



Bronchiectasis: moving from an orphan disease to an unpleasant socioeconomic burden

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Bronchiectasis has received increasing attention in recent years. At the same time, studies have shown a high incidence of this disease, especially in older populations, associated with high health-related costs and economic burden. <https://bit.ly/2WPFVZ7>

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Bronchiectasis is a complex and heterogeneous condition characterised by persistent airway dilation, mucus hypersecretion, and recurrent respiratory infectious exacerbations. Numerous diseases and external insults may trigger the process of developing bronchiectasis, which makes the management of this disease even more challenging [1]. Until a few decades ago, bronchiectasis was considered an orphan disease due to its low prevalence, little recognition of its importance even by pulmonologists, and lack of proven effective therapies for its management. However, in recent years, bronchiectasis has no longer been considered an orphan disease [2]. The improvement and greater availability of diagnostic imaging methods associated with new studies aimed to understand the pathophysiology of bronchiectasis has opened a new chapter for this disease [3]. Several studies started to demonstrate a considerable increase in both the incidence and prevalence of this condition, especially in older populations [4]. Although bronchiectasis characteristics may vary according to the country and socioeconomic status of the targeted population, recent studies show prevalence values between 67 and 566 per 100 000 inhabitants [5–7].

As expected, this large number of patients awakened the recognition of an unmet need for effective therapeutic interventions for the management of bronchiectasis. Several clinical trials and guidelines have been published, with the aim of improving quality of life, reducing the number of infectious pulmonary exacerbations, and delaying disease progression [8–10]. The main recommended treatments for the management of patients with bronchiectasis are use of techniques to improve mucociliary clearance (respiratory physiotherapy, hypertonic saline), and long-term use of macrolides, bronchodilators and inhaled antibiotics [11, 12]. One important feature of patients with bronchiectasis is the higher risk for chronic airway infection by potentially pathogenic microorganisms such as *Pseudomonas aeruginosa*. These infections are associated with greater lung function decline, increased number of exacerbations and reduced life expectancy [13]. Due to the recurrent use of several courses of oral antibiotics and severity of some patients, many episodes of exacerbations require hospital admission for intravenous antibiotic therapy, with a minimum recommended duration of 10–14 days [8–10]. It is logical to expect that this equation of greater recognition of bronchiectasis cases plus high daily therapeutic load necessity plus high number of exacerbations, including the need for hospitalisation for long periods, would result in a high expenditure of health-related resources.

In this issue of *ERJ Open Research*, PHUA *et al.* [14] have comprehensively evaluated the prevalence and incidence of bronchiectasis requiring hospitalisation in Singapore, as well as the associated healthcare utilisation and costs. They found high age-standardised incidence of hospitalised bronchiectasis that declined from 13.9 per 100 000 persons in 2007 to 10.6 per 100 000 persons in 2017 (an average decline of 2.7% per year). The incidence rate of bronchiectasis increased sharply with age for both men and women, as previously described [4]. It is important to emphasise that in this present study, only patients



who had hospitalisations related to bronchiectasis were included. Milder cases that did not require hospitalisation during the evaluated period were not considered. However, the impossibility of including these cases in the study analysis does not diminish the importance of its results. In fact, it reinforces the great economic impact of this condition, since health-related expenses with bronchiectasis should be even higher. The authors found that the annual direct medical cost associated with bronchiectasis was USD 9.6 million in 2017. The majority of this cost was due to hospitalisation, representing 55.8% of direct medical costs. It is interesting to note that there has been an average annual increase of 5.0% for inpatient cost per patient (USD 4032 in 2007 *versus* USD 6563 in 2017), which reflects the increasing complexity of treating these patients [14]. These data are in agreement with other recent publications that have also demonstrated the great economic burden related to bronchiectasis. In the USA, when compared to matched controls, patients with bronchiectasis showed an increase of USD 2319 and USD 1607 in general and respiratory costs [15]. In Germany, the direct expenditure with bronchiectasis was 31.0% higher than matched controls (mean EUR 18 634.57 *versus* EUR 14 236.99) [16].

It is interesting to note that, as found by PHUA *et al.* [14], in other studies most health expenditures related to bronchiectasis were linked to hospitalisations [16, 17]. Despite the existence of variability in the rate of hospitalisation related to bronchiectasis between countries, the impact of this condition on health systems is unquestionable. It varied from 9.4 hospitalisations per 100 000 inhabitants in Germany [18] to 16.5 hospitalisations per 100 000 inhabitants in the USA and Spain [19, 20]. In addition, patients with bronchiectasis have higher hospital costs compared with matched controls [15, 16]. However, several other costs must be taken into account when assessing patients with bronchiectasis. These patients also have high expenses related to their outpatient treatments [16, 17]. The global economic burden of bronchiectasis is far deeper than previously expected. All costs related to this condition should be considered (table 1) and we may find many new challenges while we keep digging.

Another important aspect related to bronchiectasis expenses is that the greater the severity of the disease, the higher its healthcare costs. A Spanish study showed that the mean annual costs per patient were EUR 2993, EUR 4732 and EUR 9999 for mild, moderate and severe bronchiectasis, respectively [17]. This finding reinforces the importance of early recognition of this disease. This way, therapeutic measures can be quickly implemented and, consequently, prevent the progression of bronchiectasis to more severe stages. Furthermore, the recognition of disease-related costs allows interventions to be instituted with the objective not only of reducing the economic burden but also of improving patients' quality of life. A good example is the incorporation of domiciliary programmes with intravenous antibiotic therapy, which has already proven to be a safe and effective intervention both in terms of cost reduction and in improving patient satisfaction when compared to conventional hospitalised care [21].

When facing a disease as heterogeneous as bronchiectasis is, we should expect different results according to countries and regions. This is a relevant topic since not every finding can be promptly extrapolated to the reality of other populations. In this study by PHUA *et al.* [14], they found a decline in the age-standardised incidence of hospitalised bronchiectasis over time. One of the reasons attributed by the authors for this finding was the significant reduction in tuberculosis cases in Singapore in recent years [14], since *Mycobacterium tuberculosis* infection is a well-recognised cause of bronchiectasis. Unfortunately, this is still not reality for several South American, African and Asian countries [22]. In addition, sociodemographic

TABLE 1 Economic burden of bronchiectasis

Outpatient direct costs	Inpatient direct costs	Advanced disease costs	Indirect costs
Medication costs	Length of stay	Long-term oxygen therapy	Work productivity impairment (absenteeism and presenteeism)
Medical appointments	Intravenous antibiotics	Non-invasive ventilation	Disability and early retirement
Physiotherapy	ICU resources	Lung transplantation	Limitations of daily life
Pulmonary rehabilitation	Inpatient physiotherapy		Caregiver burden
Treatment of exacerbations	Imaging and laboratory exams		
Treatment of complications	Treatment of complications		
Sputum microbiology			
Radiology			
Laboratory exams			
ICU: intensive care unit.			

characteristics may differ across regions. For example, the average age of the bronchiectasis population in South America tends to be lower when compared to the European and North American population [23]. These findings highlight the importance of local data in order to allow this complex scenario of bronchiectasis to be better understood while taking into account all particularities inherent to this pathology.

It is undeniable that our scientific knowledge related to bronchiectasis has significantly evolved. In recent years, we have experienced an exponential increase in studies focused on unravelling the pathophysiology of bronchiectasis, on testing different therapeutic interventions and on evaluating its socioeconomic burden. All players (patients, healthcare professionals and payers) will benefit from this. However, we are still seeing only the tip of the iceberg and we have a long road to walk before identifying the appropriate safe and cost-effective interventions for bronchiectasis management.

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