**The GOLD Summit on COPD in Low and Middle Income Countries**

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**ABSTRACT**

Chronic obstructive pulmonary disease (COPD) is one of the top three causes of death worldwide, but Governments and non-governmental organizations have not given its prevention and treatment the priority required. This is particularly true in low- and middle-income countries (LMIC), where most of the people suffering from this disease live. The United Nations (UN) has targeted a reduction of premature deaths from non-communicable diseases (NCDs) by a third by 2030 but there is not yet a coordinated UN/World Health Organisation (WHO) strategy to address the burden of COPD, one of the most important NCDs.

To explore the extent of the problem and inform the development of policies to improve the situation the Board of Directors of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) held a one-day Summit in September 2018 to discuss what is known about risk factors and prevalence as well as the challenges of COPD diagnosis and management in LMIC. The key themes that emerged were: the need for accurate data on prevalence, the need to raise awareness of the disease among the public, healthcare professionals and governments, including the fact that the aetiology of COPD goes beyond smoking (and other inhaled pollutants) and includes poor lung development in early life, and the need to ensure spirometry and pharmacological and non-pharmacological therapies are available and affordable.

The manuscript presents the actions civil society, individual health services, national & international professional societies, Ministries of Health, non-governmental organizations, international agencies and the pharmaceutical industry must take together with the WHO and UN to begin to address the impact of the disease. We believe that the WHO is particularly well positioned to co-ordinate an attack on COPD and GOLD will do all it can to help and rally support.

**ARTICLE SUMMARY**

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| **Strengths and limitations of this study*** Chronic obstructive pulmonary disease (COPD) is one of the top three causes of death worldwide.
* Governments and non-governmental organizations have not given its prevention and treatment the priority required particularly in low- and middle-income countries (LMIC).
* Board of Directors of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) held a one-day Summit to discuss the challenges of COPD diagnosis and management in LMIC.
* Key themes that emerged were: the need for accurate data on prevalence, the need to raise awareness of the disease among the public, healthcare professionals and governments, including the fact that the aetiology of COPD goes beyond smoking (and other inhaled pollutants) and includes poor lung development in early life, and the need to make spirometry and pharmacological and non-pharmacological therapy available.
* Coordinated action is needed to address the impact of this disease.
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**INTRODUCTION**

Chronic obstructive pulmonary disease (COPD) affects 1 in 10 of the adult global population and is one of the three commonest causes of death worldwide ([1](#_ENREF_1)). It is also a major cause of the global inequalities in health and is more prevalent where such inequalities are more extreme, but Governments and non-governmental organizations (NGOs) have not given its prevention and treatment the priority required. This is particularly true in low- and middle-income countries (LMIC), where most of the people suffering from this disease live.

We, the Board of Directors (BoD) of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) are particularly concerned that there is not yet a coordinated UN/World Health Organisation (WHO) strategy to address the burden caused by COPD despite the endorsement of the “25 by 25 goal” by the World Health Assembly 7 years ago which aimed to reduce premature deaths from non-communicable disease (NCDs) by 25% by the year 2025 ([2](#_ENREF_2)). As part of an initiative to understand the issues and explore potential ways to improve the situation we held a one-day summit in September 2018 and report the issues discussed here.

**BACKGROUND TO THE SUMMIT**

**Current understanding of the origins of COPD**

It is now clear that tobacco smoking in adult life is not the only cause of COPD, although it remains a major risk factor ([3](#_ENREF_3)). From a global perspective exposure to indoor and outdoor biomass fumes and air pollution in adult life are also important risk factors ([4](#_ENREF_4)). There is now also good evidence that poor lung growth, both before and after birth, as a result of malnutrition, infections and/or passive exposure to indoor and outdoor pollutants, can also lead to COPD ([5-7](#_ENREF_5)) and these risk factors are closely linked to poverty. A recent analysis of three large, independent cohorts in developed countries showed that even in these settings about half of adult COPD patients develop the disease as a consequence of abnormal lung development early in life ([8](#_ENREF_8)). HIV is now also emerging as an important risk factor for the development of COPD ([9](#_ENREF_9)) and HIV-associated COPD has become more common in LMIC with the increase in life expectancy in people with HIV due to increasing use of effective antiretroviral therapy (ART) ([10](#_ENREF_10)). The majority of people with HIV have low socioeconomic status and are also more likely to smoke, to develop tuberculosis and to be exposed to higher levels of pollution. Better data are required to disentangle the relationships between these risk factors ([11](#_ENREF_11)), but they represent further links between COPD, and the heath inequalities it produces, and poverty.

