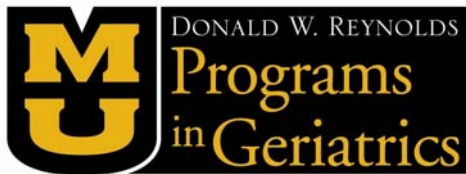


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RESPIRATORY INFECTIONS in the ELDERLY ♦ Part 1: Upper Respiratory Infections and Community-Acquired Lower Respiratory Infections

♦ David R. Mehr, MD, MS
Department of Family & Community Medicine
University of Missouri-Columbia

Long Term Links is now being partially supported by a grant to the University of Missouri from the Donald W. Reynolds Foundation. We are excited by the opportunity to extend geriatrics education programs more widely.

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While upper respiratory infections are more commonly associated with children and young adults, older adults are subject to both upper and lower respiratory infections as well, including pharyngitis, rhinosinusitis, bronchitis, influenza, and pneumonia. Many of these infections are caused by respiratory viruses; nonetheless, pneumonia in particular is usually treated assuming a bacterial etiology. For the most part, comfort is the key to treating the first three conditions, but at times antimicrobial therapy may be indicated. Limiting antimicrobial therapy to conditions for which there is reasonable expectation of benefit has become increasingly important because of the emergence of common organisms with multiple drug resistances, such as penicillin-resistant *Streptococcus pneumoniae* and fluoroquinolone-resistant organisms. A helpful series of guidelines for treating most of these conditions was developed by the Centers for Disease Control (CDC) with concurrence by The American College of Physicians-American Society of Internal Medicine (ACP-ASIM) and the

American Academy of Family Physicians (AAFP).¹ The Infectious Disease Society of America has also recently issued revised guidelines for the treatment of pneumonia.² Unfortunately, for pharyngitis, rhinosinusitis, and bronchitis, the evidence concerning older adults is very sparse. Many studies cut off enrollment at age 65, and the remaining studies usually include very few older subjects. In this first installment of a two-part article, I will address upper respiratory and community-acquired lower respiratory infections (bronchitis, influenza, and pneumonia). Nursing-home acquired lower respiratory infections will be discussed in the next issue.

Upper Respiratory Infections

The treatment of pharyngitis is similar in children and adults and primarily focuses on identifying Group A beta-hemolytic streptococcus, which should be treated with antibiotics. Most other infections are viral and should be treated symptomatically. The CDC guidelines can be consulted for

**Continued:
Respiratory Infections
in the Elderly**
David Mehr, MD

Long-Term Links

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further details on diagnosis and management of pharyngitis.³ *Rhinosinusitis* is the current preferred language for infections of the nose and sinuses, which often occur concurrently. Most are viral, and whether bacterial or viral, most will resolve spontaneously.⁴ Diagnosis of bacterial infection is challenging, as sinus puncture for culture is too invasive for routine care. However, infections of less duration than one week are rarely bacterial. Therefore, except for the unusual very severe sinus infection (high fever, pain, and swelling over a sinus), reserving antibiotic therapy for infections more than seven days old makes sense.⁴ Other signs and symptoms that have been associated with bacterial infection in emergency department and outpatient settings include: purulent nasal discharge, maxillary tooth or sinus pain (especially unilateral), unilateral maxil-

lary sinus tenderness, and worsening of symptoms after improvement ("second sickening"). According to the guideline, plain sinus radiographs are not recommended in evaluating rhinosinusitis because abnormal findings (especially mucosal thickening) are also common in viral infections.⁴ Table 1 provides recommendations for antimicrobial treatment of rhinosinusitis. Although the studies supporting these recommendations include very few older subjects, rhinosinusitis is rarely so severe that an error in treatment would be serious. Therefore, even in frail older subjects these recommendations would appear reasonable.

Bronchitis

The issues with bronchitis are more complicated. Bronchitis is defined as a respiratory illness with a persistent symptom of cough

Table 1. Antimicrobial Treatment for Rhinosinusitis

Treat with antibiotics only for severe illness (fever, pain, swelling over sinus) or for moderately severe illness persisting at least 7 days WITH:

- ♦ maxillary pain or tenderness in the face or teeth (especially unilateral) AND
- ♦ purulent nasal secretions

Drug of choice is amoxicillin

- ♦ High dose (1 gram three times daily) if specific concern for resistance (e.g., exposure to children with frequent otitis media)
- ♦ Alternatives include doxycycline and trimethoprim-sulfamethosazole

Based on conclusions and recommendations in: 1) Hickner JM, Bartlett JG, Besser RE, et al. Principles of appropriate antibiotic use for acute rhinosinusitis in adults: Background. Ann Intern Med. 2001;134:498-505; and 2) Snow V, Mottur-Pilson C, Hickner JM. Principles of appropriate antibiotic use for acute sinusitis in adults. Ann Intern Med. 2001;134:495-97.

