



## ANNUAL REPORT FOR YEAR 2023 ON THE PERFORMANCE OF “BREATHING LIFE LUNG CENTER FOR CHILDREN” IN NICOSIA-CYPRUS

The Center is located at the ground floor of the Archbishop Makarios III Hospital in Nicosia in a specially designed wing with outpatient examination rooms and labs for a wide array of assessments of the respiratory system. It is currently staffed by three physicians specialized in respiratory paediatrics (Professor Panayiotis Yiallourous, Lecturer Pinelopi Anagnostopoulou and Dr. Khalid Wahbi), two nurse specialists (Phivos Ioannou, Elena Kongorozi) and secretarial personnel. The Center collaborates closely with the Respiratory Physiology Laboratory (<https://res-lab-pcd-service.eu/>) of the Medical School of the University of Cyprus (UCY) offering supplementary diagnostic services to special groups of patients. It also collaborates closely with other medical specialties and health professionals at Makarios Hospital such as Paediatric Cardiologists, Clinical Geneticists, Paediatric Neurologists, ENT surgeons, Dieticians and Physiotherapists to offer an all-round multidisciplinary care to patients with complex health problems. The physicians of the Center perform **regular clinical rounds every week** providing consultations to inpatients with complex respiratory problems on the General Paediatric Wards, the Pediatric Intensive Care and the Neonatal Intensive Care Unit of the Hospital, in close collaboration with the physicians of each Unit.

The Breathing Life Lung Center continued in 2023 offering within the national health system (GESY) **tertiary diagnostic services and therapeutic care** to children from all over Cyprus with a wide variety of complex lung conditions such as asthma, respiratory infections, upper airway obstruction, bronchiectasis, bronchopulmonary dysplasia, congenital lung anomalies and children requiring non-invasive home ventilation, implementing international guidelines and standards of care. The Center is also the **national hub for the diagnosis and management of Cystic Fibrosis (CF)** and **Primary Ciliary Dyskinesia (PCD)** and maintains for both conditions national prospective patient registries hosted at the Medical School of the University of Cyprus. The Center also provides, after consent, annual clinical data of Cypriot CF and PCD patients to the European Cystic Fibrosis Society Patient Registry and the International Primary Ciliary Dyskinesia Registry respectively. In parallel, all CF and PCD patients that are followed up at the Center undergo annual review of their clinical status by the team of the health professionals engaged in their care.

During 2023 the Center operated daily (Monday-Friday) outpatient clinics managing **3,580 cases** referred from all over the Republic of Cyprus, the Turkish Cypriot Community in Northern Cyprus and the British Military Forces. Our personnel continued functioning throughout the year with full protection gear and disinfection measures for the COVID-19 pandemic. A wide array of specialized diagnostic procedures were performed during 2023 including **spirometries (n= 250), flexible bronchoscopies (n=28), fractional exhaled nitric oxide (n= 40), nasal nitric oxide (n=15), lung clearance index (n=42), nasal epithelium biopsies for cilia studies (n=15), 24hr pH-impedance studies (n=50) and overnight sleep studies (n=40).**

The Center also provided clinical placements and training in paediatric respiratory disorders to 5<sup>th</sup> Year Medical School students of the University of Cyprus, as well as to international students via exchange programs, as part of their curriculum.



## International Quality Accreditation

Since 2021 and following external evaluation by officials of the European Union, the Primary Ciliary Dyskinesia Service (<https://res-lab-pcd-service.eu/pcd-service/>) of the Center also enjoys **full membership of the European Reference Network for Rare Lung Disorders (ERN LUNG – PCD Core)**, while in parallel the service participates as a **Clinical Trials Center for PCD** to the relevant network created by the ERN LUNG – PCD Core (<https://pubmed.ncbi.nlm.nih.gov/35983540/>).

## Research Activity at Breathing Life Lung Centre

Research activity continued in 2023 under the umbrella of the Medical School with participation of many patients from the Breathing Life Lung Center at Makarios Hospital and the contribution of human resources and infrastructure of the Respiratory Physiology Laboratory at SEKKI. The main thematic areas of the research activities are Childhood Asthma and Allergies, Primary Ciliary Dyskinesia, Cystic Fibrosis and Environmental Health.

In particular, a new project titled **“Innovative Solutions across the MEDiterranean for mitigation of Climate change-related health risks and enhancing health systeM resilience”** with the acronym **ISMED-CLIM** has been submitted to the Horizon Europe program (HORIZON-MISS-2023-CLIMA-01-03) in September 2023. ISMED-CLIM has been eventually funded by the European Union with 5,999,552 € and is due to start in 2024 and last for four years up to 2028. The project is coordinated by Prof. P Yiallourous and aims to engage and mobilize regional stakeholders in five countries (Cyprus, Greece, Italy, Spain, and Portugal) across the Mediterranean, in implementing a wide array of adaptation solutions to mitigate the health effects of climate change, and provide evidence for their feasibility, user acceptance and efficacy.