**The size of the problem: prevalence, mortality & morbidity**

Confirming the diagnosis of COPD depends on identifying airflow obstruction using spirometry ([12](#_ENREF_12)) but this is not widely available in many LMICs ([13](#_ENREF_13)) and reliable data on the prevalence and burden in these countries is limited. As part of the Burden of Obstructive Lung Disease (BOLD) study, surveys using standardised questionnaires and spirometry have been done in 29 countries, including LMIC, with surveys in 9 more countries in progress ([14](#_ENREF_14)). Using data from such sources, the Global Burden of Disease (GBD) study estimated that in 2015 COPD affected 104·7 million men and 69·7 million women globally and that between 1990 and 2015 the prevalence of COPD had increased by 44·2%.([3](#_ENREF_3)); however an analysis by the Global Health Epidemiology Reference Group (GHERG) estimated COPD was much more common and that 384 million people had COPD in 2010, giving a prevalence of 11.7% ([15](#_ENREF_15)). Until recently the mean life expectancy of the population in many LMIC has been poor and survival to an age when COPD would usually be diagnosed was uncommon, but improvements in life expectancy in LMIC over the last 50 years together with reductions in childhood mortality are likely to lead to a substantial increase in the prevalence of COPD in Latin America, Africa and South East Asia in future decades.

In 2017 COPD was the third most common cause of death globally, killing 3.2 million people per year ([16](#_ENREF_16)). The number of deaths rose by 17.5% between 2007 and 2017. The main burden of mortality from COPD is seen in Latin America, sub-Saharan Africa, India, China and South East Asia (Figure 1a). In some LMICs age-standardized mortality rates appear to have fallen over the last decade, but these changes may unfortunately only be temporary, as they are likely to reflect increases in life expectancy as a result of better nutrition and treatment of infectious diseases. However, as the consequences of the growth in tobacco use and other risk factors become evident these positive trends are likely to be reversed.

In the latest GBD analysis COPD entered the top 10 causes of years of life lost (YLL), increasing from 11th in 2007 to 7th in 2017 ([16](#_ENREF_16)) and COPD is one of only three conditions in the top ten global causes of YLL to have shown an increase over this period. Deaths from COPD are predicted to rise to 4.4 million per year in 2040 and by then COPD is predicted to be the 4th most important cause of YLL ([17](#_ENREF_17)), but these estimates do not take into account the early life risk factors for COPD and reductions in infant mortality, so the actual increases may be even greater.

**Global inequalities in COPD management.**

Between 1990 and 2015 the greatest decreases in age-standardised disability-adjusted life years (DALY) rates due to COPD occurred in high-middle-socio-demographic index (SDI) and middle-SDI quintile countries ([3](#_ENREF_3)). Age-standardised DALY rates in males are almost twice as high as those in females, reflecting a higher male to female ratio for deaths, and were highest in countries in the low middle and middle quintiles of SDI. The age-standardised DALY rates due to COPD are highest in sub-Saharan Africa, South and South East Asia and Oceania (Figure 1b), and the biggest increase in DALYs over the last 25 years has been in low SDI countries. In many countries the inequalities in burden and mortality from COPD can be attributed to poverty ([18](#_ENREF_18)).

As well as inequalities of the burden of COPD there are wide disparities between countries in access to healthcare with worse access in regions where it is needed most (Figure 2)([19](#_ENREF_19)), and access to spirometry and basic COPD medication shows even greater inequality. For example, in Malawi there has been only one spirometer available in the public health service for many years and the diagnosis and effective management of COPD is a major challenge in countries with limited diagnostic tools.

**A brief background on GOLD**

GOLD was initiated in 1997, with the cooperation of the National Heart, Lung, and Blood Institute, National Institutes of Health (NHLBI) and the WHO ([20](#_ENREF_20)). Its goals are to increase awareness of COPD and to improve its prevention and management through a concerted worldwide effort throughout all facets of healthcare delivery and policy. GOLD is now a non-profit self-funded organization independent of the NHLBI, WHO and the pharmaceutical industry ([www.goldcopd.org](http://www.goldcopd.org)). Members of the GOLD BoD and the science committee are unpaid. Although no longer formally linked with WHO, the BoD regard working with WHO, UN and other NGOs as key to reducing the global burden of COPD.

