syndrome): A chromosomal disorder that causes neurological impairment, seizure, ataxia, behavioral and endocrine disorder.
- Cri-du-Chat syndrome (5p deletion syndrome): A chromosomal disorder that causes low birth weight and poor growth, small head, hypotonia, feeding difficulty, cognitive disabilities and heart defects.
- Wolf-Hirschhorn syndrome (4p deletion syndrome): A chromosomal disorder that causes distinct features of facial and head, growth restriction, heart defects, intellectual disorders, immunodeficiency and deafness may present.

Non-invasive prenatal testing (NIPT) results report

- “Low risk”: It is very unlikely your pregnancy is affected by trisomy 13, 18 or 21.
- “High risk”: Your pregnancy is at increased risk for Trisomy 13, 18 or 21 and the result should be confirmed by a follow-up invasive procedure such as amniocentesis.
- “No result”: In rare cases there is insufficient fetal DNA in the sample to obtain a result. You may be asked by your healthcare provider for an additional blood sample.
- “Sex determination failure”: A “sex determination failure” may be reported if there is insufficient data to support the sex determination analysis. A failure results does not reflect on the quality of any other result.

Information for non-invasive prenatal testing (NIPT)

Suitable for:

- From 10 weeks gestation pregnancies
- Singleton or twin pregnancies
- In vitro fertilization (IVF), donor egg or surrogate pregnancies (egg donor’s age at the date of egg retrieval procedure has to be addressed)

Unsuitable if the mother has:

- Cancer.
- Trisomy.
- Undergone stem cell therapy or Immunotherapy.
- Received an organ transplant.
- Recent received blood transfusion.
- Vanishing twin pregnancy.

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Test limitations

- The non-invasive prenatal testing (NIPT) should be considered a screening test only. It is recommended that you discuss the results with your healthcare provider and that a positive result (i.e., a high chance of Down, Edwards or Patau syndrome being present) is considered along with other clinical screening results and may be followed up with an invasive procedure (i.e., amniocentesis or chorionic villus sampling (CVS)). Pregnant women with a Positive non-invasive prenatal testing (NIPT) screening result should be given an invasive prenatal diagnosis and referred for genetic counselling to confirm condition. On the other hand, a negative test result does not ensure an unaffected pregnancy.
- Even though non-invasive prenatal testing (NIPT) provides reliable results, it does not apply to all cases of chromosomal abnormalities, for example, cases due to placental, maternal, or fetal mosaicism, or other causes (e.g. microdeletions, chromosome rearrangements, translocations, copy number variation, inversions, unbalanced balanced translocations, uniparental disomy (UPD), etc.). Likewise, non-invasive prenatal testing (NIPT) microdeletion test is a risk assessment test, a low risk test result does not indicate that the fetus will be free from genetic microdeletion.
- Fetal fraction is required greater than or equal to 2% to generate report for trisomy 13, 18 and 21 and greater than or equal to 3.5% to generate report for sex determination, sex chromosome aneuploidy, microdeletions and genome-wide aneuploidy detection. In rare cases when a borderline screening result or no result can be provided, patient blood redraw is required to confirm conditions.
- The non-invasive prenatal testing (NIPT) is 99% accurate for the detection of trisomy 13, 18 and 21, sex determination and sex chromosome aneuploidy detection. If sex chromosomal abnormalities are present the accuracy of the sex determination may be compromised.
- In dichorionic twins, scientific publications suggest that the detection rate of trisomy 13, 18 and 21 is reduced from greater than 99% to about 95%.The accuracy of sex chromosome aneuploidy may be slightly lower in twin Pregnancies due to multiple sources of fetal DNA. The test cannot tell which twin is high risk. If a high risk result is generated, selective invasive confirmatory testing would be required.
- For sex chromosome aneuploidy, the limitations are twin cases with a boy and girl twin and also pregnant women who have sex chromosome aneuploidy condition. Pregnancies having these conditions should not have sex chromosome aneuploidy reported.

Financial reimbursement and compensation for trisomy 13, 18 and 21

- Financial reimbursement for “High Risk” result

The non-invasive prenatal testing (NIPT) should be considered a screening test only. If the result is “High Risk” for trisomy13, trisomy 18 or trisomy 21, you are eligible for financial reimbursement towards the cost of invasive, confirmatory prenatal diagnostic testing including but not limited to amniocentesis, chorionic villus sampling (CVS), karyotyping analysis, chromosome in situ hybridization and fluorescence in situ hybridization (FISH). The reimbursement will be up to maximum reimbursement amount of 12,500 baht.

- Compensation for “False Negative” result (except mosaic chromosomal abnormality and vanishing twin)

The non-invasive prenatal testing (NIPT) should be considered a screening test only. Although, the non-invasive prenatal testing (NIPT) has high accuracy rate, false negative result may happen. If the test result is false negative, non-invasive prenatal testing (NIPT) result shows “Low Risk” but that later your baby is diagnosed with either trisomy13, trisomy 18 or trisomy 21 (karyotyping result shows 47,+13 for trisomy 13, 47,+18 for trisomy 18 or 47+21 for trisomy 21) by a qualified healthcare professional within one year of baby’s birth date or you have terminated the pregnancy, you are eligible for compensation up to a maximum of 1,000,000 baht