agnosis associated with ionizing radiation, including whole lung and 55° oblique tomography, as well as fluoroscopy associated with angiography, bronchography, and even bronchoscopy.

Is thoracic CT performed too often? In our judgment, thoracic CT is more likely underutilized than the opposite! Appropriately integrated into the overall decision making process, in our experience, CT consistently has proved cost-effective by expediting timely diagnosis, serving as a roadmap for diagnostic procedures, especially bronchoscopy, avoiding unnecessary diagnostic and/or invasive procedures, and simplifying follow-up evaluation. It may further be anticipated that the indications for the use of CT will continue to expand as further technologic breakthroughs, including spiral and ultrafast CT become more widely available.\(^\text{20,21}\)

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In Search of the Appropriate Use of Chest Computed Tomography

In a previous editorial in *Chest*,\(^1\) we noted that chest computed tomography (CT) scanning is a useful modality that has had a significant impact on the diagnosis and management of chest disease. It was also pointed out that chest CT involves substantial cost and radiation risk. We indicated that the performance of conventional CT results in radiation exposure equivalent to 100 routine chest radiographs and that high resolution CT (HRCT) (full lung evaluation) has the potential for significantly higher radiation exposure. Based on the costs, risk, and lack of controlled trials evaluating the efficacy of this test on patient outcome, we questioned the prudence of a volume of CT scans currently being performed. In an accompanying editorial in this issue of *Chest* (see page 331), Naidich and colleagues have taken the opposite stance, arguing instead for under rather than overutilization of chest CT scanning. We welcome the debate since this issue is important and one that has not been carefully examined or studied. While this forum does not allow extensive discussion of this subject, some issues merit further comment.

There is agreement concerning radiation exposure

resulting from conventional CT; however, Naidich et al refer to a very recent study indicating that HRCT usually results in substantially less radiation than we stated. Our information of radiation exposure from HRCT was based on contiguous scanning (which is still performed in some instances) and interestingly, was published by one of the coauthors of the accompanying editorial. Even if one assumes that the radiation exposure indicated by Naidich et al is correct, HRCT, however, would still result in a 10- to 20-fold greater radiation exposure than that of a single chest radiograph. To minimize the potential health consequences of such exposure is inappropriate and unwise. Recent studies suggest that the relationship between cancer and low doses of radiation is greater than previously thought. Furthermore, recent reviews have examined the very real, albeit small, cancer risk associated with a single chest film. Not surprisingly, therefore, patients are more often questioning their physicians as to the need for such tests.

We agree with the statement by Naidich et al that "the indications for use of ionizing radiation always need to be weighed against the potential risks of exposure." This statement, however, raises two important questions: first, how well defined are the indications for chest CT; and second, are ordering physicians aware of the degree of radiation exposure? To determine the appropriateness of any test, it is necessary to determine estimates of its sensitivity and specificity. Yet, such values for the use of chest CT with regard to a wide variety of chest disorders are unknown. Consequently, clear and well-defined indications for the use of chest CT do not exist. Concerning the second question, we recently assessed current attitudes of physicians (family practice, internal medicine, pulmonary medicine, and thoracic surgery) in a nationwide survey regarding the use of chest CT. Not surprisingly, the ordering practices and attitudes regarding thoracic CT varied with specialty. The most striking finding was the fact that a large majority of clinicians either did not know or underestimated the degree of radiation exposure associated with chest CT scanning. Most clinicians also perceived an inability of chest CT to improve patient outcome in a majority of cases despite its ability to often provide new information and influence patient management. The lack of knowledge of radiation risk associated with chest CT sharpens the focus and begs the question as to whether the same volume of tests would have been performed had the clinicians been fully aware of the radiation exposure associated with this test.

Finally, no discussion of medical diagnostic testing, particularly in our current medical environment, is complete without some mention of cost consider-