GOLD publishes an annual report that summarises the latest evidence on the management of COPD and in many countries this underpins local guidelines on the treatment of COPD. The most recent edition of the GOLD recommendations were published in November 2018 ([12](#_ENREF_12)). GOLD is also committed to raising awareness among policymakers and governments of the global burden caused by COPD.

**Patient and Public Involvement**

GOLD has National Leaders in over 60 countries who promote the goals of GOLD within their home country and liaise with local patient groups. They feedback to the Board. There was no direct patient or public involvement in the Summit.

**EXAMPLES OF PROBLEMS FACED BY LMIC IN DIFFERENT REGIONS**

The GOLD Summit considered the issues faced in LMICs in four of the WHO regions: Africa, the Americas, Europe and South-East Asia. Data from individual LMICs in these regions were reviewed to highlight what is known about the prevalence, aetiology and diagnosis of and mortality from COPD. They also illustrated the challenges facing clinicians managing COPD and patients living with the disease in these areas.

**Sub-Saharan Africa**

The GOLD Summit reviewed evidence from Malawi, which has a gross national income per person (GNI PP) of only $320; Sudan, with a GNI PP nearly ten times higher but still only $2380; and Nigeria (GNI PP $2080)([21](#_ENREF_21)). The information that was considered had been developed in conjunction with the Malawi Ministry of Health and The Epidemiological Laboratory (Epi-Lab) in Sudan. Despite differences in wealth, the problems faced in Malawi and Sudan were very similar, suggesting that it is not just a problem of resources but also a lack of effective policies and education. In addition to limited access to spirometry to diagnose COPD, the lack of normal reference ranges for the populations in these countries to assess the severity of airflow obstruction hinders accurate estimates of the burden of COPD.

Tobacco smoking is commonly under-reported and there are indications that smoking rates in women in countries like Sudan may be particularly under-reported because of cultural and religious attitudes. Whilst ‘asthma’ is recognised as a common cause of mortality, awareness of COPD is low. Although infectious disease appears a priority now, particularly in children, little thought has been given by governments and NGOs to the long-term workforce implications of conditions such as COPD. In addition, in countries such as Malawi where tobacco is an important cash crop, the implications of smoking cessation and tobacco control programmes are particularly problematic, both in terms of messaging about the harms of tobacco and the financial implications of reducing consumption. Of note, Malawi has not ratified the WHO Framework Convention on Tobacco Control ([22](#_ENREF_22)). Nigeria presents particular challenges and paradoxes because despite being the largest oil producer in Africa it has the largest number of the very poor in the world and has a very rapid population growth with dense urbanisation. Cigarette smoking rates are low – 89% of the population are never smokers - but there is high utilization of wood/coal for indoor cooking or heating.

A BOLD study in Ile-Ife in Nigeria estimated the prevalence of COPD to be about 7.7% (Table 1) with key risk factors being TB, “asthma” and low socioeconomic status and no clear relation between obstruction and biomass use ([23](#_ENREF_23)). Despite almost universal use of highly polluting fuels for household energy needs and high exposure to household air pollution, the prevalence of airflow obstruction in rural Malawi was only 8.7% ([24](#_ENREF_24)). The BOLD studies from Malawi and Nigeria have identified a substantial population burden of ‘low forced vital capacity’ (FVC) about which little is known ([24-26](#_ENREF_24)). Low FVC has also been found to be common in LMIC in South Asia ([27](#_ENREF_27)) and in an Aboriginal population in Australia ([28](#_ENREF_28)). Low FVC may reflect preventable poverty-related drivers of poor lung growth and accelerated decline in lung function, including malnutrition, low birth weight and childhood environmental exposures. As low FVC is associated with lower life expectancy, improving our understanding of the clinical and public health importance of low FVC and how to address the problem needs to be prioritised.

As well as limited awareness of COPD as an important medical condition by patients, there are challenges with medical staffing as there are relatively few doctors and very few who have trained in respiratory medicine. The diagnosis and treatment of many conditions is delegated to clinical officers and nurses who receive little training in the importance of COPD or how to make a diagnosis. Most of the healthcare delivered is reactive because of the overwhelming burden of infectious diseases including tuberculosis, HIV and malaria.

