

**“VICTOR BABEȘ” UNIVERSITY OF
MEDICINE AND PHARMACY FROM TIMIȘOARA
DOCTORAL SCHOOL
MEDICINE DOMAIN**



**ADVANCED APPROACHES
IN PEDIATRIC PNEUMOLOGY,
FROM RARE TO COMMON DISEASES**

ABSTRACT

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My name is Ioana Mihaiela Ciucă and I was born in 1974, in a small village of Petid, Bihor County, where I went to general school, my parents being my teachers. I attended the Emanuil Gojdu high school, from 1988-1992, the Mathematics-Physics section, in Oradea, preparing for the Faculty of Medicine. I elected to study at the Faculty of General Medicine of the University of Medicine and Pharmacy in Timișoara, graduating in 1998.

The topic of my bachelor's thesis referred to "Etiology of respiratory failure in children-ENT causes", predicting my inclination towards Pediatrics. Later, after finishing the internship, I became a PhD student in the field of Pediatrics, tackling an extremely innovative topic at that time, related to the liver pathology encountered in children with cystic fibrosis/mucoviscidosis, under the direction of Prof. Dr. Ioan Popa.

The thesis **ADVANCED APPROACHES IN PEDIATRIC PNEUMOLOGY, FROM RARE TO COMMON DISEASES**, is elaborated according to the recommendations of the Ministry of Education and Research (Order of the Minister of Education and Research no. 3121/27.01.2015) as well as the Guide for the Preparation and Editing of the Habilitation Thesis within the University of Medicine and Pharmacy "Victor Babeș" Timișoara, developed based on the recommendations of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU).

The habilitation thesis presents the results of the scientific, academic and medical activity since 2001, when I became a member of the research team of the II Pediatrics Clinic of the UMF, as a full-time doctoral student.

The work is organized in four parts:

- the 1st part is dedicated to scientific activity;
- the 2nd part is dedicated to academic activity and academic achievements;
- the 3rd part is dedicated to professional activity;
- the 4th part includes the academic career development plan.

My scientific and research activity focused on pediatric issues, including cystic fibrosis, as a polymorphic and rare disease in pediatrics, later on pediatric respiratory pathology, with a focus on lung ultrasound, as a new and innovative direction of research at the international level. The beginning of the research activity took place at the same time as enrolling in the regular doctorate, in 2001, under the guidance of Prof. Dr. Popa Ioan, an exceptional researcher and teacher, who was my mentor throughout my scientific and professional career. I started my doctoral study with

frequency, in the context where, at the II Pediatric Clinic, there is the National Center for Cystic Fibrosis (Cystic Fibrosis) and the Center of Excellence in Cystic Fibrosis/Cystic Fibrosis Research, the first in Romania and among the few European reference centers. The postdoctoral concerns included the continuation of research in the field of cystic fibrosis, and the development of the study of pneumopathy, as well as the initiation of studies on frequent pathologies in pediatric pulmonology, such as pneumonia and Covid 19 lung disease in children.

After completing my PhD, I started working in different projects and participated as an investigator in five clinical trials. I won a research project through the competition and participated as a member in two other projects.

So far, I have published in ISI indexed journals, in full and in abstracts: 116 works, 27 ISI in full articles (15 main author-10 first author and 12 coauthor), 93 works published in ISI abstracts (53 first author). The research results were published in journals with a high impact on the scientific community, accumulating a Hirsch index of 7 (157 citations) and the cumulative impact factor of the works published as the main author FCIAP= 33,947 (15 articles).

The research activity was carried out in multidisciplinary teams, in which we collaborated with pulmonologists, paediatricians, neonatologists, gynecologists, and other specialists from the country or abroad.

I currently coordinate the training activity in the Pediatric Pneumology Residency, a recent specialty in Romania, of 10 resident doctors, the department I coordinate being among the few training and research centers in the field of the "Victor Babeș" University of Medicine and Pharmacy, Timisoara.

The most recent research topics addressed refer to the discovery of ultrasound-detectable lesions, through lung ultrasonography, a very new field, in which we have achieved outstanding results. I published several pilot studies on this topic and was invited to give oral presentations at international congresses on this topic, at the European Respiratory Congress, the European Congress of Cystic Fibrosis and the International Congress of Pediatric Pneumology, where I obtained 2 awards for the best posters.

The purpose of my research activity was to improve the diagnosis and implicitly the therapy in frequent pediatric pathologies, such as pneumonia, and the non-invasive detection of lung lesions in rare diseases such as cystic fibrosis, the description of complications and risk factors.

In the first stage of my postdoctoral research activity, I continued the study of cystic fibrosis, by detecting risk factors for hepatopathy and dosing MBL, the bone damage associated with FC, as part of the study's *Cystic fibrosis liver disease—From diagnosis to risk factors, Mannan - binding lectine serum level dosing method and Ursodeoxycholic acid effects on cystic fibrosis liver disease, Genetic expression in cystic fibrosis related bone disease*. An observational, transversal, cross-sectional study published in 2014.

Later, I studied the risk factors regarding cystic fibrosis-associated pneumonia, with important results published in the works *Factors Influencing Lung Function in Patients with Cystic Fibrosis in Western Romania, The Relation between Vitamin D Level and Lung Clearance Index in Cystic Fibrosis-A Pilot Study, Vitamin D(25-OH-cholecalciferol) in Cystic Fibrosis and the Relations with Cholesterol and Proteins*.

