

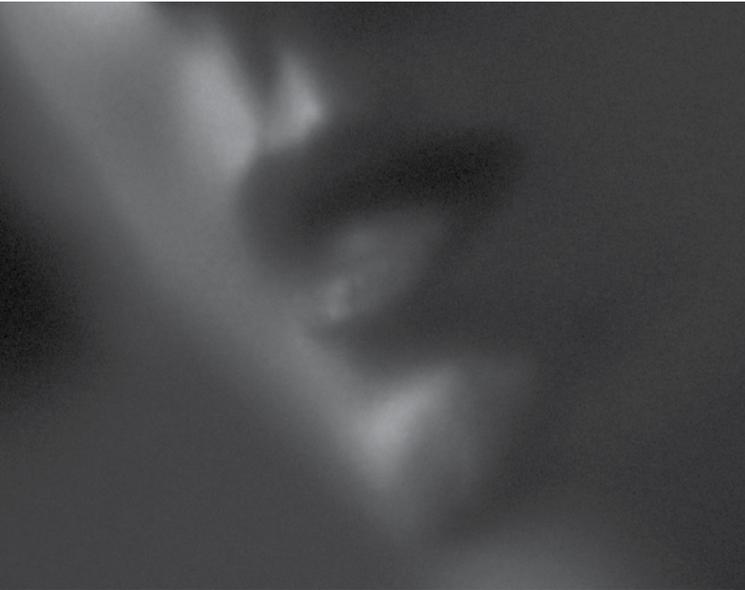
Updated September 2011

COPD UNCOVERED

COPD: The New Workplace Epidemic

Authors: Monica Fletcher, Thys van der Molen, Neil Barnes, John Walsh

About COPD Uncovered



COPD Uncovered represents the combined efforts of a multi-disciplinary committee of international experts, coming together to explore some of the most important issues in chronic obstructive pulmonary disease (COPD) today. Our aim is to highlight the impact of COPD on active, productive individuals aged from 40–65 years – a population that has been little studied until now, and as a result is poorly understood. COPD Uncovered was initiated by Education for Health and Novartis Pharma AG. Novartis Pharma AG is providing financial support for this initiative, including the commissioning of a number of underlying studies. COPD Uncovered is administered by a secretariat from Tonic Life Communications.

In 2009, the initial COPD Uncovered report¹ highlighted the serious issues faced by many nations as a result of COPD in the working age population, and raised key questions requiring further evidence and investigation of the disease.

The 2011 COPD Uncovered manuscript, published in the *BMC Public Health* open access journal, reported findings that significantly advanced our understanding of COPD. The new data included results from an international quantitative survey of more than 2,400 patients with COPD aged 45–67 in six countries, showing the enormous and wide-ranging economic impact of COPD in this group. This evidence reinforces the original call to action to prioritize the proactive management and early diagnosis of COPD and focuses attention on the benefits of sustaining an active and productive patient population.

COPD Uncovered aims to:

- Demonstrate the impact of COPD on individuals of working age, their families and communities
- Correct some key myths associated with COPD
- Illustrate the pivotal role that men and women aged 40-65 play in society and the impact that COPD can have

- Contribute evidence to support the growing calls for policymakers and healthcare providers to focus resources on improving the prevention, diagnosis and treatment of COPD

Table of Contents –

Foreword	p4
Executive Summary	p5
Chapter 1 The state of the world today	p7
Chapter 2 What we have learned about the impact of COPD	p9
Chapter 3 The case for investing in these patients	p12
Chapter 4 Conclusion	p16
Appendix COPD Uncovered	p18
Appendix Data sources and analysis	p19
References	p21

Foreword

significantly more people aged under 65 years are likely to have COPD than previously recognized, highlighting the misperception that COPD is an 'old person's disease'.

But why is this younger population so significant? The answer is simple – because they represent an economic time-bomb. Between the ages of 40 and 65 it is generally recognized that people are at the peak of their earning power and are the most active, productive contributors to society. The first report revealed that COPD places a huge burden on healthcare resources, but COPD is also associated with a range of indirect costs, including absenteeism from work, lost productivity, and a reduced quality of life.