Official state chapter



(and without evidence of pneumonia).⁵ In younger adults, the absence of fever (>38°C), tachypnea (>24 breaths per minute) and tachycardia (>100) is sufficient grounds for deciding that pneumonia is unlikely. However, in older adults these rules may not apply, as pneumonia often presents with limited symptoms (see below). Most bronchitis is viral, and there is little evidence that antibiotic treatment alters outcomes in healthy adults; however, very few older adults were included in these studies.⁵ There is some evidence that antibiotic treatment is beneficial in severe exacerbations of chronic obstructive pulmonary disease (COPD), although most randomized controlled trials were published before 1990.⁶ Furthermore, bronchitis alone may be fatal in frail older adults. In our study of lower respiratory infections in nursing homes (the Missouri LRI Study described further in the next issue), those who did not have pneumonia (and hence in most cases probably bronchitis) still had 9% 30-day mortality. The CDC guideline recommends against antibiotic treatment for bronchitis in healthy community-dwelling adults but does not comment on frail older adults or those with significant comorbidities, such as congestive heart failure or COPD.⁵ In such individuals, treatment antibiotic treatment may be appropriate, particularly if the illness appears more severe. Treatment decisions must be individualized. Albuterol may offer some relief from cough symptoms in bronchitis,⁵ although

different meta-analyses have come to different conclusions.

Influenza

Cough, fever, and severe malaise characterize Influenza. Mortality rates in frail older adults are significant.⁷ Rapid antigen tests are very useful in detecting the beginning of an outbreak, but in the midst of a known outbreak, clinician judgment is as accurate.⁵ Influenza vaccine can reduce mortality in older adults,⁷ and for nursing home residents, high rates of staff immunization are equally if not more important.⁸ Prophylactic antiviral medication provides additional protection for those with close contact with an ill person or for very high risk patients.⁷ It may be particularly useful in the event of a nursing home outbreak. Finally if started within 48 hours, antiviral medications can reduce the length of influenza illness.^{5,7} Amantadine and rimantadine are effective and approved for treatment and prophylaxis of influenza A infection.^{5,7} More recently two neuraminidase inhibitors, zanamavir and oseltamivir, have demonstrated benefit and received approval for treatment of both influenza A and B.^{5,7} Although evidence suggests both zanamavir and oseltamivir are also effective for prophylaxis,⁷ only the latter has received FDA approval to date. The two newer drugs

are also considerably more expensive.

Community-Acquired Pneumonia (CAP)

Pneumonia is the 6th leading cause of death and a leading cause of hospitalization in the elderly.⁹ In a recent Finnish community study, *Streptococcus pneumoniae* remains the most common organism in those over 65 (48%).⁹ Other reasonably common organisms included *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*, *Haemophilus influenzae*, and respiratory viruses. The prevalence of the atypical organisms (*Chlamydia* species and *Mycoplasma* species) and gram negative organisms has varied considerably among studies, with the latter most common in patients with severe infections.¹⁰ All studies of causative organisms should be interpreted cautiously, as most older adults are unable to produce sputum usable for culture.¹⁰ Penicillin-resistant *Strep pneumoniae* have become an increasing concern; however, often resistance is still intermediate with little data on serious adverse outcomes.^{2,10} More recently, resistance to fluoroquinolones has also begun to emerge, which has influenced the new Infectious Disease Society of America guideline.²

Older adults with CAP frequently present with less prominent symptoms than younger adults. Fever is variably present and declines with age. Metlay and colleagues

reported data from a large study of ambulatory and emergency department patients in three cities.¹¹ Very few of these patients were from nursing homes. They found that fever (at least 38°C) was present in 85% of adults 18-44, but only 60% of those 65-74 and 53% of those 75 or more. The number of symptoms was also fewer, but at least 80% had some respiratory signs or symptoms. Nonetheless, for over 100 years it has been observed that in frail older adults the presenting complaint can be quite non-specific, such as a fall, decreased eating or activity, or new or increased confusion.¹⁰

In assessing treatment plans, two factors should always be considered: goals of care and risk of a poor outcome. Some individuals with CAP may be near the end of life from a chronic illness, such as dementia, a malignancy, congestive heart failure, or chronic obstructive lung disease. If the goal of care has become primarily comfort, then any decision about hospitalization or antibiotic treatment needs to be considered from the perspective of whether it will enhance comfort. If palliative care is decided on, then a variety of measures may help with symptoms, including oxygen, morphine, and antipyretics. Unfortunately such discussions do not happen nearly often enough.

