1. What is nuclear medicine and molecular imaging?

✓ **Nuclear imaging** is a type of test used by doctors where a small amount of special substance called a “radiopharmaceutical” is used to look at the different organs of your child’s body and how they are working. These substances are usually injected into the blood or other part of the body and show the problem to the doctor. Nuclear medicine tests give information different from CT scans, MRI or X-rays. These tests can sometimes detect medical problems before they are seen with other types of medical tests.

Nuclear medicine drugs can also be used for treatment of some types of cancers and medical problems such as thyroid problems

**Molecular imaging** is a medical field that looks at different diseases down to the level of the functions of cells and molecules. A disease can be diagnosed and treated better according to how it acts in each person’s body.

2. How are nuclear medicine studies done?

✓ Patients are given a very small amount of a radioactive drug, also known as radiopharmaceutical or radiotracer. The radiopharmaceutical is most often given through a vein (intravenously) with a small needle. Depending on the test, sometimes it can be given by mouth or by breathing in or by putting a tube gently into the bladder or the stomach. Placing the needle may hurt a little, but trained and caring staff makes it easier. These radiopharmaceuticals give off energy called gamma rays, which are very similar to x-rays that can be seen by special cameras. The camera does not touch the patient and it does not make any radiation. These big cameras make pictures of these radiopharmaceuticals as they move in the body and go to different organs. Depending on the study, the test may start right after the drug is given or after waiting for a few hours. The total time of the test depends on the type of test being done. It may take a few minutes, many hours or, sometimes even days for the radiopharmaceuticals to go to the tissues or organs that are being studies.
It is very important for the child to not move when the pictures are being taken that can take from a few minutes to up to an hour.

3. If my child’s doctor requests a nuclear medicine test, should I allow it?
   ✓ Different tests are needed depending on why your child is ill. Before asking for any imaging test, your child’s doctor makes sure that benefits of doing the tests are more than any small risks from it. Sometimes, a nuclear medicine test may be the best way to diagnose the problem. You can always ask the doctor if another test is better. You can also ask your doctor if there is a test such as Ultrasound or MRI that does not use radiation. However in many cases, the nuclear medicine test is the one that will give your doctor the right information to better treat your child. You should have an opportunity to have your questions answered. Your doctor and the nuclear medicine physician will work together to decide which test is best for your child.

4. How much radiation exposure is in a nuclear medicine test?
   ✓ Nuclear medicine studies have been done on babies and children of all ages for more than 40 years. Children receive only a very small amount of radiation from this test. Nuclear medicine doctors make sure that your child receives the smallest radiation dose needed to obtain the pictures. The dose depends on the type of the radiotracer, child’s weight, reason for the test and the part of the body. In some cases drinking lot of fluids and going to the bathroom often can help radiotracers to get out of the body faster. Most Nuclear Medicine exams give a radiation dose that is about the same as the radiation we get each year from natural radiation. Some parents also wonder about radiation coming from their child after a radiotracer is given. In most cases, this amount is small and the parent can stay with their child during the test.

5. Is there an increased risk of cancer from nuclear medicine tests?
   ✓ Radiation from a nuclear medicine test has some risks, just like risks from other medical tests. In general, a nuclear medicine test is considered to be safe. During this test, a child receives a small amount of a drug that gives
off radiation. The radiation dose is about the same as from other X-ray exams. This dose may lead to slight increase in the risk of getting cancer sometime in the child’s life. The risk is higher for the younger children, but is still very small. To give you an example, in the United States, the risk of getting cancer from a bone scan, which is a common nuclear medicine test is about 1 in 2500, while the risk of dying from a car accident is 1 in 300. Of the 2,500 children who receive a bone scan, approximately 550 will naturally die of cancer sometime in their life and 1 additional case may be due to the bone scan. The risk is very low and it is not certain that there will be a problem from the test for your child.

6. How can we reduce radiation risk to my child?
✓ We are all exposed to some radiation in our daily life from the earth, buildings and from space. This is called background radiation. The amount of radiation a child is exposed to from a nuclear medicine test is small and has never been shown to be harmful. However, it is still important to reduce the radiation dose. Nuclear medicine doctors make sure that your child is exposed to the smallest amount of radiation possible during these tests. Your doctor and the nuclear medicine physician will work together to decide which exam is best to do.

7. Whom can I talk to about my concerns?
✓ You should always start by asking your child’s doctor. They will know or can find out from the nuclear medicine staff if any other test may be as useful or better for your child’s illness. Your doctor can also find out if your nuclear medicine center “child sizes” the dose. You may also speak with the technologist or nuclear medicine physician in the nuclear medicine department. Finally this website may be a useful resource for you and your doctors.