Over the past two years, the COPD Uncovered initiative has made significant steps towards answering some of the key questions set out in the first report including the true cost of COPD among a working age population. This has been achieved through presentation of the initial results of an international survey of patients with COPD aged 45–67, the development of a novel budget impact model and the publication of a landmark

survey in *BMC Public Health*, which expands the current understanding of the impact of COPD and demonstrates the wider potential costs in a working age population.

COPD Uncovered plans to continue to inform the ongoing debate and policy-making decisions, ensuring appropriate resources are provided for the management of the disease.

It is important that governments invest in prevention, diagnosis and management at the earliest possible stage to avoid greater costs in the future, and to ensure that these vital members of our society continue contributing to a sustainable, healthy global economy.

Monica Fletcher

Monica Fletcher
Chief Executive, Education for Health, United Kingdom
Chair, European Lung Foundation

COPD Uncovered is the first initiative of its kind to investigate the economic, social, physical and emotional impact of chronic obstructive pulmonary disease, or COPD, in the 40–65 years age group. The first COPD Uncovered report published in 2009 drew attention to the considerable scale of the problem: COPD is rapidly becoming one of the world's most serious health issues affecting millions of people. While it is estimated that around 210 million people worldwide have COPD², it is likely that only about half of these have been diagnosed³. In addition,

Executive Summary



Overview

COPD has long been wrongly considered a disease of elderly men. In fact, many more women and men suffer from the symptoms of COPD than previously recognized. It is rapidly becoming one of the world's most serious health threats. COPD Uncovered is an initiative that aims to investigate the impact of COPD in people aged between 40 and 65. Results of new research have started to reveal a devastating burden of disease – for individuals, their families, health services, employers and national economies.

The Facts

- 210 million people are estimated to have COPD worldwide²
- 50% of these are likely to be undiagnosed³
- 40-65 year olds are one quarter of the world's population
- They make up a large part of the workforce and are at the peak of their earning potential
- Two thirds of national paid income is earned by 40-65 year olds^{4,5}
- The economic environment is increasingly reliant on this group as a driving force behind tax income
- This reliance is only set to increase, with many countries extending or looking to extend the age of retirement

The impact of COPD in the working age population

Until now, the true global economic impact of COPD in a working age population was unknown. COPD Uncovered has revealed the impact on the individual, healthcare services and economies through an in-depth global survey of people aged

45-67 years. A novel budget impact model goes further to explore the complete economic impact for individual countries including effects due to lost productivity, premature retirement, healthcare utilization and mortality. These important findings provide an accurate foundation to review strategies for identifying and managing COPD.

- In the 2011 survey, one fifth of people were forced to give up work because of COPD. The average age of retirement was 54 years which is 11 years early in many of the countries surveyed
- Data from the 2011 survey highlighted that individual lifetime income losses due to retiring prematurely are estimated at \$316,000 [£200,000] or a combined total of \$141m [£89.6m]
- 26% of people aged between 45 and 67 who were not in work gave up working because of COPD¹⁰
- COPD costs include healthcare utilization, lost taxes, increased state benefits and impaired or lost productivity
- Overall cost of COPD to an economy amounts to nearly €1.7 billion (UK£1.5b, US\$2.4b)¹³



- Annual lost productivity costs due to early retirement among individuals with COPD amount to over €500 million¹³
- This is not purely monetary; the consequences of COPD have a devastating impact on the individual, their families and to society
- Up to 50% of patients reported a decrease in their total household income¹⁰
- 60% of patients worry about their future ability to earn an income as a consequence of their COPD¹⁰
- Patients worry about their health, comorbidities associated with COPD, their families and their ability to plan for the future¹⁰

Call to Action

- In addition, approaches that improve wellbeing and enable people of working age with COPD to continue to work should be included in a national strategy, such as in the UK (rather than just the traditional focus on clinical care)
- Increased awareness of COPD and its symptoms is vital; only about half of the 210 million people worldwide who are estimated to have the disease have been diagnosed. We are keen to

support screening of people aged 35 years and over and smokers or ex-smokers, and would certainly encourage those with symptoms such as a persistent cough with phlegm, breathlessness or a wheezy chest, particularly smokers, to visit their healthcare provider for a lung function test.

