

## ORIGINAL RESEARCH

## Diagnosis and management of pneumonia and bronchitis in outpatient primary care practices

\*Jennifer Evertsen<sup>a,b</sup>, Dennis J Baumgardner<sup>a,b,c</sup>, Ann Regnery<sup>a</sup>, Indrani Banerjee<sup>b</sup><sup>a</sup> University of Wisconsin School of Medicine and Public Health, Milwaukee, USA<sup>b</sup> Center for Urban Population Health, Milwaukee, USA<sup>c</sup> Aurora UW Medical Group, Milwaukee, USA

Received 30th September 2009; resubmitted 18th January 2010; revised 19th February 2010; accepted 11th March 2010; online 21st May 2010

**Abstract**

**Aims:** To understand which clinical criteria physicians use to diagnose pneumonia compared to bronchitis and upper respiratory tract infection (URTI).

**Methods:** Retrospective chart review of adults diagnosed with pneumonia, bronchitis, or URTI.

**Results:** Logistic regression analysis identified rales, a temperature  $\geq 100^\circ\text{F}$  ( $37.8^\circ\text{C}$ ), chest pain, dyspnoea, rhonchi, heart rate, respiratory rate, and rhinorrhoea, as the best explanation for the variation in diagnosis of pneumonia compared to either of the alternative diagnoses ( $R^2 = 59.3$ ), with rales and a temperature  $\geq 100^\circ\text{F}$  explaining 30% of the variation. Rales, chest pain, and a temperature  $\geq 100^\circ\text{F}$  best predicted the ordering of a chest x-ray ( $R^2 = 20.0$ ). However, 35% (59/175) of patients diagnosed with pneumonia had a negative chest x-ray. Abnormal breath sounds were the best predictors for prescribing antibiotics ( $R^2 = 38\%$ ). A significant number of patients with acute bronchitis (93% excluding sinusitis) and URTI (42%) were given antibiotics.

**Conclusions:** The presence of abnormal breath sounds and a temperature  $\geq 100^\circ\text{F}$  were the best predictors of a diagnosis of pneumonia.

© 2010 Primary Care Respiratory Society UK. All rights reserved.

J Evertsen *et al.* *Prim Care Resp J* 2010; 19(3): 237-241

doi:10.4104/pcrj.2010.00024

**Keywords** pneumonia, bronchitis, antibiotics, URTI, prediction rule, management, primary care

See linked editorial by Newbegin and Macfarlane on page 200

**Introduction**

Since the early 1990s, a number of different organisations have developed guidelines for the management of patients with community-acquired pneumonia.<sup>1</sup> These guidelines are similar, yet each has unique features with respect to its focus and recommendations.

Several investigators have attempted to design criteria to improve the detection of pneumonia in ambulatory patients as well as those presenting to emergency departments.<sup>2-12</sup> According to clinical guidelines, the gold standard for diagnosing pneumonia is the presence of lung infiltrates indicated by chest radiography.<sup>1,2</sup> A diagnostic study of pneumonia in adults in general practice found inconsistency in the radiologists' interpretation of the same chest radiograph, yet chest radiography is considered the best way

to distinguish pneumonia from other respiratory tract infections.<sup>13,14</sup> Due to its unavailability and cost restrictions, patients seen in primary care clinics for possible pneumonia may not get a chest x-ray. As a result, untreated patients with unresolved chest infections may be labeled as having pneumonia in order to justify antibiotic prescriptions, despite guidance which advises against routine antibiotic use in patients with upper respiratory tract infection (URTI).<sup>14</sup>

According to guidelines, chest infection is divided into acute bronchitis (for which antibiotics are not recommended) and pneumonia (for which antibiotics are recommended).<sup>14</sup> The effectiveness of antibiotic treatment in reducing the risk of complications of pneumonia has already been validated in several studies, but the use of antibiotics to reduce the risk of serious complications for acute bronchitis or URTI is generally not justified.<sup>14-22</sup> Given the emergence of antibiotic-resistant strains of bacteria such as *Streptococcus pneumoniae* and *Haemophilus*

\* **Corresponding author:** Ms Jennifer Evertsen, University of Wisconsin School of Medicine and Public Health, Center for Urban Population Health 1020 N. 12th Street, Milwaukee, WI 53233, USA. Tel: 001 414 219 5594 Fax: 001 414 219 6563 E-mail: evertsen@wisc.edu