There is poor access to adequate inhaled therapy as a result of both financial and logistical issues. For example, a month’s supply of inhaled salbutamol and beclometasone in Malawi costs the equivalent of 9.2 days’ wages/month, and they are only available in 0.4% of outlets ([29](#_ENREF_29)). As well as the direct costs of purchasing medication when this is not provided by the public sector, there are frequently substantial indirect costs of accessing healthcare as a result of the need to travel and the necessity of taking time away from work.

In contrast to data from India ([4](#_ENREF_4)) and Latin-America ([30-33](#_ENREF_30)) epidemiological studies in Sub-Saharan Africa have not shown any apparent relation between biomass exposure in the home and the occurrence of airflow limitation ([24](#_ENREF_24), [25](#_ENREF_25), [34](#_ENREF_34)); however, these data are difficult to interpret as high exposures in children and adults are the norm and cooking is frequently performed outdoors ([24](#_ENREF_24), [35](#_ENREF_35), [36](#_ENREF_36)). As a consequence, there is uncertainty about the potential COPD-related benefits of reducing domestic biomass exposure in isolation as high background exposures to pollution from other sources (e.g. traffic, industry and burning rubbish) are common. Furthermore, many of the risk factors for COPD, such as malnutrition during pregnancy, low birth weight, and childhood exposure to air pollution, are features of poverty and are difficult to disentangle from COPD development as a result of adult exposures ([18](#_ENREF_18)). An integrated approach to tackling the various poverty-related drivers to COPD including achieving clean air for all to breathe is needed.

The Summit also heard that recommendations in the GOLD Report are not well known among care providers in countries such as Nigeria and unaffordable to those that need the care. Ways of supporting and improving care in LMICs alongside making recommendations relevant to well-resourced countries need to be developed.

**Latin America**

There is variation between countries in Latin America, due to the heterogeneity between developing LMIC in Central America versus upper middle- and high-income countries (HIC) such as Brazil, Mexico, Argentina and Chile. In terms of healthcare this means that a wide range of sophistication and facilities exist varying from provision similar to Africa in some regions of some countries to systems that are compatible with the best in HIC.

There are data available on the prevalence of airflow obstruction in urban areas in Mexico, Brazil, Venezuela, Uruguay, Chile, Colombia, Peru and Argentina from the PLATINO, PREPOCOL, CRONICAS and EPOC.AR studies ([32](#_ENREF_32), [37-39](#_ENREF_37)). CRONICAS assessed COPD prevalence in an agrarian setting in a sea-level community in northern Peru and in a rural area in the Andes ([38](#_ENREF_38)). In the Andean countries the prevalence is lower than in lowland countries that have experienced more European migration, and the prevalence of COPD was lower among people of native American ancestry. Similarly, in Costa Rica Native American ancestry was associated with a lower risk of having COPD than European ancestry ([40](#_ENREF_40)) suggesting there is a strong genetic influence on the risk of developing COPD, whether due to smoking, pollution or early life exposures.

A sub-analysis of the original PLATINO study showed that the prevalence of COPD under-diagnosis in the total population was 12.7% (ranging from 6.9% in Mexico City to 18.2% in Montevideo). Among the subjects with spirometric diagnosis of COPD, 89% of the cases had no previous diagnosis ([41](#_ENREF_41)).

In the PLATINO study the prevalence COPD (GOLD stages 2-4) in never smokers was 3.5% and risk factors in this group were self-reported asthma, previous tuberculosis, a previous history of respiratory symptoms and a low body mass index (BMI)([42](#_ENREF_42)). The PUMA study showed that smoking and biomass are both risk factors for COPD, but they do not appear to have an additive effect ([43](#_ENREF_43)). Higher exposure to biomass smoke may also be a marker of poverty. Results from the PLATINO follow-up study showed that COPD is associated with an increased risk of mortality in middle income countries ([44](#_ENREF_44)).

In the PUMA study, which was carried out in primary care sites selected to reflect national primary care practice in Argentina, Uruguay, Venezuela & Colombia (middle-income countries), nearly 80% of patients in primary care with a prior clinical diagnosis of COPD were treated with inhaled therapy, most commonly short acting bronchodilators ([45](#_ENREF_45)). However, when patients were assessed using spirometry there was a high level of over diagnosis (30%), and paradoxically only 37% of patients with airflow obstruction were treated with inhaled therapy. In primary care in these countries long acting bronchodilators (LABD) are frequently underused as regular maintenance therapy for COPD despite being available and the treatment received by COPD patients does not follow guidelines. Unsurprisingly, having health insurance with medication coverage increased the use of bronchodilators. Data on the availability of spirometry for diagnosis and the availability use of inhaled therapy in LMIC in Latin America are not available.