- Payors and health authorities need to provide input into deciding the most relevant measures to accurately assess the benefit and value of treatment, given the overall goal of keeping patients active and productive. The novel budget impact model, developed as a global tool, can be used to define the true economic costs of COPD for an individual country.
- Healthcare professionals need to measure the health status of each patient to assess the full impact of COPD symptoms on the patient's life and design their management plan to address this, instead of focusing solely on one clinical measure e.g. pulmonary function.
- There needs to be a joint effort by stakeholders to improve education for healthcare professionals to identify symptomatic patients and ensure access to appropriate integrated care.

Chapter I

The state of the world today



In our challenging economic climate, it is critical to keep people of working age active and productive.

We are currently in the grip of a global recession, and this is likely to continue for some time. In this harsh economic climate it is crucial that all nations seek to maximize the productivity of their workforce.

The generation driving the economy in most countries is people aged 40–65 years – and this

group represents one quarter of the world's total population. In effect this group represents a nation's 'social capital', as they take on many of the important social responsibilities within their communities. Furthermore, in addition to their role as wage-earners, people in this age group are often the primary carers for children and other family members including elderly relatives.

In terms of earning power, two-thirds of the income earned by all workers in the UK and USA is earned by those aged 40–65 years^{4,5}. They are also the group with the greatest spending power and the ones who pay the highest taxes, thereby contributing the most to the costs of healthcare, education and other social services. Essentially, these people are the glue that binds our society together.

Many in this age group have significant financial and social responsibilities – it is known that around half of women aged 45–55 provide their children or grandchildren with financial support, and have parents who may need care and assistance^{6,7}. As a result of this, many people in this age group expect to have to work beyond their official retirement date to continue to meet these family commitments⁸.

Furthermore, to tackle the downturn in the global economy, many governments are seeking creative ways to reverse the economic slowdown in order to ensure sustainable growth that will maintain the existing health and social protection networks, including the pension system. One strategy being adopted to combat the national debt in some countries is to increase the state retirement age – this has already been done in Taiwan in 2008, and in France in October 2010 and there are plans for similar moves in Germany, Greece and the UK in the near future.

Many people in the 40–65 year old age group expect to have to work beyond their official retirement date to continue to meet their financial commitments

The argument behind this is that people are living longer and healthier lives than ever before, but this has received a mixed reception. The consequences will be that people will be expected to continue working beyond current retirement age – thereby contributing to the economy – and therefore they will not be able to claim their pension until later than previously planned.

The key generation driving the economy in most countries is people aged 40–65 years – one quarter of the world’s population – and we need to ensure they stay healthy, active and productive

It is clear therefore that the global economy depends heavily on the 40–65 year old group – and this will now include even older people when the retirement age is increased in some countries. Therefore, it is important that every effort is made to ensure they stay healthy, active and productive.

Within this stringent economic environment, maintaining health also comes at a cost and healthcare budgets are being increasingly scrutinized and reduced. Economic evaluation of the management of a disease often places an undue focus on optimizing healthcare utilization and on generating savings in the direct costs of care, in many cases giving less consideration to the wider societal costs of a condition.

One strategy being adopted to combat the national debt in some countries is to increase the state retirement age – this will result in an older working population who need to stay active and productive

A greater understanding of these costs as they relate to COPD is needed to inform policy-making decisions and build a true picture of the optimum management of these patients for the benefit of society as a whole.

In the case of COPD, the disease has wide-ranging implications not only for affected individuals but also for their families and friends, and for the wider community. Chapter 2 will review the individual, family and social impacts of COPD in the younger, working age population as revealed by the results of an international survey of more than 2,400 individuals with COPD.



