

# The Global Burden of Respiratory Disease

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## Abstract

The Forum of International Respiratory Societies has released a report entitled *Respiratory Disease in the World: Realities of Today—Opportunities for Tomorrow*. The report identifies five conditions that primarily contribute to the global burden of respiratory disease (asthma, chronic obstructive pulmonary disease, acute respiratory infections, tuberculosis, and lung cancer), and offers an action plan to prevent and treat those diseases. It describes the staggering magnitude of the global burden of lung disease: hundreds of millions of people suffer and four million people die prematurely from respiratory diseases each

year. The situation is not hopeless, because most major respiratory illnesses are avoidable. Much of the disease burden can be mitigated by reducing exposure to indoor and outdoor air pollution, restraining tobacco use, and relieving urban overcrowding. Implementation of the strategies described in the Forum of International Respiratory Societies respiratory diseases report would have a profound effect on respiratory health, reduce economic costs, and enhance health equality in the world.

**Keywords:** respiratory tract diseases; prevention and control; public health

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For more than a decade, the world's international respiratory societies have regularly met as the Forum of International Respiratory Societies, a collective of the major international respiratory societies (American Thoracic Society, American College of Chest Physicians, Asian Pacific Society of Respirology, Asociación Latinoamericana del Tórax, European Respiratory Society, International Union against Tuberculosis and Lung Disease, and Pan African Thoracic Society) with common goals: to highlight the burden of lung diseases, promote respiratory health worldwide, and identify new areas for global initiatives. It provides a voice to its 70,000 professional members worldwide, who devote their working lives to some aspect of respiratory health or disease, as well as the millions of patients they treat. The Forum recently produced a report on global respiratory diseases, titled, *Respiratory Disease in the World: Realities*

*of Today—Opportunities for Tomorrow* (1) (<http://www.thoracic.org/global-health/firs-report-respiratory-diseases-in-the-world/index.php>), which provides an action plan to prevent and treat lung diseases. This plan will serve as a basis for the respiratory discussion at the United Nations High-Level Summit on Non-Communicable Diseases that is tentatively scheduled for next fall. The report highlights five conditions that primarily contribute to the respiratory disease burden: acute respiratory infections, chronic obstructive pulmonary disease, asthma, tuberculosis, and lung cancer (Table 1).

As outlined in Table 1, the morbidity and mortality related to lung diseases is staggering. Hundreds of millions of people are burdened with chronic respiratory conditions; four million people die prematurely from chronic respiratory diseases each year (2). Respiratory infections are the leading cause of death in

developing countries. Although the Global Burden of Disease Study 2020 revealed fewer deaths related to lower respiratory tract infections than 2 decades ago, too many are still dying (3). Infants and young children are especially susceptible. Nearly three million children, mostly under 5 years of age, died of pneumonia and lower respiratory tract infections (3). In fact, pneumonia kills far more children than human immunodeficiency virus or malaria (4). Tuberculosis infected an estimated 8.6 million and killed 1.3 million people in 2012, primarily in sub-Saharan Africa, where the human immunodeficiency virus epidemic continues unabated (5). The global burden of childhood tuberculosis is unknown, but it is estimated that 10–15% of cases in endemic areas occur in children. Infants and young children are especially susceptible to developing severe or disseminated tuberculosis. Multidrug-resistant tuberculosis is a growing problem,

with about 450,000 new cases in 2012 that contributed to 170,000 deaths (6). Indeed, respiratory illnesses (including tuberculosis) account for one-quarter of all deaths in the world.

Millions die due to the lack of access to immunizations, medications, or the inability of the health care system to provide care. These deaths are avoidable. Immunization programs have proved to be effective in preventing many infectious killers, including measles, influenza, pertussis, and common bacterial pneumonias, such as those caused by *Streptococcus pneumoniae*. Indefensibly, some vaccines are not available as part of the national immunization programs in many countries (6). Though incomplete, multinational efforts for tuberculosis control have been effective, and comprehensive public health programs that identify cases and contacts, and treat tuberculosis to prevent spread (7).

With increasing control of infectious respiratory diseases, efforts have shifted to noncommunicable diseases. Although asthma causes 180,000 deaths worldwide each year, its greatest burden is the morbidity and disruption of lives that it

causes (8). Asthma afflicts 235 million people worldwide and accounts for over 30% of all pediatric hospitalizations in the United States (2), but touches the lives of many more. Its incidence is growing in both developed and developing countries. It affects all ages, races, and ethnicities, although wide variation exists between countries and within different demographic groups. The burden of asthma is greatest in urban communities, related in part to environmental exposures and lack of access to care and effective medications, especially in low-income countries (8).

