

Two Decades of Respiratory Medicine in Israel: Achievements and Perspectives

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As we breathe, our lungs are constantly exposed to pollutants in the environment. Ambient air contains toxic particles, chemicals, and infectious agents. At least 2 billion people are exposed to indoor toxic smoke from biomass fuel, caused by surroundings such as fireplaces. Approximately 1 billion are exposed to tobacco smoke. At least 1 billion people inhale polluted outdoor air [1].

In 2006, the World Health Organization (WHO) launched the Global Alliance Against Respiratory Diseases (GARD), which aimed to improve the lives of more than one billion people affected by acute and chronic respiratory diseases [2]. The Global Burden of Diseases, Injuries and Risk Factors Study (GBD) provides a systematic and scientific analysis of incidence, prevalence, and mortality of a variety of diseases and injuries [3].

Respiratory diseases cause one-third of all deaths worldwide, surpassed only by cardiovascular diseases and cancer (including primary lung and metastatic cancer). The five most common respiratory disorders are asthma, chronic obstructive pulmonary disease (COPD), acute lower respiratory tract infection (mainly of viral etiology), tuberculosis, and lung cancer.

Since December 2019, global health professionals have been struggling with the worst pandemic event of the last 100 years. Like the influenza virus disease, coronavirus disease-2019 (COVID-19)

is a respiratory viral disease that is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which also has been shown to affect other body systems [4-6]. The long-term respiratory consequences of SARS-CoV-2 are still unknown at this stage [7-10].

Pulmonary infections like tuberculosis and lung cancer are lethal diseases. In 2017 more than 1 million people died from tuberculosis [11]. Lung cancer is the leading cause of cancer death among both men and women, including up to 25% of all cancer deaths [12]. In addition, other respiratory conditions impact global health: occupational lung diseases, pulmonary hypertension, pulmonary embolism, and sleep disordered breathing.

In this context, significant progress was made during the last 20 years in all fields of respiratory medicine in Israel. The incidence of tuberculosis declined significantly and the care of asthma and COPD improved. Emphasizing education and preventive medicine (e.g., campaigns to discourage smoking and early detection of lung cancer programs) represent a major part of the current practice. The field of interventional pulmonology is also rapidly developing and Israel is at the forefront of the new diagnostic and therapeutic procedures. Furthermore, new medications such as biologic treatment for asthma, anti-fibrotic therapy for interstitial lung disease, and drugs for pulmonary hypertension were included in the national health fund benefits. In recent years, Israel initiated the establishment of pulmonary rehabilitation centers to help patients with chronic severe respiratory diseases get access to rehabilitation programs in the com-

munity. Israel lung transplant programs rapidly evolved with more than 50 transplantations per year. This special issue of the *Israel Medical Association Journal (IMAJ)* includes perspectives of Israeli pulmonologists in almost all the respiratory medicine fields during the last 20 years. It comprises a population study of chronic obstructive lung disease [13], diagnostic procedures for lung pathologies [14], pleural disorders diagnostic and therapy [15,16], interventional pulmonology procedures [17,18], respiratory rehabilitation following COVID19 [19], lung transplant in fibrotic diseases [20], aviation and respiratory diseases [21], invasive therapy of pulmonary hypertension [22], lung cancer non-invasive diagnosis [23], pediatric pulmonology [24], and the new field of pulmonary regenerative medicine [25].

Israeli Pulmonary Medicine specialists are an integral part of hospital and health fund clinics, university laboratories who are involved in industrial diagnostic and therapeutic technologies.

CONCLUSIONS

The prevention, control, and cure of respiratory diseases are among the most cost-effective health interventions available. We hope this issue of *IMAJ* will generate a renewed interest in this dynamic and challenging chapter of medicine.

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Capsule

Structure of a vaccine candidate

Much effort is being targeted at developing vaccines that will provide protection against severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). A trimeric spike protein that decorates the virus is a primary target of the host immune system and the focus of vaccine development. **Bangaru** et al. presented the structure of a leading vaccine candidate: a full-length spike protein

with some modifications aimed at enhancing stability that is formulated in polysorbate 80 detergent. The study confirmed that the full-length immunogen is in a stable prefusion conformation and provides a basis for understanding immune responses to the vaccine.

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Capsule

A beneficial cocktail

Since the start of the coronavirus disease-2019 (COVID-19) pandemic, considerable effort has gone into generating and characterizing neutralizing antibodies that could be used as therapeutics. Studies in humanized mice and convalescent humans led to the development of a cocktail of two potent antibodies that simultaneously bind to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spike protein and prevent the virus from entering host cells. **Baum**

et al. evaluated the efficacy of this cocktail, REGN-COV2, in rhesus macaques, which may model mild disease, and in golden hamsters, which present more severe symptoms. The antibody cocktail provided benefits in both models when administered either prophylactically or therapeutically and is currently in clinical trials.

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