**Russia**

Russia is a vast country encompassing different climate zones, different ways of life, diet and preferences, different ethnic groups, different medical services, and different access to medication. Reduction in health inequalities is an important political aim, but this relies on having accurate data on the prevalence, outcome and aetiology of COPD across the country, and these are limited. The current official COPD prevalence figure of 1.7% (46) is likely to be an underestimate as the data were only collected from clinics in regional hospitals. The prevalence estimated by pulmonologists in Russia is higher with the majority estimating it at over 15% ([47](#_ENREF_47)), and a patient survey suggested it was around 9% ([48](#_ENREF_48)). A survey in 10 cities distributed across the country from East to West found an estimated prevalence of COPD of 15.3% and only 21% of these patients had been diagnosed ([49](#_ENREF_49)). The data were not analysed to assess regional differences in prevalence, however, and no data were collected in rural areas. As well as tobacco smoking, exposure to biomass fuel smoke and occupational dust were identified as important risk factors.

Official statistics show respiratory conditions were the fourth most common cause of death in Russia, with COPD accounting for 40% of these respiratory diseases, but there is some uncertainty about the accuracy of the attribution of the cause of death. There is low awareness among the public of COPD compared to other NCDs such as ischaemic heart disease, diabetes etc. (50)

For routine management spirometry is available but the quality is generally poor. Many patients diagnosed with COPD do not receive treatment recommended by international or local guidelines, but there is a government-led pneumococcal vaccine programme. All medications recommended by the GOLD report are available and reimbursed, but there is significant variation in supply. In a survey, specialists estimated that 70% of patients in Russia had problems accessing the medication that had been prescribed ([51](#_ENREF_51)).

As in many countries, unlike access to medication, there is ready access to tobacco, even in remote rural areas, showing that distribution networks can and do work for some goods. Tobacco use has declined in recent years as a result of a tripling of the cost as well as implementation of a 100% smoke-free policy in all public places; banning all forms of tobacco advertisement, promotions, and sponsorships; and increasing anti-tobacco use campaigns in various types of media. Surveys using the Global Adult Tobacco Survey (GATS) methodology ([52](#_ENREF_52)) have shown a decrease in overall tobacco use from 39.4% in 2009 to 30.9% in 2016 with the use in men falling from 60.7% to 50.9% and from 21.7% to 14.3% in women ([53](#_ENREF_53)).

**India**

India had a population of over 1.3 billion people in 2016 (18% of the global population)([54](#_ENREF_54)) and encompasses different ethnic groups, climate zones, ways of life and diet. In the last 50 years life expectancy from birth has risen from 41 to 68 years, mortality for those under 5 years of age has fallen from 242 to 39 per 1000 births ([55](#_ENREF_55)), and the GNI PP has quadrupled in the last 20 years to $1820 ([21](#_ENREF_21)). This means the burden of COPD is likely to rise dramatically as children and adults survive long enough to suffer from the disease. Already, the GBD estimates that the number of cases of COPD in India has increased from 28·1 million in 1990 to 55·3 million in 2016, an increase in prevalence from 3·3% to 4·2% ([56](#_ENREF_56)). The National Health Policy of India 2017 reflects the WHO “25 by 25” goal that premature mortality from non-communicable diseases should be reduced by 25% by 2025 ([57](#_ENREF_57)) and national disease control programmes have been developed for other diseases but not for COPD.

Surveys using the BOLD methodology have been carried out in 3 cities and showed significant variations in the prevalence of COPD between cities, but similar prevalence in men and women in each city (Table 1)([14](#_ENREF_14)). The higher prevalence in Srinagar in Kashmir may reflect the fact that this is a colder region where biomass fuel is used for heating as well as cooking in poorly ventilated homes. Smoking rates are relatively low, particularly in women: the 2015 age standardised prevalence of smoking was 2.8% in women and 17·4% in men ([58](#_ENREF_58)). 85% of people identified as having COPD were never smokers. In these people outdoor air pollution from particulate matter, indoor air pollution from biomass fuels, occupational exposure to crop dust, dust from mines, poor socioeconomic status, poor nutrition, overcrowding, and residence in urban slums have been identified as risk factors for COPD, but the importance of childhood exposures has not been evaluated ([4](#_ENREF_4), [59](#_ENREF_59), [60](#_ENREF_60)). A study in Pune has looked at COPD in rural areas and found an overall prevalence of 5.1% among 3600 randomly selected men and women aged over 30 ([61](#_ENREF_61)). COPD was found to be more prevalent in villages close to highways than in more remote areas, suggesting a possible role for vehicle derived pollution, but this interpretation may be confounded by the fact that villages away from highways are also less poor and use cleaner fuel.