The human lung is subjected to airborne pollutants and irritants with each breath. Tobacco smoke, including passive smoke exposures, is a leading cause of the respiratory disease burden, along with air pollution and workplace exposure to unsafe air. Contact with smoke from fires used in heating and cooking causes acute and chronic respiratory illness. Over two billion people are regularly exposed to the toxic effects of indoor and outdoor air pollution, which is responsible for 3.5 million premature deaths each year (9). Much of the morbidity and mortality associated with

exposure to poor indoor air quality occurs in women and children, especially in low-income families (10). Chronic obstructive pulmonary disease and lung cancer are leading causes of death worldwide, and their numbers are rising. Respiratory cancers cause 1.5 million deaths annually, which account for over 15% of all cancer-related deaths (11). Lung cancer is the most common malignancy worldwide, and is largely preventable by smoking prevention and cessation. Public programs are needed reduce or eliminate cigarette smoking to avoid the inevitable rise in respiratory cancers in nations where smoking has increased (11).

Respiratory illnesses are frequently avoidable, and prevention costs only a fraction of treatment. The ability to control and eliminate respiratory diseases worldwide relies on public health measures, which include increasing awareness, education, and capacity. Research is essential and improves understanding of disease processes, which then allows for better diagnoses, treatment, and prevention. The American Thoracic Society has made research a priority, and established the

**Table 1.** The big five global respiratory conditions: Forum of International Respiratory Societies, 2013 (1)

Disease	Major Preventable Risk Factors	Estimated Global Disease Frequency (millions)	Global Deaths Per Year (millions)	Comments
COPD	Cigarette smoking; indoor smoke; occupational gases and particles; outdoor air pollutants; asthma.	200 (prevalence)	Unavailable	The 4th leading cause of death worldwide.
Asthma	Genetic predisposition; environmental allergens; air pollutants; dietary factors; abnormal immunological responses.	235 (prevalence)	0.18	Increasing in prevalence worldwide.
Acute respiratory infections	Low immunization rates; poor nutrition; overcrowding; HIV infection.	Unavailable	4	The most common chronic disease of children. The leading overall cause of death in developing countries. Pneumonia is the leading cause of death of children under 5 yr of age. The greatest single contributor to the overall burden of disease in the world as measured by DALY lost
TB	HIV infection; overcrowding.	8.7 (incidence)	1.4	Approximately 80% of global HIV-TB cases occur in Africa. Multidrug-resistant tuberculosis is increasing globally.
Lung cancer	Cigarette smoking; passive exposure to cigarette smoke; biomass fuel smoke; inhaled radon and asbestosis.	1.6 (incidence)	1.37	The most common cause of cancer death.

*Definition of abbreviations:* COPD = chronic obstructive pulmonary disease; DALY = disability adjusted life years; HIV = human immunodeficiency virus; TB = tuberculosis.

Methods in Clinical and Operational Research program in Latin America over a decade ago, with a goal to increase the numbers of public health, academic, and clinical leaders to support and facilitate research and its application to public health and care related to respiratory disease (12). The program has been an unqualified success, and these courses are now held in Asia and Africa. Investments in health care systems and training are priorities that are paying dividends.

Medical breakthroughs have led to many improvements in health, but they are not always implemented in the communities that need them most. Increasing medical costs are threatening the financial health of many nations. Respiratory diseases are an enormous drain on resources, and create a massive health burden worldwide. A

vicious circle—poor health impoverishes nations, and poverty leads to poor health—develops with inadequate access to health care and medications. Improvement in health care requires programmatic research, a well trained and available work force, education, and an efficient medical system to maximize the benefits of research within the context of each country.

Concern for the global burden of respiratory disease has prompted the Forum to issue the *Respiratory Disease in the World* report, which will educate a broad audience on how vulnerable the lung is. It informs political leaders and global policy makers that respiratory diseases are the major cause of childhood illness and have long-term negative consequences on adult health, which has national economic implications. Quality health care is a right; vaccines and

essential medications must be made available to those with respiratory disease. Tobacco use and exposure to airborne pollutants must be reduced. Nations need to provide advanced training of health professionals in respiratory disease. Research is needed to better understand diseases and allow the development of better diagnostics and treatments. Implementation of the strategies described in the report would have a profound effect on respiratory health, reduce economic costs, and enhance health equality in the world. We must act globally to reduce the burden of lung diseases, as described (pp. 407–417) in a Perspectives article by Schluger and Koppaka in this issue (13). ■

**Author disclosures** are available with the text of this article at [www.atsjournals.org](http://www.atsjournals.org).

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