for developing disease, which patients should be offered therapy, and what therapeutic regimens are the most effective.

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REFERENCES

What Is the Prognosis for Using the Pneumonia Severity Index To Make Site-of-Care Decisions In Community-Acquired Pneumonia?

Starting in 1993, the approach to community-acquired pneumonia (CAP) changed dramatically with the development of management guidelines by a number of national societies.1 2 This process has continued for a decade, and the result has been a more organized approach to disease management and to defining the agenda for research in CAP. Although guidelines help to provide a framework for the care of patients, there are a number of controversies in management, and not all guidelines have approached these issues in the same way. One unresolved issue is deciding who should be admitted to the hospital, a decision that has a major impact on the cost of care for patients with CAP. The American Thoracic Society guidelines have stated that the admission decision is an “art-of-medicine” decision and that scoring systems, such as the pneumonia severity index (PSI), should be used as decision support tools for evaluating mortality risk.1 But, they also have stated that no rule can be used, by itself, to define the need for hospitalization.1 On the other hand, the Infectious Disease Society of America has endorsed the use of the PSI to guide the admission decision.2

In our current health-care environment, cost containment is an important goal, and the major driving factor in the cost of care for CAP patients is the site-of-care decision. In the United States, CAP affects 5.6 million patients annually, with a total cost of care of $8.4 billion.3 Although the majority of patients (4.5 million) are treated out of the hospital, the majority of cost ($8.0 billion) is attributed to patients admitted to the hospital. Inpatient costs can be curtailed in a number of ways, ranging from a reduction in length of stay (LOS) to avoiding hospital admission altogether, especially in patients who are at a low risk for poor outcome. Fine et al4 have examined the relationship between LOS and costs, and have estimated the financial impact of reducing LOS by 1 day to be $680, from a median of $5,942. The economic benefit of a reduction in LOS has no obvious negative clinical impact, since investigators have demonstrated that among different hospitals, there are no differences in outcome observed at sites with the shortest duration of hospitalization.5 This is probably related to the fact that most patients achieve clinical stability within 2 to 3 days of hospital admission yet are often kept in the hospital for several days after reaching this point.6 Interestingly, investigators also have demonstrated that costs are not evenly distributed throughout the hospitalization, with 32% of all costs being incurred on the first 2 days and daily costs declining thereafter.4 This can be explained because room costs are relatively constant, but pharmacy costs, emergency services, and radiologic/laboratory tests are greatest on the first day. Thus, reducing LOS can reduce costs, but maybe not as dramatically as avoiding hospitalization.

It is against this backdrop that the PSI was developed by Fine and colleagues,7 in what may be the most important investigation of CAP in the past decade. The PSI was developed using a derivation cohort of 14,199 inpatients with CAP, and was independently validated in 38,039 inpatients with CAP and in 2,287 inpatients and outpatients prospectively enrolled in the Pneumonia Patient Outcomes Research Team cohort study.7 One limitation in the derivation of this rule was that it included mostly patients seen in a hospital emergency depart-
ment, and included very few outpatients who were evaluated in a physician’s office and then were sent home. The PSI stratifies patients into five severity classes using a two-step process that evaluates a number of demographic factors, comorbid illnesses, physical findings, and laboratory and radiographic data. In the derivation and validation of this rule, the mortality rate ranged from 0.1 to 0.4% in class I, 0.6 to 0.7% in class II, and 0.9 to 2.8% in class III. The mortality rate was intermediate for class IV (8.2 to 9.3%) and was high for class V (27.0 to 31.1%).

Although the PSI was developed to stratify the mortality risk in CAP patients, the investigators hypothesized that patients in low-risk categories I to III could be considered for outpatient care, while those in classes IV and V would need hospitalization. Using this approach, they estimated that the proportion of patients receiving traditional inpatient care could be reduced by 31%. Recently, two studies have prospectively applied the PSI in the site-of-care decision and have found that, even when physicians are instructed to use this process to guide the admission decision, they often use clinical judgment to override the recommendations. In fact, clinicians admitted anywhere from 31 to 43% of patients in classes I to III to the hospital, even when told to use the PSI to guide the admission decision. Although one could argue that these results are still an improvement over past behavior, it is clear that the PSI cannot be viewed as an absolute rule for site-of-care decisions.