Studies have shown that burning different biomass leads to different risks of developing COPD, with crop waste/dung being worst ([62](#_ENREF_62)). Attempts to improve indoor air quality have included the introduction of cooking stoves which use cleaner fuels, but these still produce fine particulate matter (diameter <2.5 µm or PM2.5) at levels well above the levels recommended by WHO ([63](#_ENREF_63)). Their efficacy in reducing the incidence of COPD is not proven and there is a danger that their widespread introduction could divert resources away from other initiatives. Burning mosquito coils (MCs) also produces indoor levels of PM2.5 that are higher than those reported during the burning of biomass fuels for cooking purposes ([64](#_ENREF_64)). Further studies are urgently required to assess the full burden and adverse effects caused by the burning of MCs and less harmful alternatives developed.

It is estimated that 95-98% of COPD in India is undiagnosed, partly because symptomatic people are often late in seeking care as a result of insufficient awareness of the disease ([65](#_ENREF_65), [66](#_ENREF_66)) and also because most symptomatic individuals tend to seek treatment from practitioners of alternative medicines and faith healing. In most cases, the diagnosis of COPD is based on symptoms rather than spirometry. In the BOLD surveys the probability of being treated for a standard group of 50–69 year olds with COPD (i.e. FEV1 50-80% predicted) and either dyspnoea or wheeze ranged from 20% in Pune to 42% in Srinagar ([67](#_ENREF_67)).

All the main types of branded inhaled therapies are licensed for use in India, but they are not widely available or used and the prescription of inhalers is often perceived as a stigma in rural areas ([66](#_ENREF_66)). Medicines are provided free in public facilities, which are the primary source of drugs for poor populations; however, in a survey beclomethasone was found to be available in no public facilities in four states, and in only 25% of facilities in Rajasthan ([68](#_ENREF_68)). Inhalers were available in between 10-90% of private facilities in all states; however purchasing one inhaler each of salbutamol and beclomethasone cost between 1.6 and 2.3 days’ wages for the lowest paid government worker and 80% of the population earn less than this ([68](#_ENREF_68)).

**China**

Although China is the most populous country in the world (population 1·38 billion) and has the largest number of active smokers (300 million adults)([69](#_ENREF_69)), the Summit did not hear specifically about the challenges posed by COPD in China. Nevertheless, the BoD consider that addressing the burden of COPD in China is an essential component of strategies to reduce the global burden.

The prevalence of COPD in China is predicted to rise substantially as a consequence of the increasing age of the Chinese population, the continued high rates of cigarette smoking and high levels of air pollution. In 2004 the overall prevalence of COPD in China was estimated to be 8·2% ([70](#_ENREF_70)). A more recent survey in 2015 across seven major regions showed that the prevalence had increased to 13·6%, with a higher prevalence in men (19·0%) than in women (8·1%) ([71](#_ENREF_71)). COPD is more prevalent in rural areas than in urban areas and most cases remain undiagnosed with diagnostic rates around 23-30% ([72](#_ENREF_72)). Tobacco smoking and biomass exposure are the major risk factors for COPD in China ([72](#_ENREF_72)) and the higher prevalence in men is due largely to differences in smoking rates (58·2% in men, 4·0% in women). China is the world’s largest tobacco producer and consumer ([69](#_ENREF_69)) but the country has made progress on tobacco control in recent years. Measures include bans on smoking in public places in a number of cities including Beijing and taxation changes and the government’s Healthy China 2030 initiative has set an ambitious target to decrease the rate of smoking to 20% by 2030 ([73](#_ENREF_73)).

**EMERGENT themes**

The COPD burden will undoubtedly increase in the coming decades because of continued exposure to risk factors, increased childhood survival and an aging population ([74](#_ENREF_74)). Although the focus of the Summit was the burden of COPD in LMIC, the GOLD BoD are also aware that in upper-middle and high income countries in Europe and North America and in China COPD remains one of the major causes or morbidity and mortality.

