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## Routine Screening for Lung Cancer by Helical Computed Tomography (CT)

### Introduction

Lung cancer is the leading cause of death for both American men and women. It is estimated that there will be 164,100 new cases of lung cancer during 2000.<sup>1</sup> In Minnesota, an estimated 2,300 new cases of lung cancer are diagnosed each year and approximately 2,200 Minnesotans will die of lung cancer annually.<sup>2</sup> The survival rate for individuals with lung cancer is generally poor, with less than 15% of patients surviving five years after diagnosis.<sup>1</sup>

By far, the greatest risk factor (something that increases a person's likelihood of getting a disease) for lung cancer is smoking. Approximately 8 out of 10 cases of lung cancer are thought to be the result of smoking. Symptoms of lung cancer include: a cough that does not go away; wheezing; shortness of breath; chest pain, especially if made worse by a deep breath; hoarseness; weight loss or loss of appetite; bloody or rust colored spit or phlegm; recurring infections; and fever without a known reason. Lung cancer is a life-threatening disease, which often takes years to develop and can spread to other parts of the body before it is discovered.<sup>1</sup>

### Helical Computed Tomography (CT) Scan

Helical computed tomography (CT) is a radiographic method that can provide high quality, three-dimensional images of the lungs during a single breath-hold. Chest x-rays can generally not detect lung nodules smaller than 10 mm in diameter, while helical CT is more sensitive than chest x-ray and can often detect lung nodules as small as 5mm in diameter. Therefore, helical CT may detect lung cancers at an earlier stage.

Helical CT, also known as spiral CT, traces x-rays in a spiral path through the patient's chest. During a helical CT lung scan, the patient lies on his or her back on the examination table while the table moves through the scanner frame. Helical CT scanners can image entire regions of the body, such as the lungs, during a single breath hold of approximately 20 seconds, about 10 times faster than conventional CT scanners, and with less radiation exposure.<sup>3</sup> If a suspicious nodule is detected, additional scans may be performed to provide more detailed images. A lung scan is non-invasive and does not require the use of contrast material or other preparation, and no sedation is needed.<sup>3</sup>

This imaging method has been proposed as a way to detect early lung cancer in the general population or in individuals who are showing no disease symptoms, but who may be at high-risk. However, at the present time, there is no evidence that screening individuals without signs or symptoms for lung cancer with helical CT can increase

actual survival time or reduce lung cancer-related deaths.<sup>4-7</sup> Some individuals without cancer symptoms who are curious about their health are purchasing helical CT scans out-of-pocket.<sup>8</sup> Since helical CT can detect very small lung nodules whose appearance may be ambiguous in regard to cancer, more non-cancerous nodules are detected as compared to routine chest x-ray.<sup>9</sup> These false-positive results may lead to unnecessary secondary testing causing anxiety, additional medical expense and potential risk to patients.

### **Accuracy**

The accuracy of helical CT for detection of lung cancer has not been well documented.<sup>10</sup> The best clinical use of low-dose helical CT scanning for lung cancer screening has not been determined, although most studies agree that 5 mm is the smallest lung nodule that can be detected under most imaging procedures.<sup>11-13</sup> The false-positive rate for CT lung scans is relatively high, although a positive result is generally followed with additional imaging tests before a surgical procedure, such as biopsy, is performed.<sup>9</sup> If a lung nodule is found during repeated screening, physicians have developed criteria for determining when it may be cancerous or benign depending on factors that include the size and shape of the nodule. Non-cancerous appearing nodules up to 5 mm in diameter are followed with repeated Helical CT scans in 3, 6, 12 and 24 months. If the nodule is 6-10 mm in diameter, patients may either be followed with helical CT or a biopsy. If the nodule is greater than 10 mm, a biopsy is generally performed.<sup>9</sup>

### **Patient Selection**

The benefits of screening individuals who are showing no disease symptoms for lung cancer have not been proven, and therefore no criteria for patient selection have been established. There is evidence that helical CT scanning is more sensitive than chest x-ray for detecting lung cancer, and therefore this type of imaging may be considered an appropriate tool in diagnosis of selected individuals who are showing symptoms of lung cancer.<sup>14</sup> However, there is no evidence that diagnosing and treating lung cancer at an earlier stage has an affect on the eventual outcome.<sup>4-7</sup>

### **Cost of Procedure**

Helical CT for lung cancer screening is generally less expensive than a full conventional CT scan, but more expensive than a routine chest x-ray.<sup>9</sup> In Minnesota, a helical CT scan costs between \$300-\$500.<sup>8</sup> Generally, unless a patient has specific signs and symptoms that warrant a physician ordering a helical CT scan, the cost of the scan will not be covered by medical insurance.

### **Conclusion**

At the present time, a number of professional organizations including the National Cancer Institute and the United States Preventive Services Task Force recommend against routine screening of persons without symptoms for lung cancer. These organizations suggest the highest priority should be given to programs that encourage people to stop smoking, which is by far the most effective way to reduce lung cancer deaths.

The key question regarding lung cancer screening, by any method, is whether screening produces a health benefit through increasing survival time, improving quality of life, and/or reducing lung cancer-related deaths. There is evidence that helical CT scanning is more sensitive than conventional chest x-ray, and can detect cancers at an earlier stage. However, there is no evidence that diagnosing and treating lung cancer at an earlier stage can increase survival time or reduce lung cancer-related deaths. Also, helical CT scanning produces more false-positive results than does chest x-ray, which may lead to unnecessary secondary testing causing anxiety, additional medical expense and potential risk to patients.

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