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## Maternal PKU and Pregnancy

This sheet talks about the risks that having PKU can have during pregnancy. With each pregnancy, all women have a 3% to 5% chance of having a baby with a birth defect. This information should not take the place of medical care and advice from your health care provider.

### ***What is PKU?***

PKU stands for phenylketonuria, an inherited condition where the body is missing an enzyme that is needed to break down an amino acid called phenylalanine, or Phe for short. Since people with PKU cannot properly digest Phe, Phe and similar compounds build up in the body. This can lead to problems with brain development and mental retardation. However, treatment with a special diet can decrease the levels of Phe in the body so that this damage does not occur. Newborns in North America are checked for PKU at birth.

### ***Is there any reason to continue the diet in adulthood?***

Currently, medical professionals recommend staying on the diet lifelong to ensure the healthiest development. It is particularly important for females with PKU to stay on the diet, since increased Phe levels during a pregnancy can cause problems for an unborn baby. This is referred to as Maternal PKU effects. Since half of all pregnancies are not planned, it is especially important for women with PKU to maintain the diet even if they are not actively trying to get pregnant.

### ***What effects do high levels of Phe have on a developing baby?***

Babies born to mothers with untreated PKU (women who are not on the special diet) are commonly born smaller, have microcephaly (an abnormally small head), mental retardation, behavior problems, characteristic facial features similar to those of the fetal alcohol syndrome, and have higher risks of heart defects.

### ***Is there anything I can do to prevent these effects?***

The same diet you were on as a child can reduce your Phe levels, which in turn reduces the chance for your baby to have any of the problems related to Maternal PKU. The goal is to get your Phe levels below 6 mg/dl (or 360  $\mu$ mol/l). Dietary control

should start *before* conception, because it may take some women longer than others to get their Phe levels down. The diet should be continued throughout pregnancy.

One large study looked at over 550 pregnancies in women with PKU, some of which were on a restricted diet before conception and others who began the diet once the pregnancy was recognized. Babies born to mothers on the special diet before conception or before 8 to 10 weeks of pregnancy had similar brain development as babies born to women without PKU. Women who did not start the diet until after the first trimester (after 12 weeks of pregnancy) had babies who did poorer on developmental tests. Therefore, the special diet should be started as soon as possible in order to increase your chances of having a healthy baby.

It is important to talk to a dietician and a geneticist *before* getting pregnant: they will provide you with more specific information on the diet and will follow you throughout your pregnancy. Getting enough protein (other than Phe) and vitamins, especially vitamins from the B group like folic acid and vitamin B12, is also important for your baby's development.

### ***I am 11 weeks pregnant. Will it help if I go on the diet now?***

Yes. Your baby continues to grow and the brain develops throughout the pregnancy. Untreated PKU has a direct effect on growth and brain development. So, it is still a good idea to go on the diet and maintain low levels of Phe. However, the first 12 weeks of pregnancy are the critical period for the organs, including the heart, to form. Therefore, starting the diet after the first trimester does not lower the risk for birth defects. Consult a dietician and a geneticist as soon as possible when you find out you're pregnant.

### ***What does the diet consist of?***

The diet replaces foods containing high amounts of Phe, such as meats, dairy products and nuts, with low protein foods such as certain grain products, fruits, and some vegetables. There is also a special low Phe formula to make sure that you will get the essential nutrients. A dietician or other health care professional familiar with PKU can provide you with more specific information on the diet.

### ***Is there any treatment other than the diet that could help me to maintain low Phe levels during pregnancy?***

In recent years, drugs and nutritional supplements, like sapropterin (Kuvan<sup>®</sup>) and BH4 (tetrahydrobiopterin), have been used to help reduce blood Phe levels with or without a restricted diet. Not all people who have PKU will respond to these drugs.

Individual reports on 7 pregnancies with restricted diet and sapropterin therapy have been promising. More studies are needed on the safety and efficacy of these treatments.

### ***Is there any way to know if my baby will have problems related to Maternal PKU?***

A detailed ultrasound around 18-20 weeks of pregnancy can look for a heart defect or a growth problem, including microcephaly. However, changes in learning and behavior cannot be seen before a baby is born.

### ***Will my baby need to be on the diet?***

Your baby will only need to be on the special low phenylalanine diet if he or she also has PKU. In all states and provinces in North America, newborns are tested for PKU before they leave the hospital.

### ***Can I breastfeed my baby if I have PKU?***

If the baby does not have PKU, breastfeeding is not a problem. If you stay on the diet after you deliver, the baby should not be exposed to high levels of Phe. Your doctor can also measure the Phe levels in the baby to make sure they are not elevated after breastfeeding.

Babies with PKU can be breastfed, but they need to be followed strictly by a dietician and a geneticist, and their Phe blood level checked to make sure they receive the correct amount of phenylalanine. Alternating breastfeeding with a special PKU formula (with low Phe levels) is usually done. Different approaches are possible, depending on the experience of the medical team taking care of you and your baby.

### ***What if the father of the baby has PKU?***

There have been two small studies that suggest that there is no increased risk for birth defects

when the father has PKU. In some men, PKU may reduce their fertility.

### ***What is the chance that my baby will have PKU as I do?***

A baby can only have PKU if both the mother and the father carry a specific genetic change for PKU. Since you have PKU, you have two non-working genes for PKU, one from your mother and one from your father. You will always pass on one non-working gene for PKU to your children. A person who has only one non-working gene for PKU is called a carrier for PKU. Carriers of PKU are healthy.

If the father of the baby does not have PKU and is not a carrier, none of your children will have PKU, but they will all be carriers. However, if you have children with someone who is a carrier of PKU, then there is a 50% chance for each child to have PKU. Finally, if you have children with someone who also has PKU, all of your children will have PKU. Testing to find out if a partner is a carrier of PKU is possible in some families, and if the specific genetic change is found, prenatal testing may also be available. A genetic counselor or other health care professional can provide more information.

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