For the greater number of individuals in whom goals of care are not strictly palliative, Fine's Pneumonia Severity Index (found in this

month's insert) can be quite helpful.¹² It was developed for patients presenting to outpatient settings or emergency departments. Because it was developed for individuals of all ages, age is a prominent component — with men 71 or older and women 81 or older automatically placed in at least class III. Nonetheless, in many cases individuals with CAP who are class III or lower are good candidates for treatment outside the hospital. As with all tools, judgment is required. Individuals may also require admission if they are not maintaining oxygen saturation of at least 90%, cannot be relied on to take medications, have inadequate home support or other active problems requiring inpatient care.

The Infectious Disease Society of America has recently released new suggested antibiotic guidelines for CAP.² Abstracted from those guidelines, Table 2 lists recommended treatment for CAP that does not require ICU care. Recommendations for care of critically ill patients can be found in the full guideline. Recommendations for nursing home residents will be covered in part 2 of this review in the next issue. .

For particularly frail older adults, it may be appropriate to review treatment goals during or following an episode of CAP treated in the hospital. For example, individuals with severe dementia who are hospitalized with pneumonia have over a 50% six-month mortality despite aggressive hospital care.¹³

Such frail individuals with limited life expectancy may be appropriate for a palliative approach as discussed above.

Conclusion

Upper respiratory infections are predominantly viral and usually do not require antibiotic treatment. While the same consideration applies to bronchitis in generally healthy adults, there is little or no data concerning the elderly, and their treatment needs to be individualized. For pneumonia, consideration of appropriate goals of care and risk of mortality can help guide treatment decisions. In all cases, individualizing treatment is essential for optimum care.

Contact Dr. Mehr at
mehrd@health.missouri.edu.

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Table 2. Initial empiric therapy for CAP in immunocompetent adults

Patient type	Recommended treatment options
Outpatient	
Previously healthy	
No recent antibiotic therapy	A macrolide ^a or doxycycline
Recent antibiotic therapy ^b	A respiratory fluoroquinolone ^c alone, an advanced macrolide ^d plus high-dose amoxicillin, ^e or an advanced macrolide plus high-dose amoxicillin-clavulanate ^f
Comorbidities (COPD, diabetes, renal or congestive heart failure, or malignancy)	
No recent antibiotic therapy	An advanced macrolide ^d or a respiratory fluoroquinolone
Recent antibiotic therapy	A respiratory fluoroquinolone ^c alone or an advanced macrolide plus a beta-lactam ^g
Suspected aspiration with infection	Amoxicillin-clavulanate or clindamycin
Influenza with bacterial superinfection	A beta-lactam ^g or a respiratory fluoroquinolone
Inpatient (not in an ICU)	
No recent antibiotic therapy	A respiratory fluoroquinolone alone or an advanced macrolide plus a betalactam ^h
Recent antibiotic therapy	An advanced macrolide plus a betalactam or a respiratory fluoroquinolone alone (regimen selected will depend on nature of recent antibiotic therapy)

NOTE. Adapted from Mandell LA, et al. Update of Practice Guidelines for the Management of Community-Acquired Pneumonia in Immunocompetent Adults. *Clinical Infectious Diseases* 2003;37 (1 Dec):1405-33. (used with permission) COPD, chronic obstructive pulmonary disease; ICU, intensive care unit

a. Erythromycin, azithromycin, or clarithromycin.

b. That is, the patient was given a course of antibiotic(s) for treatment of any infection within the past 3 months, excluding the current episode of infection. Such treatment is a risk factor for drug-resistant *Streptococcus pneumoniae* and possibly for infection with gram-negative bacilli. Depending on the class of antibiotics recently given, one or other of the suggested options may be selected. Recent use of a fluoroquinolone should dictate selection of a nonfluoroquinolone regimen, and vice versa.

c. Moxifloxacin, gatifloxacin, levofloxacin, or gemifloxacin (recently approved)

d. Azithromycin or clarithromycin.

e. Dosage, 1 g po t.i.d.

f. Dosage, 2 g po b.i.d.

g. High-dose amoxicillin, high-dose amoxicillin-clavulanate, cefpodoxime, cefprozil, or cefuroxime.

h. Cefotaxime, ceftriaxone, ampicillin-sulbactam, or ertapenem; ertapenem was recently approved for such use, but there is little experience thus far.

