

# Community-acquired pneumonia: Changing paradigms about mortality

Community-acquired pneumonia (CAP) is a major respiratory disease and the leading cause of death due to infection in Europe<sup>[1]</sup> particularly in some risk classes such as at the extreme ages (childhood and elderly), and where complicated by other conditions (comorbidities, immunosuppression).<sup>[2]</sup> Moreover, CAP has demonstrated a relevant socio-economic burden worldwide.<sup>[2-5]</sup> For instance, a Spanish study in 2012 has estimated an adjusted mean cost per hospitalized patient of €2,332.4 and of €698.6 per ambulatory patient,<sup>[6]</sup> whereas the estimated annual costs of CAP in Europe are approximately €10 billion/year, mainly due to hospitalization and lost working days.<sup>[7]</sup>

In the European Union, approximately 3.370.000 cases of CAP are expected annually, and about 1 million are hospitalized.<sup>[8]</sup> The reported *incidence of pneumonia* varies considerably among countries (1.7-11.6/1000 person-years,<sup>[4,9,10]</sup> but it is always higher in the elderly (7.65-15.3/1000 person-year<sup>[5,11-14]</sup>). In COPD patients (a common comorbidity of CAP) the highest incidence of CAP is described (21.7-23.2/1000 person-years)<sup>[15]</sup> and older age is a major risk factor in this population (age 65-80 years, odds ratio (OR): 1.28; age >80 years, OR: 1.86). Other relevant risk factors for CAP are male gender<sup>[5,16,17]</sup> and different conditions of immunosuppression (e.g. HIV).<sup>[18-21]</sup>

In addition, the *mean age of the population* in Europe is increasing sharply, and this is likely to lead to a significant increase in the incidence of CAP, hospital admissions and socio-economic burden.<sup>[22]</sup> Indeed, an English study has shown a 34% increase in CAP hospitalization from 1997-1998 to 2004-2005.<sup>[23]</sup> The hospitalization rate is around 40%<sup>[9]</sup> but it increases enormously in elderly people ≥65 years accounting for 60-70% of overall hospitalizations for CAP.<sup>[22,24,25]</sup>


Unfortunately, despite the great improvements in public health and standards of care of the last decades, CAP remains the fifth leading cause of mortality in Europe, and the mortality has not changed since the widespread introduction

of antibiotics in the 1950's.<sup>[26,27]</sup> In particular, the mortality rates of hospitalized CAP patients in Europe are 5-15% rising to 40% in intensive care unit admitted patients.<sup>[2]</sup> Moreover, in hospitalized CAP patients mortality increases dramatically in the presence of determined risk factors (comorbidities, immunosuppression, increasing age) up to 20-40%.<sup>[28,29]</sup> Indeed, it is known that 25-50% of all deaths from pneumonia are reported within the first 30 days after diagnosis with a large proportion of deaths being related to co-morbidities rather than directed due to pneumonia. After 30-day, mortality is still increased in patients with CAP with the majority of deaths being the result of co-morbidities and particularly cardiovascular co-morbidities.<sup>[27,30-32]</sup>

Community-acquired pneumonia patients may still experience adverse outcomes after discharge, including readmission and death due to relapse of pneumonia or other causes. Early readmission rates are about 2.3% in ambulatory patients<sup>[33]</sup> and 8-46% in hospitalized patients, particularly in the presence of advanced age or relevant comorbidities (chronic renal, cardiac or respiratory disease, malignancy).<sup>[7,34]</sup> Moreover, it has been shown that recurrent pneumonia in elderly people is associated with increased 1-year mortality.<sup>[31,35]</sup>

In CAP patients, the *mortality rate* within 90 days after discharge can be as high as 14% (this is in addition to the inpatient mortality referred to early) and considerably higher than in the general population or in those hospitalized for other reasons.<sup>[32,33,36-38]</sup>

Unfortunately, a CAP-related excess mortality is also described at long-term (particularly in the elderly people) for different reasons, not only strictly related to pneumonia (treatment failure or readmissions) but also related to a variety of underlying conditions (comorbidities and functional status).<sup>[31-33]</sup> Indeed, Kaplan *et al.*<sup>[39]</sup> followed elderly patients up to 1-year after CAP and almost 50% of them died, mainly after hospital discharge. Different authors have demonstrated excessive mortality up to 7 years after CAP in comparison with the general population although the greatest impact of CAP on mortality is certainly in the 1<sup>st</sup> year.<sup>[32,33,37-41]</sup> Similarly, a Dutch study investigated 356 CAP patients over a 7-year follow-up period. Cumulative mortality rates were clearly higher for CAP patients in comparison with the age-and sex-matched control group at all-time points: 1 year, (17% vs. 4%) 5-year (43% vs. 19%) and 7-year (53% vs. 24%) with an overall mortality relative risk of 3.6.<sup>[41]</sup>

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Consequently, although CAP has been considered for decades a time-limited acute infection it is now being regarded as an infectious disease with potential long-term consequences particularly in the presence of advanced age, poor functional status, latent or known comorbidities.

This is the inaugural issue of a new Journal about community-acquired infections (CAI). This Journal will cover any aspect of this type of infections in the field of Internal Medicine. I choose CAP for the editorial comment since it is one of the paradigms of infections acquired in the community. CAI is an important health problem all over the world in terms of prevalence, morbidity and mortality. We hope that this new Journal will fill an important gap and it will be of interest for Internal Medicine physicians and for the specialties that deal with CAI.

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