2. CHALLENGES AND OPPORTUNITIES OF THE ARTIFICIAL INTELLIGENCE IN RESPIRATORY MEDICINE

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Introduction. Artificial Intelligence is a mechanism capable of actively perceiving the surrounding environment, taking initiatives to maximize the chances of successfully achieving its objectives. Additionally, it can interpret and analyze data in a way that simulates and reproduces human cognitive processes, such as learning, reasoning, and analysis. Scientific papers increasingly address its applicability in medicine, aiming for more precise diagnostics and avoiding the influence of human factor. An increasing number of respiratory pathologies pose a challenge for clinicians due to their heterogeneity. AI could serve as assistance in establishing a more coherent diagnosis by interpretating functional respiratory tests and imagistics methods.

Aim of study. The aim of the study is to identify and describe scientific papers that demonstrate the applicability of AI in pneumology and to acknowledge the need for its implementation in the healthcare system.

Methods and materials. Literature review of the PubMed, GoogleScholar electronic database, 11 articles for the terms ,, Artificial intelligence in respiratory disease ’’ and the American Thoracic Society (ATS)/European Respiratory Society (ERS) original research article.

Results. The research of AI in respiratory medicine focuses primarily on pulmonary function tests (PFTs), the diagnosis and management of conditions like acute respiratory distress syndrome (ARDS), idiopathic pulmonary fibrosis, COPD and other obstructive lung diseases. AI-based software can precisely measure spirometry data quality, comparable to expert over-readers, potentially offering immediate feedback and consistent results, which could benefit clinical trials. The ATS/ERS guidelines served as the gold standard benchmark for interpreting PFT patterns. The study compares the accuracy and consistency of pulmonologists' interpretations of PFTs with those of an AI-based software developed from a large dataset of patient cases. 120 pulmonologists evaluated 50 cases each, resulting in 6000 interpretations, while the AI software analyzed the same data. The investigation revealed that pulmonologists' interpretations matched guidelines in 74.4% of cases, with moderate interrater agreement (κ=0.67). However, correct diagnoses were made in only 44.6% of cases, with significant variability among raters (κ=0.35). In contrast, the AI software matched PFT patterns perfectly and provided correct diagnoses in 82% of cases, significantly outperforming pulmonologists and highlighting the potential for AI-based software to provide more accurate results.

Conclusion. In conclusion, the research underscores the significant potential of AI in revolutionizing respiratory medicine, with a particular focus on PFTs. AI offers the capability to meticulously assess data, providing immediate feedback and consistent results, suggesting its viability as a decision support tool in clinical practice.

Keywords. AI, respiratory medicine, PFTs.