Notes from the Best Practices Symposium

Feb. 6, 2004

David D. Cravens, MD, CMD

Attendees included MALTCP members Drs. Jeff Kerr, Chuck Crecelius, David Brunworth, and David Cravens, along with administrators of long-term care facilities, DHSS director, deputy director and legislative liaison, representatives of Missouri PRO, the ombudsman program and Missouri Hospital Association.

Dr. Jeff Kerr and Dick Dunn led a discussion on the physician's role in Best Practices Symposium and ways to maintain physician interest in serving. Projects will be sought on which to jointly collaborate, such as the End of Life Manual project, which hold common interest for both DSS and physicians. Additional physician roles suggested were to serve as educators for surveyors on "life in the trenches," getting information to nursing homes from DSS, educating CMS on moving from a prosecutorial approach to a resolution approach, and empowering nursing home staff through education and allowing them more responsibility, and improving organizational culture so that staff feel more valued, resulting in decreased staff turnover.

CMS will soon have a Scope and Severity Guidance on Urinary Incontinence. Requests for any new materials to help in training facility staff may be sent by e-mail to

the facilities or by posting on CMS or PRO internet site. There was discussion about use of the MDS Bulletin Board, but this is available only to long-term care facilities with an MDS password to access the site. There was interest in learning how often facilities access this information. Either DHSS or MO Pro will get the items of interest on their website.

Statistics were presented on full-survey deficiency-free facilities. There was wide variability, probably partly due to variability in staff turnover of surveyors region by region.

Tracy Cleeton reviewed clarifications from CMS regarding Life Safety Code. Exceptions are needed for facilities to have chairs in hallways for "resident rest-stops", isolation carts in proximity to rooms of residents on isolation, and lifts in hallways. A problem is that the people writing life safety codes aren't talking to the people in charge of resident care. It was suggested that the group draft letters to CMS, their federal representatives and senators regarding issues where resident safety is being overridden by arbitrary rules.

Betty Markway stressed that DHSS does not prohibit the use of Merry-Walkers in facilities, but that the resident needs to be closely

monitored to ensure ongoing device indications and benefit. There was also discussion regarding aviaries being proper for facilities as long as they are enclosed and away from food preparation or distribution areas.

Carol Scott distributed new brochures that the ombudsman office helped to develop: "Guide to Selecting an Alzheimer's Special Care Unit" and "Who, What and Where of Medicare, Medicaid and Veterans Benefits in Missouri".

Sharon Burnett gave an update on hospital-to-facility transfers. A task force has identified the following areas for focus: 1) Communication and fear of citations for HIPPA violations, 2) Ambulance transfers after 5 PM, 3) Ambulance for nonacute transfers, and 4) Development of a universal transfer form. Sharon suggested that members from Best Practices could work with the Hospital Task Force to address these issues.

Contact Dr. Cravens at cravensd@health.missouri.edu.

Message from AMDA's House of Delegates Chair:

Does It Make A Difference? ♦ Charles A. Crecelius, MD, PhD, CMD

Ever feel like just giving up? Frustrated over slow progress or the lack of change? Feel like one person just can't make a difference?

No — one person normally can't make a difference — but a group can. That's what AMDA is all about. Many of us go to our state and national meetings to get our "batteries recharged", so we can then function better as individuals. The organization also gets re-energized after meetings. New ideas and new directions occur, and enthusiasm for better ways to advocate for our patients and ourselves takes shape.

The House of Delegates and State Presidents Council act as conduits for member input, vital to the health of AMDA. AMDA staff depend on the help of many volunteers throughout the year to make ours an effective voice in LTC. It is essential this be a year round process to operate, educate and advocate effectively. So how can we do this?

