

# Moderate- and high-intensity implementation of guidelines increased outpatient care of low-risk pneumonia

Yealy DM, Auble TE, Stone RA, et al. Effect of increasing the intensity of implementing pneumonia guidelines: a randomized, controlled trial. *Ann Intern Med.* 2005;143:881-94.

**Clinical impact ratings:** Emergency Med ★★★★★☆☆ Hospitalists ★★★★★☆☆ Infectious Disease ★★★★★☆☆ Pulmonology ★★★★★☆☆

## QUESTION

In patients with community-acquired pneumonia (CAP), what is the relative safety and effectiveness of low-, moderate-, and high-intensity implementation of treatment guidelines?

## METHODS

**Design:** Cluster randomized controlled trial.

**Allocation:** {Concealed}†.\*

**Blinding:** Blinded {patients and data collectors interviewing patients}†.\*

**Follow-up period:** Up to 30 days.

**Setting:** 16 emergency departments (EDs) in Connecticut and 16 in Pennsylvania, United States.

**Patients:** 3615 patients ≥ 18 years of age with a clinical diagnosis of CAP and a new pulmonary infiltrate identified by radiography. Exclusion criteria included hospital-acquired pneumonia, immunosuppression, specified comorbid conditions (e.g., cystic fibrosis and pulmonary tuberculosis), psychosocial conditions or substance abuse problems incompatible with outpatient treatment, homelessness, and pregnancy. Patients were categorized into low- and high-risk groups according to Pneumonia Severity Index (PSI) scores.

**Intervention:** Low- (8 EDs, *n* = 740), moderate- (12 EDs, *n* = 1162), or high- (12 EDs, *n* = 1317) intensity guideline implementation strategies. Low-intensity implementation strategies were typical quality improvement (QI) methods used by collaborating QI organizations. The moderate-intensity sites

had an additional requirement to address the site of treatment (inpatient vs outpatient) for pneumonia and onsite education to use the PSI. The high-intensity sites received additional real-time reminders, audit and feedback, and continuous QI activities.

**Outcomes:** Proportion of low-risk patients treated as outpatients. Secondary outcomes were proportions of inpatients and outpatients treated with 4 recommended care processes, and safety (death, subsequent hospitalizations, and medical complications).

**Patient follow-up:** 3219 patients (89%) (median age range 65 to 70 y, 51% women).

## MAIN RESULTS

More low-risk patients in moderate- or high-intensity guideline implementation groups were treated as outpatients than were patients in the low-intensity group (Table). For the 3201 patients assessed for process of care, more outpatients and inpatients in the high-intensity group received all 4 recommended

processes of care than did low-intensity group patients (Table). Groups did not differ for any safety outcomes.

## CONCLUSIONS

In patients with community-acquired pneumonia, moderate- or high-intensity guideline implementation strategies were more effective than low-intensity guideline implementation for increasing outpatient treatment of low-risk patients. High-intensity guideline implementation increased recommended processes of care.

*Sources of funding:* Agency for Healthcare Research and Quality and National Institute of Allergy and Infectious Diseases.

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\*See Glossary.

†Information provided by author.

## Low-, moderate-, and high-intensity guideline implementation strategies for community-acquired pneumonia at up to 30 days†

Outcomes	Low	Moderate	High	RBI (95% CI)	NNT (CI)
Proportion of low-risk patients treated as outpatients	38%	—	62%	65% (45 to 89)	5 (4 to 6)
Outpatients that received all 4 processes of care§	38%	61%	—	62% (43 to 86)	5 (4 to 6)
Inpatients that received all 4 processes of care§	25%	—	61%	169% (92 to 226)	3 (2 to 5)
Inpatients that received all 4 processes of care§	23%	—	44%	105% (46 to 168)	5 (3 to 10)

‡Abbreviations defined in Glossary; RBI, NNT, and CI calculated from data in article.

§RBI, NNT, and CI calculated from adjusted odds ratios in article.

## COMMENTARY

Yealy and colleagues have conducted a timely study of the management of CAP, comparing multifaceted implementation strategies (moderate and high intensity) to a single strategy (low intensity).

Systematic reviews of interventions for CAP called for the use of evidence-based strategies and rigorous study designs (1, 2). The authors developed a tailored “study practice guideline” through a comprehensive process, including a systematic review of the literature, input from experts, and involvement of local clinicians. Although the particular guideline may not apply to all other settings, aspects of the effective implementation strategies should. Moreover, the study included a stringent cluster randomized trial design, which decreased risk for contamination between intervention and control groups. This design poses 2 major challenges: risk for imbalance in baseline characteristics, and less-than-independent action of practitioners within clusters (statistically captured in “the intraclass correlation”). Appropriately, the authors adjusted for imbalances between groups and used an a priori estimate for the intraclass correlation.

The moderate- and high-intensity implementation strategies led to improvement in a patient-important outcome by reducing unnecessary hospitalizations without negatively affecting satisfaction in patients who can safely be treated as outpatients (3). More data are needed to determine whether these benefits outweigh the downsides (e.g., resource requirements) of the multifaceted implementation strategies.

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## References

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3. Carratalà J, Fernández-Sabé N, Ortega L, et al. *Ann Intern Med.* 2005; 142:165-72.