Chapter 2

What we have learned about the impact of COPD



COPD is devastating for individuals, families and society as a whole and without effective intervention, prompts a costly spiral of decline.

When assessing the true impact of COPD, the perspectives of all the different parties involved – patients, carers, employers, healthcare providers and policymakers – need to be considered.

An international survey, presented at the American Thoracic Society (ATS) annual congress in 2010 and 2011, documents the impact of COPD on the daily lives of a working age population, including^{9,10}:

- their daily functioning, overall quality of life, productivity and ability to continue to work, and their aspirations for the future
- any co-morbidities they had in addition to COPD
- their patterns of healthcare utilization

The survey showed that COPD has a significant impact on the daily activities and quality of life of individuals of working age, compared with what would be expected in a healthy population of similar age. In addition, more severe disease was associated with a greater number of co-morbidities, resulting in a poorer quality of life⁹. COPD was also reported

by the people interviewed as having a significant impact on their productivity and ability to undertake daily work, and limited their lifestyle choices¹⁰. The survey found that, of those interviewed, 29% were in paid work and of these 23% reported that COPD affected their work productivity. Of those people not in work, 26% gave up work because of their COPD.

Large numbers of respondents reported that their COPD had an impact on their earning power and their overall household income. This made them concerned about its future impact on their own lives and those of other family members, and the ability to maintain the same lifestyle as they had before. In effect, they could not confidently plan for the future.

COPD was reported by individuals to have a significant impact on their productivity and ability to undertake daily work, and was a limitation to their lifestyle choices

Data included in the following chapter is taken from the 2011 COPD Uncovered manuscript published in the BMC Public Health

Some very clear messages emerged from this international survey and were discussed at ATS 2010 and 2011: individuals with COPD felt that the unpredictability of symptoms, coupled with the significant burden of these symptoms, often left them feeling older than their true age, worrying about the future, and unable to fully participate to the extent they would like in family and social life.

From the perspective of healthcare providers, the survey identified that individuals of working age are most often managed within the primary care setting and this places increasing demands on primary care services¹¹. Results showed that 50% of patients reported visiting a family physician for their COPD within the four-week period prior to the survey.

The average monthly direct healthcare cost (based on UK cost) per patient in the survey was £362 (or €411 / US\$574) – to put this in perspective, this would be double the national average cost for the

The economic costs associated with managing the incapacity and disability that result from untreated or poorly-managed COPD far exceed the direct healthcare costs of treating the condition

UK – and in the month preceding the survey, this cohort’s total healthcare cost was estimated to be £878,846 (or €997,362 / \$1,392,808)¹¹.

An international survey of over 2,400 people with COPD found that one in five gave up work due to their disease

As COPD severity increases, so does the requirement for patients to be seen in emergency departments or to be hospitalized due to exacerbations of COPD. It is these hospitalizations that are responsible for the majority of the direct costs associated with COPD, with in-patient hospitalizations accounting for 52–84% of direct healthcare costs in five of the seven countries included in an earlier survey¹².

However, direct medical costs are not the only economic impact of COPD. From the employer’s perspective, and that of society at large, COPD also results in significant indirect costs in terms of impaired productivity and lost productivity due to early retirement in the working age population¹³, as will be seen in more detail in Chapter 3.

The effective management of COPD includes both pharmacological and non-pharmacological interventions, including the encouragement of

