What is an X-ray?
X-rays are invisible beams of high energy radiation called ionization radiation that pass through the body and are altered by different tissues to create 2-dimensional images of many organs.

What is a CT scan?
CT scans use x-rays generated from a source that is rotated around the body to create 3-dimensional pictures of the body. CT studies can provide critical information for the care of your child, but obtaining the images results in more radiation exposure for the study than a single X-ray.

How much radiation is used in these exams?
We all are exposed to small amounts of radiation daily from soil, rocks, building materials, air, water, and cosmic radiation. This is called naturally occurring background radiation. The radiation used in X-rays and CT scans has been compared to background radiation we are exposed to daily. This comparison may be helpful in understanding relative radiation doses to the patient.

<table>
<thead>
<tr>
<th>Radiation source</th>
<th>Days background radiation</th>
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<tbody>
<tr>
<td>Background</td>
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<tr>
<td>Chest X-ray (single)</td>
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<tr>
<td>Head CT</td>
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<td>Abdominal CT</td>
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What are the risks from medical radiation?
There is no conclusive evidence that radiation from diagnostic X-rays causes cancer. There are some studies of large populations exposed to radiation have demonstrated slight increases in cancer risk even at low levels of radiation exposure in children, but other studies that do not demonstrate this risk or emphasize that the risk is uncertain. To be safe, we should act as if low doses of radiation may cause harm.

The risk for radiation induced cancers should be evaluated against the statistical risk of developing cancer in the entire population. The overall risk of a cancer death over a person’s lifetime is estimated to be 20-25%. For every 1,000 children, 200-250 will eventually die of cancer if never exposed to medical radiation. The estimated increased risk of cancer over a person’s lifetime from a single CT scan is controversial but has been estimated to be a fraction of this risk (0.03- 0.05%). These estimates for the population as a whole do not represent a direct risk to one child. This information shows that the risk of developing cancer related to a single CT scan is very small, if a risk at all.

How can we minimize radiation risk to my child?
There are ways to ensure that your child is exposed to the smallest amount of radiation possible during an imaging study. The Image Gently Campaign is promoting optimal scanning strategies for children and they are listed below:

- Image when there is a clear medical benefit
- Use the necessary amount of radiation for adequate imaging based on size of the child; avoid excess
- Image only the indicated area
- Do not perform multiple scans (series) during the examination if one series is enough
- Use another type of study (such as ultrasound or MRI which don’t depend on ionizing radiation) when appropriate

If I still have concerns regarding radiation exposure to my child, whom should I talk to?
You should first talk to the physician or other healthcare provider who is requesting your child’s exam. Your provider and the radiologist can work together on decisions about which study is best to perform. If you still have questions, ask to speak to the radiology physician or other imaging expert such as a dentist.

The information contained in this publication should not be used as a substitute for the medical care and advice of your pediatrician. There may be variations in treatment that your pediatrician may recommend based on individual facts and circumstances.