



ERS | *monograph*

# The Nose and Sinuses in Respiratory Disorders

Edited by Claus Bachert,  
Arnaud Bourdin and  
Pascal Chanez

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Claus Bachert, Arnaud Bourdin  
and Pascal Chanez

Editor in Chief  
Robert Bals

This book is one in a series of *ERS Monographs*. Each individual issue provides a comprehensive overview of one specific clinical area of respiratory health, communicating information about the most advanced techniques and systems required for its investigation. It provides factual and useful scientific detail, drawing on specific case studies and looking into the diagnosis and management of individual patients. Previously published titles in this series are listed at the back of this *Monograph*.

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# Preface

Robert Bals

The nose is an important body part for the pulmonologist. In my opinion there are three main reasons why lung doctors should read this *ERS Monograph* on “The Nose and Sinuses in Respiratory Disorders” and learn more about the role of the nose in lung diseases:

- 1) The nose represents the upper part of the airways and is thus an important component of the air conduction system. The “united airways disease” concept covers physiology as well as pathomechanisms. Thus, diseases of the lung are often diseases of the nose, and *vice versa*.
- 2) Lung-related symptoms may also originate from diseases of the nose and therefore the lung physician needs to know the basic concepts of nasal disorders, including diagnostic approaches that are available from their ENT colleagues.
- 3) Therapeutic interventions of diseases of the lung often include treatment of disorders of the nose.



With this *ERS Monograph*, we provide the reader with a broad and detailed overview on the basic biology of the interaction between the nose and the lung. The various chapters cover a number of diseases that involve both organs, *e.g.* cystic fibrosis, asthma, COPD and bronchiectasis, and the authors also discuss the effect of diseases of the nose on the lung. The focus is on the practical aspects of clinical work and providing insight into diagnostic procedures and therapeutic options in the ENT area.

The Guest Editors, Claus Bachert, Arnaud Bourdin and Pascal Chanez, have worked very successfully to select the topics and to integrate these aspects into this *ERS Monograph*, which summarises our current knowledge. I thank the Guest Editors and all of the authors of the individual chapters for their work on this excellent book. Together, they have produced a practical publication that comprises information on the scientific background and the application at the patient’s bed. I am sure

that this comprehensive overview will be useful for the clinical practice of a broad range of respiratory physicians and improve the care for patients with diseases of the nose and the lung.

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# Guest Editors

## Claus Bachert

Claus Bachert MD, PhD is chief of the clinic and Professor at the University Hospital of Ghent, Belgium, and also holds a position as Professor at the Karolinska Institute, Stockholm, Sweden. He qualified from the University of Heidelberg, Germany, and trained in ENT diseases and allergology in Mannheim and Düsseldorf, Germany. His research interests include the pathophysiology and management of diseases of the nose and sinuses, such as allergic and nonallergic rhinitis, chronic rhinosinusitis, and nasal polyposis. Specifically, he has worked on endotyping rhinosinusitis, innovative treatments such as biologicals for recalcitrant disease and the role of *Staphylococcus aureus* in the inflammation of nasal polyp disease.



He chairs the Upper Airways Research Laboratory at Ghent University and has published over 460 peer-reviewed articles in international journals. He has received several national and international prizes, and two doctor *honoris causa* (Capital University, Beijing, China and Democritus University, Thrace, Greece).

Claus Bachert forms part of the international guidelines groups ARIA (Allergic Rhinitis and its Impact on Asthma) and EPOS (European Position Paper on Sinusitis and Nasal Polyposis), has served on the Boards of the European Academy of Allergy and Clinical Immunology and World Allergy Organization, and was President (2007–2010) and Vice-President (2011–2016) of the German Allergy Society (DGAKI). He currently serves as an Associate Editor for the *Journal of Allergy and Clinical Immunology*.

## Arnaud Bourdin

Arnaud Bourdin MD, PhD is head of pulmonology and a Consultant and Professor of Respiratory Medicine at Hôpital Arnaud de Villeneuve, Montpellier, France. He gained his MD and PhD in 2001 and 2006, respectively, from the University of Montpellier, and was subsequently a fellow at Monash University, Melbourne, Australia, working alongside Professor Tom Kotsimbos.



He is head of a clinical research group investigating innovative treatments for asthma, COPD, idiopathic pulmonary fibrosis and pulmonary hypertension. His scientific research interests include COPD and severe asthma. He has acted as Principal Investigator for a number of trials in asthma and COPD, including the COBRA (“Cohorte Obstruction Bronchique et Asthme”) study.

Arnaud Bourdin is an Organising Committee Member of the G2A project “Journées d’échange sur l’asthme sévère”, and a member of the editorial team and reviewer for three international journals: *Respiratory Research*, *BMC Public Health* and *La Revue des Maladies Respiratoires*. He is also a member of the European Respiratory Society, at whose Congress he has acted as a Chair and speaker for the past 5 years. In addition, he is a credible speaker on the subject of severe asthma in France. He has authored or co-authored more than 100 peer-reviewed articles, reviews and monographs.