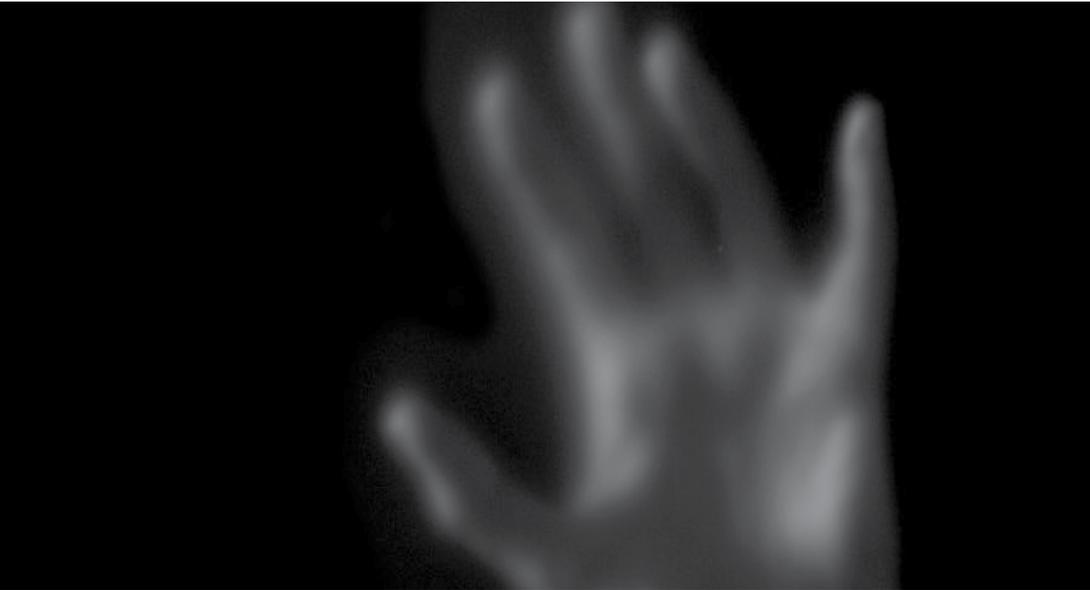
smoking cessation, which is the only known intervention to date that has been shown to conclusively alter progression and prognosis of COPD. When people participating in the survey were questioned about their smoking habits, the responses showed that smoking rates remained high regardless of disease severity; notably, in people with mild disease, 47% continued to smoke¹⁴.

Data presented in recent years at international congresses highlighted that COPD has a devastating impact on quality of life, household income and certainty about the future

Up to **9 out of 10 patients** reported an inability to maintain their lifestyle following the onset of COPD

Up to **half of all patients** reported a decrease in their total household income, and inability to plan for the future due to their COPD

Up to **6 out of 10 patients** reported feeling concern about their future earning potential as a consequence of COPD



The situation is not that simple. Even if everyone stopped smoking today, the rates of COPD would still continue to increase for the next 20 years or more, particularly in developing countries.¹⁵ In addition, across the globe, environment societal and genetic factors play a significant role in the development of COPD and an estimated 25–45% of patients with COPD have never smoked.¹⁶

Case Study*

- Bob, aged 56, was diagnosed with **COPD two years ago with symptoms of breathlessness**. He is a long-term smoker with a history of occupational dust and solvent
- With his ill health, he has had **many sick days** recently and is now considering **early retirement**; he states “**he is not as young as he used to be**”
- He is a **self-employed** builder and has **no private pension provision**. His inconsistent work history also means that he has gaps in his National Insurance contributions
- He is saddened that his disease will **impact his capabilities** as a father and soon to be grandfather. He enjoys life and is a central figure in the community
- He spends money when he’s got it and is looking forward to taking his new grandchild on holiday if he can manage it

*For illustrative purposes. Not based on any one particular patient.

Chapter 3

The case for investing in these patients



Latest findings from the 2011 COPD Uncovered manuscript published in the BMC Public Health show that COPD is a major economic burden for countries throughout the world.

The challenge now is to understand the real costs of the disease, not only for the individual but also for society as a whole, so that policymakers can make informed decisions regarding resource provision to ensure effective care of the critical 40–65 year old population in their most productive years.

To help define the true economic costs of COPD, a novel budget impact model was developed and used to estimate the economic burden of COPD in a population aged 45–64 years¹³. This model was developed as a global tool for easy adaptation and use by individual countries using their own data. The impact of COPD across four areas was investigated: healthcare utilization, impaired productivity, lost productivity resulting from early retirement due to COPD, and mortality.