While most experts agree that social needs should be factored into the site-of-care decision for CAP, very few studies have evaluated how such needs are defined. In the current issue of CHEST (see page 2148), Goss and colleagues have prospectively examined the admission decision for CAP in patients cared for in a public hospital and have documented that many patients who fall into PSI classes I to III do require hospitalization, generally because of appropriate medical and social needs that are not measured by the PSI. They documented that the PSI was accurate in predicting mortality, since only 1.6% of low-risk patients died, but, once again, this study emphasized that the risk of death from CAP is not the same as the need for inpatient care. In fact, the dichotomy between these two end points seems particularly striking in a hospital that cares for the urban poor, a population not clearly studied with the PSI in the past.

In their study, Goss and colleagues evaluated 425 HIV-negative patients who were hospitalized with CAP, of whom 253 fell into risk categories I to III. Of this group, 45% had clear medical needs for hospital admission, including hypoxemia (33%), ICU admission (2%), altered mental status (11%), and hypotension (9%). Of the remaining 55% without an obvious physiologic need for CAP admission, most had pressing social needs or other reasons for inpatient care that were not captured by the PSI calculation. These included the following: homelessness; respiratory isolation for possible tuberculosis; recent IV drug abuse and fever (necessitating an evaluation for endocarditis); and acute alcohol intoxication. Overall, only 8% of all low-risk patients could have been managed out of the hospital because of the absence of both the physiologic and social needs for admission. The authors also identified the cost of care for low-risk patients, and this population accounted for 45% of all bed-days for CAP and 35% of all CAP costs.

The findings in this study are worth noting because they point to the limitations of the PSI in the site-of-care decision at a hospital that cares for a large number of the urban poor. Although the findings are important, the study does have some limitations. First, it was conducted at only one hospital, so its applicability to other public hospitals can only be inferred. Second, the study only examined those who were admitted to the hospital, so the usefulness of the PSI in guiding decision making for those who were not admitted was not evaluated. Finally, the study was conducted from 1994 to 1996, and results might be different today, especially in communities that have provided for intermediate level outpatient care of the homeless.

The findings extend our previous understanding of the social needs of patients with CAP. In one French study, 107 consecutive patients with CAP were evaluated, and 34 were identified as falling into a category of low socioeconomic status, which was defined as being unemployed, homeless, on government assistance, or having poor living conditions. These patients were more often substance abusers than other patients, and they had a higher incidence of tuberculosis as a cause of their infection. The overall mortality rate was lower in those of lower socioeconomic status, and severity of illness was similar to that of other patients, but their LOS was on average 6 days longer than for patients without this risk factor. Other studies have reported that the cost of care is higher in urban hospitals than in rural hospitals in the United States, presumably in part because of greater care needs in disadvantaged urban patients. In examining the specific impact of social factors, Fine et al have reported that a lack of patient home care support increased the likelihood of hospital admission for CAP by more than 50-fold, even in a population with a low risk of death (ie, < 5%). Similarly, for patients who are hospitalized, discharge is delayed, even in clinically stable patients, in order to make arrangements for long-term care, a provision that may be harder in patients of
low socioeconomic status. Thus, for a number of reasons, the cost of care for economically disadvantaged patients is increased when CAP is present, even though severity of illness and outcomes are similar to those of patients without such profound social needs.

One other population that has been studied and has been proven to have limited applicability of the PSI is patients admitted to a Veterans Affairs Hospital. Of a total of 328 patients hospitalized for CAP, 86 were in risk classes I and II, yet 72 had clinical factors that justified inpatient care, despite the PSI score. These reasons included the following: other medical conditions requiring hospitalization; unmet social needs; oral intolerance of therapy; failures of outpatient therapy; noncompliance; suspicion of sepsis; and hypoxemia.

Where do these latest findings leave us in the decision about hospitalization for CAP patients? Clearly, we would like to contain costs by reducing the number of patients who are admitted to the hospital but could be safely managed at home. Unfortunately, the PSI cannot always identify this population, and many “low-risk” patients have definite physiologic and social needs that make them candidates for hospital admission that are not captured by the PSI. In the future, we may need to recognize the limitations of any “rule” for the site-of-care decision and keep this as a decision to be made by the clinician, accounting for many medical and social factors. If our goal is to reduce costs, and to manage patients safely and effectively, maybe we should also focus on other areas such as how to reduce LOS. As pointed out, this may not be as efficient a way to reduce costs as focusing on the hospital admission decision, but opportunities to reduce LOS do exist. For example, many patients currently remain hospitalized after they have achieved clinical stability. A renewed focus on early hospital discharge, without the need for observation after a switch to oral therapy, also may have a benefit. Can any of these approaches work for the population of urban poor, who have often unmet social needs? Clearly, this problem needs to be addressed through the development of outpatient intermediate care settings that provide for such patients. Until this happens, we will need to continue using the economically inefficient solution of keeping such patients in the hospital.

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References

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