Participation in state chapter affairs is essential for the health of AMDA. Working with other stakeholders including consumer groups, state surveyors, and nursing home, nursing and administrator associations on either the local or national level is a win-win proposition when the focus is kept on resident care. Offering to help with committee work, replying to surveys and email queries, keeping staff and officers aware of concerns, and helping to build membership keeps the grassroots nature of AMDA alive and well. AMDA especially needs the experienced services of those who have served either the House of Delegates or their state organization.

AMDA is not a once a year event at the annual symposium. It requires year-round commitment, not just from staff and elected officials, but from the members, where its strength lies. Resolutions and policy don't happen only in March, but need continuous suggestion, development and enactment. Unless there is more continuity, more flow

from the general membership, we risk stagnation at a time and place where we can least afford it.

It's normal to get frustrated over the slow progress or lack of success that sometimes occurs. We work with many people and organizations, and consensus and change happen gradually. We have to balance talking and listening, acting and observing, and being firm and compromising constantly. Failure to be involved is the only true failure.

Work for yourself, and you can make a small difference in your community. The future will be out of your control, however, until you work within your state and national organization to affect the systems and processes that need the expertise of the medical director and attending physician to truly improve the delivery of resident care.

♦ Reprinted from AMDA's State Network News May 2004

Contact Dr. Crecelius at c_crecelius@msn.com.

Newsworthy

MALTCP member Randy Huss, MD, CMD, received the 2004 William Dodd Founder's Award for Distinguished Service at this year's AMDA conference in Phoenix in March.

2004 AMDA Core Curriculum on Medical Direction in Long-Term Care

In St. Louis:

Part I - July 12-13, 2004

Part II - July 14-17

Hyatt Regency Hotel

Register online at www.amda.com/education/CMD2004. With questions, call AMDA at (410) 740-9743.

In Houston:

Part I - Nov. 15-16, 2004

Part II - Nov. 17-20

Intercontinental Hotel

14th Annual Conference on Caring for the Frail Elderly

and

13th Annual meeting

Missouri Association of Long-Term Care Physicians

August 27 and 28, 2004

Holiday Inn Select Executive Center
Columbia MO

Purpose: To prepare healthcare professionals to care for frail older adults along the full continuum of care.

Objectives

Participants will be able to:

- ♦ Innovate within your programs and organizations to promote medication reduction, support aging in place, recommend assistive technologies, develop patient centered care, retain staff, work with family members in difficult situations, create intergenerational programs, and provide good end of life care.
- ♦ Apply new knowledge to the care of pressure ulcers, sleep disorders, mentally retarded and disabled residents, and dementia to improve the quality of care of the frail elderly.
- ♦ Relate principles of prevention to elder mistreatment and the screening and forestalling of diseases in the elderly
- ♦ Provide appropriate coding and billing in long-term care settings

These and other topics will be addressed during the two-day conference:

- ♦ Management of Pressure Ulcers
- ♦ Who is Appropriate for Prevention and Screening
- ♦ Elder Mistreatment: Prevention and Detection
- ♦ Understanding Sleep Problems of the Elderly
- ♦ Memantine: How to Integrate with Other Treatments of Dementia
- ♦ Medication Reduction in Long-Term Care
- ♦ Dealing with Difficult Families
- ♦ An Intergenerational Program Linking Middle School Students and Nursing Home Residents
- ♦ Use of Drugs for Behavior Management in Dementia
- ♦ Incontinence and Catheters in Long-Term Care
- ♦ Assistive Technology for Edlers
- ♦ Person-Centered Care: A Model for Nursing Homes
- ... and more!

For registration information, contact Elaine Rogers at the University of Missouri Continuing Medical Education Office, (573) 882-9973 or visit www.muhealth.org/~cme

Calculating the Pneumonia Severity Index (PSI)

PSI Step 1. Identifying Patients in Risk Class I

- | | | | | |
|--|-----------------------------|------------------------------|---|---|
| 1. Is the patient <u>more than 50</u> years of age? | No <input type="checkbox"/> | Yes <input type="checkbox"/> | → | |
| 2. Does the patient have a history of any of the following <u>coexisting conditions</u> listed in the table below? | No <input type="checkbox"/> | Yes <input type="checkbox"/> | → | IF YES to any of these questions, assign patient to risk class II-V according to PSI Step 2 (below). |
| 3. Does the patient have any of the <u>physician examination findings</u> listed in the table below? | No <input type="checkbox"/> | Yes <input type="checkbox"/> | → | |
| | ↓ | | | |