International recognition as an expert in Cystic Fibrosis was co-opted as a member of the European Centers of Reference Network For Cystic Fibrosis - ECORN-CF project, an international project carried out within the European Program of Community Action in the Field of Public Health), coordinated by University of Frankfurt - Klinikum der J.W. Goethe, Prof. Dr. T.O.F. Wagner, 2007-2010.

I participated as a member in important national projects, as a pilot study for the *Identification and analysis of mutations and genetic structure in children with cystic fibrosis (cystic fibrosis) from Romania* Director Prof. Dr. Ioan Popa, CNCSIS type A, Code 1188/2004-2006, and *The anti-infectious action of lavandula augustifolia* (lavender) on the germs from patients with Cystic Fibrosis and gynecological pathology, project manager Florin George Horhat 94 / 06.01.2017, 2015-2017, which had important results. I was a member of the research group that introduced the methodology for postnatal genetic diagnosis of cystic fibrosis (cystic fibrosis) in the Timisoara medical center (2005) and the methodology for antenatal genetic diagnosis in cystic fibrosis/cystic fibrosis in a national premiere (2006).

Cystic fibrosis is polymorphic, burdened by multiple complications and lung damage dictates the vital prognosis of children with CF, that is why we studied the risk factors for this pathology - *Factors Influencing Lung Function in Patients with Cystic Fibrosis in Western Romania* and the existing optimal therapy - *Antibiotherapy in Children with Cystic Fibrosis—An Extensive Review*.

Lately, I have innovatively developed lung ultrasound as a method of diagnosis and monitoring of specific lesions, the results of which were published in a pilot study:

Lung Ultrasound in Children with Cystic Fibrosis in Comparison with Chest Computed Tomography: A Feasibility Study, the first study at the level international that comparatively approached this pathology.

Another research direction was represented by the study of pneumonia in children, where we used lung ultrasound as a diagnostic modality superior to irradiating radiography - *Lung Ultrasound Is More Sensitive for Hospitalized Consolidated Pneumonia Diagnosis Compared to CXR in Children* and as a method of non-invasive monitoring of children with pneumonia, which is the most frequent cause of death in children, internationally, developing the first ultrasound score useful in child pneumonia: *Pediatric pneumonia (PedPne) lung ultrasound score and inflammatory markers: A pilot study*, which is used by researchers as a parameter objective of evaluating and monitoring the evolution of pediatric pneumonias.

With the emergence of the SARS-CoV2 infection, I considered it very important to prepare a review of this pathology in children, which materialized in the report *COVID-19 in Children: An Ample Review*, which was cited by 53 studies and I participated in the elaboration of another report with an important topic related to the pathology of Covid in children: *Is Lung Ultrasound Helpful in COVID-19 Neonates? - A Systematic Review* and *The Assessment of COVID-19 Pneumonia in Neonates: Observed by Lung Ultrasound Technique and Correlated with Biomarkers and Symptoms*.

The second chapter includes the academic achievements, in which the achievements obtained during my career from university teacher to lecturer are presented. I have mentioned and detailed the didactic activity, from practical works and courses for students to other educational activities, such as the organization of the Timișoara Pediatric Pneumology Symposium (from 2018, addressed to resident doctors and students), the coordination of the Pediatric Student Club (from 2010), coordinating students' bachelor's theses. Also, since the establishment of the Medicine in French section, I have given the courses and internships in Pediatrics and Pediatric Emergencies, annually coordinating undergraduate theses in French.

We developed study materials for students and resident doctors, with a focus on the Pediatric Pneumology specialty, being the only specialty in the country that has a manual dedicated to Pediatric Pneumology residents, in Timișoara.

Involvement in academic activity is also proven by the fact that I have reviewed for 5 journals indexed in Clarivate's Web of Science, and I am a member of the editorial board of Frontiers in Medicine, Pneumology section.

In parallel with the academic activity, I am a primary physician in Pediatrics and a primary physician in Pediatric Pneumology in the Department of Pediatric Pneumology of the Pediatric Clinic of the "Pius Brînzeu" Timișoara County Emergency Clinical Hospital, having a certificate of complementary studies in Pediatric Respiratory Medicine (2012), complementary studies in Allergology and Pediatric Clinical Immunology (2017), certified by General Ultrasonography (2004), certified by complementary studies in Health Services Management (2020) and I am also a Pneumologist specialist (2015).

In the last chapter, the achievements for academic and scientific development are presented, I predict the development of the Pediatric Pneumology segment, by intertwining with related specialties, such as Pediatrics and Pneumology, and I predict the creation of an exceptional Pediatric Pneumology school in Timișoara. The multidisciplinary involvement of young researchers is essential for academic development. Together with young doctors, residents of Pediatric Pneumology, we have built a team with very good results presented through papers at congresses in the country and abroad. Some of them will be co-opted into a future team of doctoral students that I want to coordinate in the field of Pediatric Pneumology, having, through international scientific collaboration relations, requests for co-supervision.

In the long term, I will continue the academic, research and scientific activity in the field of Pediatric Pneumology, developing a Center of Excellence within the Timișoara "Victor Babeș" University of Medicine and Pharmacy, with international connections, which will position pediatric respiratory medicine from Timisoara on a European level.

The bibliography and the list of ten representative scientific papers conclude this habilitation thesis.