## Pascal Chanez



Pascal Chanez MD, PhD, FERS is a Consultant and full Professor of Respiratory Medicine attending the “Clinique des bronches, de l’allergie et du sommeil et de la plateforme ambulatoire du pôle thorax” at the APHM and Aix-Marseille University, Marseille, France. He coordinates a research group at INSERM-CNRS U1067 in the same institute on the role of bronchial epithelium in inflammation and environmental aggression in severe bronchial diseases. He is the head of a clinical research group investigating new innovative treatments for severe asthma and COPD.

His clinical and research interests are devoted to a better understanding of the mechanisms of severe asthma and COPD with a special effort put into bringing clinical and biological findings together to provide patients with new specific biomarkers and therapies. He has demonstrated in the past his willingness and ability to gather researchers and clinicians together to decipher the complexity of severe asthma in France and Europe.

Pascal Chanez gained his MD and PhD degrees from the University of Montpellier and was a fellow at Imperial College London in the UK with Professor P.J. Barnes. He is the author or co-author of more than 300 peer-reviewed articles, reviews and monographs. He is an Associate Editor of the *European Respiratory Journal* and an Editorial Board Member of the *Journal of Allergy and Clinical Immunology*.



# Introduction

Claus Bachert<sup>1,2</sup>, Arnaud Bourdin<sup>3</sup> and Pascal Chanez<sup>4</sup>

In 2001, the European Respiratory Society welcomed a *Monograph* entitled “The Nose and Lung Diseases” [1] and one of the original Guest Editors, Philippe Godard (1948–2011), was instrumental in gathering people around the idea that the nose is the most easily accessible part of the airways.

With this new *ERS Monograph* we would like to again emphasise the notion within our chest community that the nose and sinuses belong to the airway tree, and that it is part of our duty as chest clinicians to think about the upper airways in all our common diseases and to consider our ENT colleagues as important partners in improving the quality of life of our patients. The links between the upper and lower airways are numerous, including anatomical, physiological, triggers and risk factors. The presence of these strong relationships argues for a constant dialogue between specialists and we hope that the comprehensive overview presented in the various chapters herein will contribute to reinforce the willingness of our colleagues to undertake fruitful collaboration in order to increase our knowledge with the ultimate goal of improving patient care.

The first three chapters cover anatomy, imaging and clinical examination, within the approach of the “united airways” concept. This approach should consider a pragmatic understanding of the situation, subject to the constraints of human and financial resources, leading to the best compromise to establish a clear diagnosis. Mutual understanding between chest physicians and ENT specialists is the guiding principle. We should understand the real involvement of the upper airways in all chronic respiratory disorders and consider them as “morbidity” rather than comorbid conditions.

The association of nasal polyposis and asthma and the complex pathophysiological landscape is covered by chapters focusing on chronic infection and its potential impact on immunity, and the perspectives of both ENT and chest physicians. Sino-nasal involvement in cystic fibrosis and COPD patients requires specific attention, not only as a source of potential triggering pathways but also as a matter of persistent complaints. The subjective symptoms, including fatigue, impaired sleep quality, dyspnoea and mucus secretion, should direct more attention to the upper airways. Risk factors, triggers and other associated influences are important, but direct causality is often difficult to demonstrate and a strong

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research effort may lead to new evidence. The microbiome revolution is a potential source for a better understanding of the role of microorganisms in the inception, loss of control and natural history of chronic respiratory disorders from the nose to the alveoli.

The ultimate challenge is to improve the treatment for patients, and both chest and ENT physicians are relying on each other to understand and better control symptoms and the underlying disease as a whole. Little evidence has been provided so far to assess whether a single local intervention may be an option for curing persistent airways disease. The burst of biologics potentially active in both asthma and nasal polyposis provides perfect support for the “united airways” hypothesis.

In summary, we hope that this *ERS Monograph* will encourage chest physicians to consider upper airways disease seriously and to organise a common and constant dialogue with ENT surgeons to promote research, coordinate management and, ultimately, elicit new treatments for the best care of our patients.

*La vapeur du tabac vous sort-elle du nez. Sans qu'un voisin ne crie au feu de cheminée?*

*[That the tobacco-smoke spouts from your nose. Do not the neighbours cry “The chimney is afire”?]*

*Cyrano de Bergerac [2]*

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# List of abbreviations

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<b>AERD</b>	aspirin-exacerbated respiratory disease
<b>ARS</b>	acute rhinosinusitis
<b>CF</b>	cystic fibrosis
<b>CFTR</b>	cystic fibrosis transmembrane regulator
<b>COPD</b>	chronic obstructive pulmonary disease
<b>CRS</b>	chronic rhinosinusitis
<b>CT</b>	computed tomography
<b>ENT</b>	ear, nose and throat
<b>FEV<sub>1</sub></b>	forced expiratory volume in 1 s
<b>GINA</b>	Global Initiative for Asthma
<b>IFN</b>	interferon
<b>IL</b>	interleukin
<b>ILC</b>	innate lymphoid cell
<b>MRI</b>	magnetic resonance imaging
<b>NK</b>	natural killer
<b>NSAID</b>	nonsteroidal anti-inflammatory drug
<b>PCD</b>	primary ciliary dyskinesia
<b>QoL</b>	quality of life
<b>Th</b>	T-helper
<b>Treg</b>	T-regulatory