

To X-Ray or Not in Child With Signs of Pneumonia

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HONOLULU — Of 526 children presenting to an emergency department with wheezing—but no fever or hypoxia—only 3.7% turned out to have radiographically diagnosed pneumonia.

On the other hand, of 308 children without the classic lower respiratory tract signs and symptoms, 6.8% had definite pneumonia and another 4.2% had equivocal results from chest x-rays, according to two related poster presentations at the annual meeting of the Pediatric Academic Societies.

Taken together, the results of the two studies make the decision of whether to order a chest x-ray a complex one.

The decision whether to x-ray is even more difficult when children don't have the classic lower respiratory tract signs and symptoms of pneumonia.

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According to Dr. Bonnie Mathews of the emergency department at Children's Hospital Boston, routine chest x-rays should be discouraged in children with wheezing but without fever

or hypoxia because so few of them turn out to have pneumonia. Dr. Mathews was the lead investigator in the study of the children referred to chest x-ray with lower respiratory signs and symptoms.

But the decision is much more difficult in children without these signs, said Dr. Sonal Shah, also of the emergency department at Children's. Dr. Shah was lead investigator in the study of the children without the classic pneumonia signs and symptoms who were referred to chest x-ray. Of those children, 21 turned out to have definite occult pneumonia, and in another 13, radiographic findings were equivocal. (Dr. Shah and Dr. Mathews were among the coauthors of each other's paper.)

In an interview, Dr. Shah said that the investigators had hoped to find some predictors indicating which patients without lower respiratory tract findings are more likely to have occult pneumonia. Unfortunately, of the 20 variables they examined, only 2 showed significant associations with positive radiographic signs, and those associations were relatively weak statistically. Patients with confirmed pneumonia tended to have a more acute onset of chest pain (under 1 day) than those without pneumonia. And children with confirmed or equivocal occult pneumonia tended to have a longer duration of fever (more than 1 day). But few children had both acute onset of chest pain and longer duration of fever, and the *P* values—0.5 and 0.4, respectively—were so close to the statistical cutoff for determining significance that it would not be appropriate to give recommendations on that basis, said Dr. Shah, also of Harvard Medical School, Boston.

The situation among children with

wheezing was more definitive, Dr. Mathews said in an interview. Of 526 children between the ages of 0 and 21 years in her study, 30 (5.7%) turned out to have pneumonia on chest x-ray. Of those 30, 23 (77%) had a fever and 7 (23%) had an oxygen saturation of less than 93%. In a bivariate analysis, children with low oxygen saturation turned out to be 2.74 times more likely to have confirmed pneumonia than those without, and those with a triage temperature of 38°C (100.4°F) or

more were 1.75 times more likely to have confirmed pneumonia, said Dr. Mathews, also of Harvard.

In all, only 3.7% of the children without fever or low oxygen saturation turned out to have pneumonia as confirmed by chest x-ray.

"A lot of kids get x-rays that don't need them," Dr. Mathews said. "A lot of health care dollars are spent, and there's a lot of radiation that these kids undergo." This situation is particularly worrisome for chil-

dren who return to the emergency department with wheezing on several occasions.

She said, however, that she had not done a formal cost-benefit analysis, acknowledging that the monetary and radiation-burden costs could perhaps be balanced, at least to some extent, by the benefit involved in detecting pneumonia in that small proportion of wheezing children without fever or low oxygen saturation.

Dr. Mathews and Dr. Shah declared they had no relevant conflicts of interest. ■

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