PSI Step 2. Identifying Patients in Risk Classes II-V

Patient Characteristics	Points Assigned	Patient's Points	Definitions																																		
Demographic Factors																																					
Age																																					
Males (in years)	age	<input type="text"/>																																			
Females (in years)	age - 10	<input type="text"/>																																			
Nursing home resident	+ 10	<input type="text"/>																																			
Coexisting Conditions																																					
Neoplastic disease	+ 30	<input type="text"/>	>any cancer, except basal or squamous-cell cancer of the skin, that was active at the time of presentation or diagnosed within one year prior to presentation																																		
Liver disease	+ 20	<input type="text"/>	>prior clinical or histologic diagnosis of cirrhosis or another form of chronic liver disease, e.g., chronic active hepatitis																																		
Congestive heart failure	+ 10	<input type="text"/>	>prior history of cardiomyopathy, CHF, or systolic or diastolic ventricular dysfunction, or EF <40% documented by history, PE, chest radiograph, echocardiogram, multiple gated acquisition scan or left ventriculogram																																		
Cerebrovascular disease	+ 10	<input type="text"/>	>prior clinical diagnosis of hemorrhagic or non-hemorrhagic stroke, intracerebral bleed, or transient ischemic attack; or stroke documented by MRI or CT																																		
Renal disease	+ 10	<input type="text"/>	>prior history of chronic renal disease or prior documentation of abnormal BUN (≥40) or creatinine (≥2.0) concentrations																																		
Physical examination findings																																					
Altered mental status	+ 20	<input type="text"/>	> stupor or coma; acute disorientation to person, place, or time																																		
Respiratory rate ≥ 30/min	+ 20	<input type="text"/>																																			
Systolic BP < 90 mm Hg	+ 20	<input type="text"/>																																			
Temperature < 35° or > 40°	+ 15	<input type="text"/>																																			
Pulse ≥ 125/min	+ 10	<input type="text"/>																																			
Laboratory findings																																					
pH < 7.35	+ 30	<input type="text"/>																																			
BUN ≥ 30 mg/dL	+ 20	<input type="text"/>																																			
Sodium < 130 mmol/L	+ 20	<input type="text"/>																																			
Glucose ≥ 250 mg/dL	+ 10	<input type="text"/>																																			
Hematocrit < 30%	+ 10	<input type="text"/>																																			
pO ₂ < 60 mm Hg or O ₂ sat < 90%	+ 10	<input type="text"/>																																			
Pleural effusion	+ 10	<input type="text"/>																																			
TOTAL SCORE (sum all patient's points):		<input type="text"/>																																			
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">Risk Class (points)</th> <th colspan="2">MedisGroups Validation Cohort</th> <th colspan="2">Pneumonia PORT Validation Cohort</th> </tr> <tr> <th>Patients (#)</th> <th>Mortality (%)</th> <th>Patients (#)</th> <th>Mortality (%)</th> </tr> </thead> <tbody> <tr> <td>I (Step 1)</td> <td style="text-align: center;">3,034</td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">772</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td>II (≤ 70)</td> <td style="text-align: center;">5,778</td> <td style="text-align: center;">0.6</td> <td style="text-align: center;">477</td> <td style="text-align: center;">0.6</td> </tr> <tr> <td>III (71 - 90)</td> <td style="text-align: center;">6,790</td> <td style="text-align: center;">2.8</td> <td style="text-align: center;">326</td> <td style="text-align: center;">0.9</td> </tr> <tr> <td>IV (91 - 130)</td> <td style="text-align: center;">13,104</td> <td style="text-align: center;">8.2</td> <td style="text-align: center;">486</td> <td style="text-align: center;">9.3</td> </tr> <tr> <td>V (> 130)</td> <td style="text-align: center;">9,333</td> <td style="text-align: center;">29.2</td> <td style="text-align: center;">226</td> <td style="text-align: center;">27.0</td> </tr> </tbody> </table>				Risk Class (points)	MedisGroups Validation Cohort		Pneumonia PORT Validation Cohort		Patients (#)	Mortality (%)	Patients (#)	Mortality (%)	I (Step 1)	3,034	0.1	772	0.1	II (≤ 70)	5,778	0.6	477	0.6	III (71 - 90)	6,790	2.8	326	0.9	IV (91 - 130)	13,104	8.2	486	9.3	V (> 130)	9,333	29.2	226	27.0
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