Despite its prevalence in LMIC there is little public awareness of COPD as a major health problem and health services have not given it the priority it requires. There is a need to raise awareness of COPD among health workers, to emphasise the importance of accurate diagnosis, to make spirometry easily available and to train health workers in its use. There is also a need to identify lung function abnormalities at an earlier age. There is a lack of reliable epidemiological data on COPD in many regions, particularly outside cities, and no consensus exists on case definitions and how to measure disease severity in population health surveys. Comparisons between countries and over time are important, and we support the call for greater standardisation in data collection ([3](#_ENREF_3)).

COPD due to smoking remains a major problem globally and there is a growing epidemic of smokers in LMICs; however poor pre- and post-natal lung development as a result of indoor and outdoor air pollution, malnutrition and poverty in LMIC, and HIV infection, particularly in sub-Saharan Africa, are also important and correctable causes of COPD. The majority of the world’s smokers now live in LMIC ([75](#_ENREF_75)) and tobacco control attempts there have been limited by a focus by governments on what are perceived as more immediate health threats, together with pressure from the tobacco industry, both local producers and transnational companies. As smoking has declined in HIC manufacturers have targeted LMIC, particularly those in sub-Saharan African, to maintain their sales ([76](#_ENREF_76)).

Differences between the clinical characteristics and pathological abnormalities of COPD caused by tobacco smoke, biomass exposure and HIV have been identified ([77-79](#_ENREF_77)) but there are limited or no data on differences in disease progression, long term outcomes, and optimal treatment. There is no data on differences in the clinical features of COPD due to poor lung development.

The 2013 WHO Global Monitoring Framework included a target to achieve “80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities.” ([2](#_ENREF_2)). The only long-acting bronchodilator in the WHO list of essential medications is formoterol, but it is only listed in combination with budesonide ([80](#_ENREF_80)), and as the Summit heard the current availability of the medications for COPD and spirometry for diagnosis is way below this level and the affordability of the medications when they are available is poor ([81](#_ENREF_81)).

Preventative strategies in line with the UN SDGs must begin ante-natally and continue throughout the life-course to effectively impact disease burden. Universal Health Coverage (UHC) is defined by the WHO as health coverage that “all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship” ([82](#_ENREF_82)).The 2019 UN HLM on UHC offers a significant opportunity to make progress on reducing the global burden and inequalities due to COPD.

**THE BOARD’S RESPONSE**

The GOLD BoD has challenged all relevant parties to form a coalition with GOLD to achieve our ambition of reducing the number of people suffering and dying from COPD in all countries of the world ([83](#_ENREF_83)). We must work together to prevent the development of COPD by reducing exposure to risk factors, but to achieve the “25 by 25” target we must ensure the diagnosis is made as early as possible and that all patients around the world receive effective therapy. GOLD will work to develop resource-stratified recommendations on the management of COPD tailored to the reality of what is available in LMICs, and the GOLD Report will include definitions of what we consider basic essential prevention, diagnostic and treatment services. We believe that the WHO is particularly well positioned to co-ordinate an attack on COPD and we, the GOLD BoD, will do all we can to help and rally support. We have called for a whole system approach that moves COPD management up a ladder of quality, driven by action and political pressure led by these organisations and underpinned by the WHO. Unless this happens, COPD will remain a low priority in health policies in many countries, and there will be substantial preventable direct and indirect costs, increasing inequalities and needless suffering and death.