To demonstrate the enormous economic impact and to identify the different factors contributing to this, such as productivity and healthcare utilization, the model was initially applied to the UK as a case study. The calculations revealed that countries face

considerable economic consequences of COPD, particularly as a direct result of lost productivity and early retirement of key members of the workforce (Figure 1).

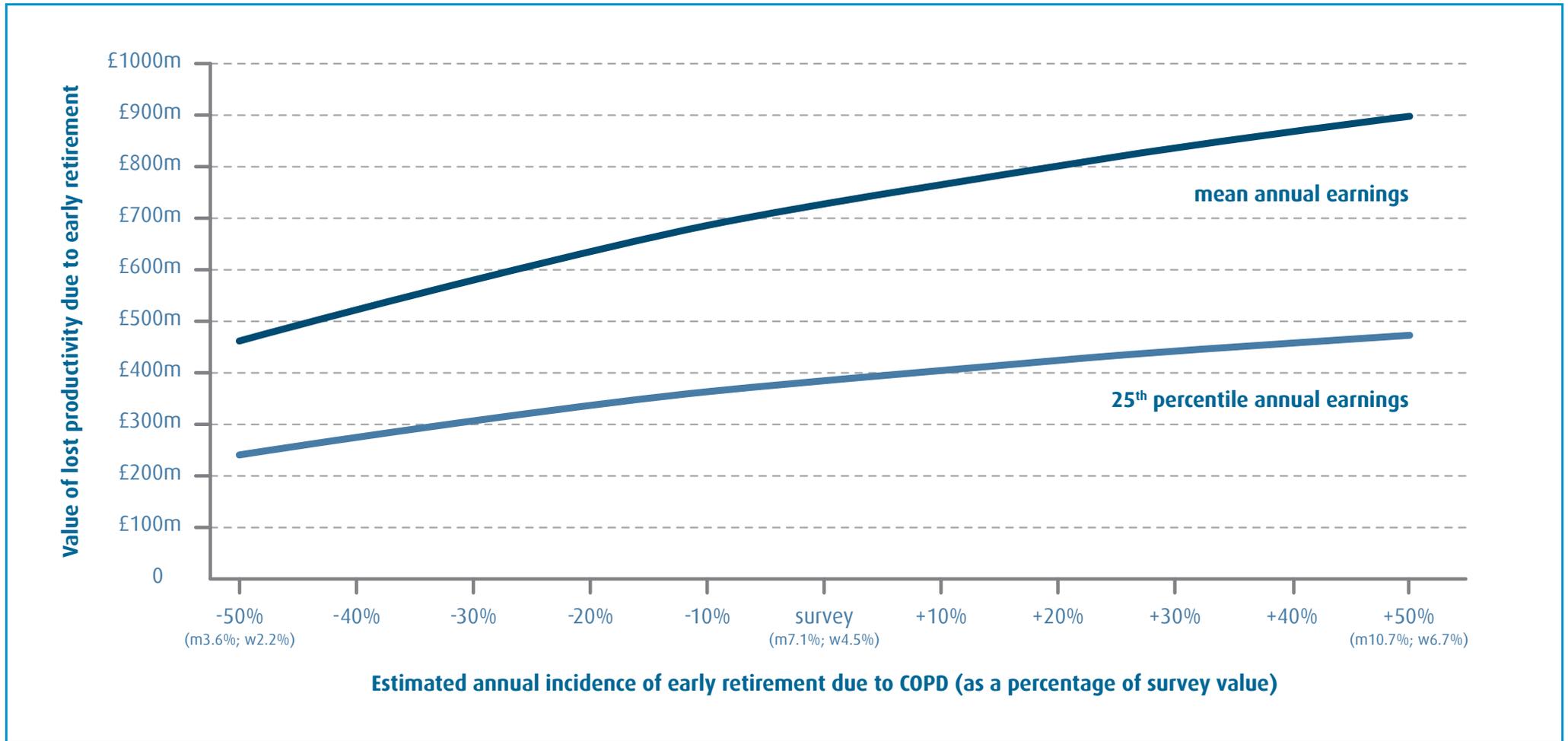
Calculations of the economic impact of COPD comprise outgoing costs to governments (healthcare costs and state benefit paid due to COPD), annual lost tax due to premature retirement, and impaired / lost productivity in working individuals due to excess mortality.