## Relevant Research Publications in 2023

1. Lam YT, Papon JF, Alexandru M, Anagiotos A, Armengot M, Boon M, Burgess A, Caversaccio N, Crowley S, Dheyauldeen SAD, Emiralioglu N, Erdem E, Gogh CV, Gokdemir Y, Gunaydin O, Haarman EG, Harris A, Hayn I, Ismail-Koch H, Karadag B, Kempeneers C, Kim S, Lorent N, Ozcelik U, Pioch C, Poirrier AM, Reula A, Roehmel J, Yiallourous P, Goutaki M. [Lack of Correlation of Sinonasal and Otologic Reported Symptoms With Objective Measurements Among Patients With Primary Ciliary Dyskinesia: An International Study.](#) Clin Exp Otorhinolaryngol. 2023 Nov;16(4):407-412. doi: 10.21053/ceo.2023.01130.
2. Liu K, Kouis P, Nikolopoulos G, Kyprianou T, Nikolaidis K, Scoutellas V, Filippou T, Koutrakis P, Yiallourous P, Papatheodorou S. [Ambient climatic factors and term birthweight: A study of critical windows of exposure in the Republic of Cyprus.](#) Environ Res. 2023 Nov 15;237(Pt 1):116885. doi: 10.1016/j.envres.2023.116885.
3. Kouis P, Lemonaris M, Xenophontos E, Panayiotou A, Yiallourous PK. [The impact of COVID-19 lockdown measures on symptoms control in children with asthma: A systematic review](#)

and meta-analysis of observational cohort studies. *Pediatr Pulmonol.* 2023 Nov;58(11):3213-3226. doi: 10.1002/ppul.26646.

4. Lam YT, Papon JF, Alexandru M, Anagiotos A, Armengot M, Boon M, Burgess A, Crowley S, Dheyauldeen SAD, Emiralioglu N, Erdem Eralp E, van Gogh C, Gokdemir Y, Gunaydin O, Haarman EG, Harris A, Hayn I, Ismail-Koch H, Karadag B, Kempeneers C, Kim S, Latzin P, Lorent N, Ozcelik U, Pioch C, Poirrier AML, Reula A, Roehmel J, Yiallourous P; EPIC-PCD team; Goutaki M; EPIC-PCD team. [Sinonasal disease among patients with primary ciliary dyskinesia: an international study](#). *ERJ Open Res.* 2023 May 22;9(3):00701-2022. doi: 10.1183/23120541.00701-2022.
5. Goutaki M, Lam YT, Alexandru M, Anagiotos A, Armengot M, Boon M, Burgess A, Caversaccio N, Crowley S, Dheyauldeen SAD, Emiralioglu N, Erdem E, van Gogh C, Gunaydin O, Haarman EG, Harris A, Hayn I, Ismail-Koch H, Karadag B, Kempeneers C, Kim S, Lorent N, Ozcelik U, Pioch C, Poirrier AML, Reula A, Roehmel J, Yiallourous P, Yumusakhuyly AC, Papon JF. [Characteristics of Otologic Disease Among Patients With Primary Ciliary Dyskinesia](#). *JAMA Otolaryngol Head Neck Surg.* 2023 Jul 1;149(7):587-596. doi: 10.1001/jamaoto.2023.0841.
6. Anagnostopoulou P, Kouis P, Papatheodorou SI, Middleton N, Papasavvas I, Avraamides P, Simantirakis E, Anastasiou I, Novack V, Stamatelatos G, Revvas E, Kaniklides C, Tymvios F, Savvides C, Koutrakis P, Yiallourous PK. [MEDEA randomised intervention study protocol in Cyprus, Greece and Israel for mitigation of desert dust health effects in adults with atrial fibrillation](#). *BMJ Open.* 2023 Mar 24;13(3):e069809. doi: 10.1136/bmjopen-2022-069809.
7. Eleftheriou A, Mouzourides P, Biskos G, Yiallourous P, Kumar P, Neophytou, M.K.-A. [The challenge of adopting mitigation and adaptation measures for the impacts of sand and dust storms in Eastern Mediterranean Region: a critical review](#). *Mitigation and Adaptation Strategies for Global Change* This link is disabled., 2023, 28(6), 33.
8. Michanikou A, Kouis P, Karanicolas K, Yiallourous PK. [Setup of Consumer Wearable Devices for Exposure and Health Monitoring in Population Studies](#). *J Vis Exp.* 2023 Feb 3;(192). doi: 10.3791/63275.
9. Kouis P, Michanikou A, Galanakis E, Michaelidou E, Dimitriou H, Perez J, Kinni P, Achilleos S, Revvas E, Stamatelatos G, Zacharatos H, Savvides C, Vasiliadou E, Kalivitis N, Chrysanthou A, Tymvios F, Papatheodorou SI, Koutrakis P, Yiallourous PK. [Responses of schoolchildren with asthma to recommendations to reduce desert dust exposure: Results from the LIFE-MEDEA intervention project using wearable technology](#). *Sci Total Environ.* 2023 Feb 20;860:160518. doi: 10.1016/j.scitotenv.2022.160518.
10. Achilleos S, Michanikou A, Kouis P, Papatheodorou SI, Panayiotou AG, Kinni P, Mihalopoulos N, Kalivitis N, Kouvarakis G, Galanakis E, Michailidi E, Tymvios F, Chrysanthou A, Neophytou M, Mouzourides P, Savvides C, Vasiliadou E, Papasavvas I, Christophides T, Nicolaou R, Avraamides P, Kang CM, Middleton N, Koutrakis P, Yiallourous



PK. [Improved indoor air quality during desert dust storms: The impact of the MEDEA exposure-reduction strategies](#). Sci Total Environ. 2023 Mar 10;863:160973. doi: 10.1016/j.scitotenv.2022.160973.

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Panayiotis K. Yiallourous  
Professor of Pediatrics & Pediatric Pulmonology  
Medical School - University of Cyprus