4967 words

Competing interests

David M.G. Halpin reports personal fees from AstraZeneca, personal fees and non-financial support from Boehringer Ingelheim, personal fees from Chiesi, personal fees from GlaxoSmithKline, personal fees and non-financial support from Novartis, personal fees from Pfizer. Bartolome R. Celli reports grants and other from Astra Zeneca, personal fees from GlaxoSmithKline, personal fees from Boehringer Ingelheim, personal fees from Novartis, personal fees from Sanofi-Aventis, personal fees from Menarini. Gerard J. Criner has nothing to disclose. Peter Frith reports personal fees from Boehringer Ingelheim, non-financial support from Global Initiative for Chronic Obstructive Lung Disease, personal fees from Menarini, personal fees from Novartis, non-financial support from Lung Foundation Australia. M.Victorina López Varela has nothing to disclose. Sundeep Salvi has nothing to disclose. Claus F. Vogelmeier reports personal fees from Almirall, grants and personal fees from AstraZeneca, grants and personal fees from Boehringer Ingelheim, grants and personal fees from Chiesi, grants and personal fees from GlaxoSmithKline, grants and personal fees from Grifols, grants and personal fees from Mundipharma, grants and personal fees from Novartis, grants and personal fees from Takeda, personal fees from Cipla, personal fees from Berlin Chemie/Menarini, personal fees from CSL Behring, personal fees from Teva, grants from German Federal Ministry of Education and Research (BMBF) Competence Network Asthma and COPD (ASCONET), grants from Bayer Schering Pharma AG, grants from MSD, grants from Pfizer. Ronchang Chen reports grants and personal fees from GSK, grants and personal fees from Astra Zeneca, personal fees from Novartis, personal fees from Boehringer Ingelheim. Rebecca Decker has nothing to disclose. Kevin Mortimer reports personal fees from International Union Against TB and Lung Disease. Maria Montes de Oca has nothing to disclose. Zaurbek Aisanov has nothing to disclose. Daniel Obaseki has nothing to disclose. Alvar Agusti reports grants and personal fees from AstraZeneca, grants and personal fees from Menarini, personal fees from Chiesi, grants and personal fees from GSK, personal fees from Nuvaira.

Contributions

All authors meet criteria for authorship as recommended by the International Committee of Medical Journal Editors, take responsibility for the integrity of the work as a whole, contributed to the writing and reviewing of the manuscript, and have given final approval for the version to be published. David M.G. Halpin, Bartolome R. Celli, Gerard J. Criner, Peter Frith, M.Victorina López Varela, Sundeep Salvi, Claus F. Vogelmeier, Ronchang Chen, Rebecca Decker & Alvar Agusti are members of the Board of Directors of GOLD. Kevin Mortimer, Maria Montes de Oca, Zaurbek Aisanov & Daniel Obaseki contributed to the Summit.

Table 1. Prevalence of post-bronchodilator airflow obstruction in men and women aged 40 years and older in the regions considered by the Summit estimated by surveys using the BOLD methodology ([14](#_ENREF_14)).

|  |  |  |  |
| --- | --- | --- | --- |
| City | Prevalence in men (%) | Prevalence in women (%) | Ref |
| Blantyre (Malawi)\* | 9.0 | 7.0 | ([25](#_ENREF_25)) |
| Ile-Ife (Nigeria)\*\* | 8.6 | 6.7 | ([23](#_ENREF_23)) |
| Cape Town (South Africa)\*\* | 23.0 | 16.9 | ([14](#_ENREF_14)) |
| São Paulo (Brazil)\*  | 18.0 | 14.0 | ([37](#_ENREF_37)) |
| Santiago (Chile)\* | 23.3 | 12.8 | ([37](#_ENREF_37)) |
| Mexico City (Mexico)\* | 11.0 | 5.6 | ([37](#_ENREF_37)) |
| Montevideo (Uruguay)\* | 27.1 | 14.5 | ([37](#_ENREF_37)) |
| Caracas (Venezuela)\* | 15.7 | 10.2 | ([37](#_ENREF_37)) |
| Russia | No data | No data |  |
| Srinagar (India)\*\* | 17.3 | 14.8 | ([14](#_ENREF_14)) |
| Mumbai (India) \*\* | 6 | 7.6 | ([14](#_ENREF_14)) |
| Pune (India) \*\* | 5.7 | 6.8 | ([14](#_ENREF_14)) |
| Kashmir (India)\*\* | 17.3 | 14.8 | ([84](#_ENREF_84)) |

\* using FEV1/FVC < 0.7; \*\*using FEV1/FVC < LLN

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*Figure 1. (a) Age standardised mortality rates per 100,000 for COPD in 2017 (data from GBD* [*https://vizhub.healthdata.org/gbd-compare/*](https://vizhub.healthdata.org/gbd-compare/)*); (b) Age standardised DALY rates per 100,000 for COPD in 2017 (data from GBD https://vizhub.healthdata.org/gbd-compare/)*



*Figure 2. Global differences in access to care. Universal Health Coverage service coverage index (84) in 2018 (http://blogs.worldbank.org/opendata/2018-atlas-sustainable-development-goals-all-new-visual-guide-data-and-development).*

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