



Pneumonia: The Forgotten Pandemic

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Respiratory Infections and Pneumonia

In some countries, acute lower respiratory tract infection causes more illness and death than any other infection; as is the case in the United States. In fact, these infections also cause a greater burden of disease worldwide than human immunodeficiency virus (HIV) infection, malaria, cancer, or heart attacks [1]. With regard to pneumonia, the prevalence of various pathogens and the epidemiology of the disease vary widely between countries and regions, making it difficult to accurately discuss the international burden of the disease.

Epidemiology of Pneumonia in the World

Annually, pneumonia affects approximately 450 million people, seven percent of the world's total, and results in about 4 million deaths. It has a global presence, but the infection is more prevalent in underdeveloped areas, especially in parts of South Asia and sub-Saharan Africa. In developing countries, a worldwide incidence of clinical pneumonia cases of 0.29 events per child per year has been estimated, which implies 150.7 million new episodes per year, while in the developed world there are no comparable data. The estimated incidence of clinical pneumonia is highest in Southeast Asia (0.36 events per child per year), ahead of Africa (0.33) and the eastern Mediterranean (0.28), requiring hospitalization for pneumonia severe in 7-13% of cases. In the developed world, the annual incidence of pneumonia is estimated at around 33 x 10,000 in children less than 5 years of age and 14.5 x 10,000 in children aged 0 to 16 years.

However, the incidence of CAP in children under 5 years of age is approximately 0.026 episodes per child per year, which means that more than 95% of all global cases of clinical

pneumonia in young children occur in developing countries [2,3]. Acute pneumonia in the United States is the sixth most common cause of death and the first in infection-related mortality. The incidence is 170-280/10,000, treatment costs exceed \$ 12 billion, and inpatient treatment costs 25 times more than outpatient treatment. In 2003, the age-adjusted mortality rate from influenza and pneumonia was 20.3 per 100,000 people [4]. Estimates of the incidence of CAP vary from 4 million to 5 million cases per year, and around 25% require hospitalization [5]. It is estimated that HAP occurs in 250,000 people per year, which represents about 15 to 18% of all nosocomial infections [6,7].

Other authors consider that the burden and epidemiology of the disease have been difficult to describe with sufficient precision due to the lack of an adequate definition of pneumonia for epidemiological purposes and of sensitive and specific tests to establish the bacterial etiology [8]. Despite important advances, the dimensions of the clinical problem posed by pneumonia remain enormous. After the initial gains made with first-generation antibiotics, the mortality rate from pneumonia has not changed appreciably in the last 50 years [9]. Overall, mortality is 1% in non-hospitalized patients, 13.7% in hospitalized patients, 19.6% in patients with bacteremia, and <36.5% in intensive care units.

By relevance, the epidemiology of bacterial pneumonia infections includes: *Streptococcus pneumoniae*, *Haemophilus influenzae* type B, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and non-typhoid *Salmonella*. In the case of *Streptococcus pneumoniae*, it represents > 50% of bacteremia. Indicate that the incidence of *Streptococcus pneumoniae* and *Haemophilus influenzae* could be lower in the regions where the vaccines are administered; however, there is an increased risk of *Haemophilus influenzae* B, invasive meningococcal disease.

Epidemiology of Pneumonia in Children

It is known that pneumonia is a respiratory disease that can be fatal [10]. It especially affects children in developing countries [11], with more than 150 million cases of pneumonia occurring each year, requiring hospitalization in more than ten million [2]. Pneumonia and diarrhea are considered the two major causes of death in the world in children under five years of age [12,13]. However, it is possible to reduce mortality associated with pneumonia in the community. In fact, the WHO points out that the adoption of adequate policies and the promotion of health are fundamental to this end [14]. Likewise, the allocation of economic resources directed to specific programs and the integration of activities for the treatment of pneumonia at the community level are basic aspects for the reduction of mortality. In addition, the WHO indicates that the promotion of prevention and treatment practices, together with the involvement of governmental, non-governmental and community entities, would improve first-level health care; strengthening the ties between health centers, their staff and the community.

Pneumonia is the leading individual cause of infant mortality worldwide, surpassing all deaths from AIDS, malaria and measles in children under five years of age [15]. Several authors have described this mortality in the world [12,16-18] despite the difficulty in making estimates and the differences between the developed and undeveloped world, calculating that there are currently more than 2 million deaths each year in younger children 5 years [19]. However, the distribution of mortality for the disease is uneven [20], with Africa standing out with 45% of the total deaths attributable to this disease [21] contrasting with a low mortality rate in developed countries [22]. In contrast, infant mortality rates in most developing countries range from 60 to 100 per 1,000 live births, with one fifth of these deaths due to pneumonia [15]. Therefore, pneumonia causes approximately 19% of all deaths in the world in children under five years of age [3,12], being linked to malnutrition, lack of access to health care and poverty [23].

The disease is the main cause of infant death in children under 5 years of age in countries with medium or low development. In this age group, the disease registers an annual worldwide mortality of 18%, which corresponds to 20% in less developed countries and 4.3% in developed countries [13]. In the year 2000 was estimated 13.8 million cases of pneumococcal pneumonia with 741,000 deaths in children under 5 years of age, most of them occurred in Southeast Asia (38.6%), Africa (27.6%) and the western Pacific region (17%) [24]. Regarding *Haemophilus influenzae*, was estimated 7.9 million annual worldwide cases of pneumonia for the same age, which represents 292,000

deaths [25] although the incidence of pneumonia in children decreases with age [2]. More recent estimates [11] showed that by 2011 1.3 million pneumonias were fatal, with a high proportion of deaths in the first two years of life.

It should be noted that three quarters of pneumonia in children under the age of five occur in 15 countries, India and China stand out, and these represent 74% of the annual cases worldwide [3]. As indicated, in order to reduce the incidence of the disease, preventive interventions are necessary, especially: periodic vaccination, complementary feeding, and exclusive breastfeeding, reduction of indoor air pollution [26] and administration of zinc supplements [27,28]. Furthermore, increasing the quality of health care and care in the community helps to effectively reduce the disease [29]. In fact, community programs [30] for the treatment of pneumonia have indicated that the correct use of antibiotics is an effective measure to combat it and vaccination against whooping cough, measles and *Haemophilus influenzae* type b would contribute to reducing the incidence of infections of the respiratory tract.

In 2007, pneumonia accounted for almost 20% of deaths in the world [31], followed by diarrhea [13]. As indicated worldwide, approximately 1.8 million children under the age of five die every year, representing more than 98% of deaths from pneumonia in 68 countries [32]; mainly in Southeast Asia and Africa, so it can be consider a “forgotten” pandemic. Furthermore, it’s estimated that between 11 and 20 million children with pneumonia per year require hospitalization and that more than 2 million will die as a result of the disease [15].

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