



# Introduction

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**Respiratory diseases and cancer are frequently linked as both are highly prevalent. Their bidirectional relationship means that each can be a risk factor or a protective factor for the other, significantly impacting diagnosis, management and outcome.** <https://bit.ly/3CBf3H>

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Respiratory diseases and cancer are two of the most frequent causes of morbidity and mortality in the world. As such, the coexistence of both diseases in the same person is a frequent occurrence. There is a consistent body of scientific evidence to suggest that this goes beyond chance; in fact, both disease types are associated and the presence of one of them can be a risk factor or protective factor for the other. Notably, one of the fundamental characteristics is the bidirectionality of this relationship.

There are multiple reasons why respiratory diseases can be related to cancer. 1) Some respiratory diseases share environmental or genetic risk factors with cancer. For example, the relationship between COPD and cancer is mediated by smoking, where tobacco smoke is a powerful carcinogen as well as an inducer of inflammation. 2) Beyond association, a clear causative relationship has been established in some cases, such as the relationship between asbestos exposure and pleural mesothelioma. 3) Respiratory diseases and cancer can share common pathophysiological pathways, such as those relating to pulmonary inflammation, infection and/or hypoxaemia. 4) Cancer can first present with symptoms associated with lung diseases, such as pulmonary thromboembolism. 5) Treatment for some respiratory diseases can pose an elevated risk of adverse events, such as the loss of cancer immunosurveillance from immunosuppressants. Conversely, some treatments for respiratory diseases can reduce the risk of cancer, such as the use of inhaled corticosteroids in certain circumstances. 6) There is speculation that certain respiratory diseases may protect against cancer, as has been proposed in allergic diseases.

There are also a number of reasons why certain individuals diagnosed with cancer may be predisposed to the development of some types of lung diseases. 1) Direct cancer involvement in the lung, *e.g.* lung cancer. 2) The large vascular bed and filtration function of the lung, which

gives rise to a propensity for exposure to cancer cells or their by-products, *e.g.* lung metastases. 3) The higher incidence of pulmonary thromboembolism caused by indirect paraneoplastic activation of the pathophysiological pathways of some cancers in common with lung disease, such as the state of hypercoagulability. 4) The unintended effect of a variety of cancer treatments, such as cytotoxics, radiation, targeted therapy and immunotherapy (*e.g.* a higher incidence of pulmonary infections, interstitial pulmonary diseases or lung infection).

In this *ERS Monograph*, we have brought together renowned clinical and scientific experts to provide an exhaustive review of the bidirectional relationship between respiratory diseases and cancer in general (not just lung cancer). To this end, and given the vast quantity of literature in the area, the *Monograph* is divided into different thematic blocks, covering the most important pathophysiological mechanisms that are prevalent in both diseases [1–4], the assessment of the impact of each disease on the other in terms of risk factors and protective factors [5–7], diagnosis, treatment [8–10] and prognosis. Finally and importantly, this *Monograph* addresses patient-focused outcomes, such as the influence of cancer on the care and outcome of respiratory patients and *vice versa*.

We hope that the valuable knowledge diligently compiled by our authors, to whom we are deeply grateful, will help generate a better understanding of the relationship between these two important diseases, from an epidemiological, clinical and therapeutic point of view. Such knowledge will undoubtedly give rise to a greater awareness of the possible development of lung diseases in people with cancer, and of the different types of cancer that are frequently seen in those with lung diseases. This will help optimise diagnosis and treatment: “*scientia potentia est*”, knowledge is power. The ultimate objective of this *Monograph* is, of course, to improve the health both of our communities and of those affected by these diseases – the patients we have the privilege of helping.

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