Point-of-care ultrasound is more accurate than the stethoscope in diagnosing pneumonia in children

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Point-of-care ultrasound is more accurate than the traditional method of auscultation by stethoscope in diagnosing pneumonia in children and young adults, and can even detect small pneumonias that a chest x-ray may miss, a Mount Sinai researcher reports in an article titled, "Prospective Evaluation of Point-of-Care Ultrasonography for the Diagnosis of Pneumonia in Children and Young Adults" in the online edition of *Archives of Pediatrics & Adolescent Medicine* published December 10, 2012.

These findings have important public health implications, especially in the developing world, as pneumonia is the leading cause of death in children worldwide. Pneumonia kills an estimated 1.2 million children under the age of five years every year – more than AIDS, malaria and tuberculosis combined.

"The World Health Organization has estimated as many as three-quarters of the world's population, especially in the developing world, does not have access to any diagnostic imaging, such as chest x-ray, to detect pneumonia," said senior author James Tsung, MD, MPH, Associate Professor of Emergency Medicine and Pediatrics at Mount Sinai School of Medicine. "Many children treated with antibiotics may only have a viral infection— not pneumonia. Portable ultrasound machines can provide a more accurate diagnosis of pneumonia than a stethoscope."

Dr. Tsung of Mount Sinai, along with collaborators Vaishali Shah, MD of the Children's Hospital at Montefiore and Michael G. Tunik, MD of Bellevue Hospital Center/NYU School of Medicine, studied 200 patients from birth to 21 years of age who were presented to the emergency department with suspected community acquired pneumonia at Bellevue Hospital Center from 2008-2010. The criteria for inclusion were patients requiring a chest x-ray for evaluation. Sonologists, clinicians who perform and interpret ultrasonography, were given one hour of focused training prior to the start of the study on the use the ultrasonography to diagnose pneumonia.

Researchers found point-of-care ultrasound to be highly specific (97 percent) for diagnosing pneumonia, with sensitivity as high as 92 percent that can be achieved with training and experience. The accuracy for diagnosing pneumonia with the stethoscope was lower: specificity ranged from 77-83 percent, and sensitivity at 24 percent.

Further analysis of the data at Mount Sinai Medical Center revealed that ultrasound was able to identify pneumonia too small (less than 1 centimeter) for a chest x-ray to detect in 12 out of 48 patients with confirmed pneumonia.

Dr. Tsung and colleagues noted that diagnosing pneumonia with a stethoscope can be more difficult when a patient is wheezing or has co-existing diseases like asthma or bronchiolitis. This is not a problem for ultrasound.

Pneumonia is a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli. The alveoli fill with air when a healthy person breathes. When an individual has pneumonia, the alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake.

Provided by The Mount Sinai Hospital