Specimen calculations are outlined based on UK data:

Healthcare costs: The annual healthcare costs due to COPD in patients aged 45–64 years are £277.7 million (or €315.7 million / \$440.1 based on 2009 values)

Lost productivity due to early retirement among people with COPD aged 45–64 years is a key driver of healthcare costs, representing one-fifth of the productivity that would have been generated by these people if they had not retired early (UK data)

Figure 1 – The results of the cost model for the annual costs of lost productivity due to early retirement vary depending on assumptions about earnings and the estimated incidence of early retirement. Even at the lowest 25th percentile of annual earnings, the costs of lost productivity are substantial¹³



Lost taxation and incurred state benefit: In addition to healthcare expenditure, the annual costs incurred by government due to early retirement from COPD amount to £341 million (or €387 million / \$540.3 million). These costs are made up of £268.9 million (or €304.6 million / \$426.1 million) in state benefit and £72.1 million (or €81.7 million / \$114.2 million) in lost tax revenue

Impaired productivity in working individuals: The annual impaired productivity costs are estimated to be £124.1 million (or €140.6 million / \$196.6 million) for people with COPD who continue to work

Patients with COPD are losing an average of \$1800 per year in lost income due to their condition, which equates to lifetime losses of nearly \$20,000¹⁰

Lost productivity due to early retirement: The annual costs of lost productivity due to early retirement among people with COPD aged 45–64 years amounted to £522.9 million (or €592.6 million / \$828.5 million), representing 21% of the productivity that would have been generated by these people if they had not retired early

Mortality before retirement age: Annual impaired productivity from mortality due to COPD in individuals aged 45–64 years was estimated to total £318 million (or €360.4 million / \$503.8 million)

Annual economic impact for a country due to the direct and indirect costs of COPD exceeds the economic costs to Europe of the Icelandic volcano eruption in April 2010 (i.e. an estimated €1 billion)

These estimates of healthcare costs, impaired productivity costs, lost productivity costs due to early retirement, and mortality, provide convincing evidence of the high economic burden of COPD in the working-age population. The annual economic impact for a country due to the direct and indirect costs of COPD is estimated to be €1.7billion ^{modified from} ¹³, as a consequence, this younger population should be a priority for the improvement of COPD services and the delivery of effective interventions that will ultimately reduce the cost to society.

Early intervention to maintain a healthy working population will become increasingly important with the shift in the retirement age and the greater number of older working people.



The younger working age population aged 45–64 years should be a priority for the improvement of COPD services, as the delivery of effective interventions will ultimately reduce the cost to society

Lost productivity due to early retirement among people with COPD aged 45–64 years is a key driver of healthcare costs, representing one-fifth of the productivity that would have been generated by these people if they had not retired early

UK data

Annual economic impact on a country due to the direct and indirect costs of COPD exceeds the economic costs to Europe of the Icelandic volcano eruption in April 2010 (i.e. an estimated €1 billion)



It is time to prioritize younger patients with the goal of enabling them to continue or return to work – for the benefit of individuals with COPD, their families, and society as a whole.

A review of the accumulating evidence, along with the recent data generated by the COPD Uncovered initiative, brings the global burden of COPD into sharp focus and illustrates the urgent need for action to combat this growing problem.

- COPD is a growing threat to the health, well-being and productivity of people aged 40–65, and action to improve its management is required now before the situation becomes uncontrollable
- The incapacity associated with COPD is seriously affecting the ability of this key group of individuals to make their proper contribution to society
- Evidence shows that a key driver of the economic burden of COPD is lost productivity due to early retirement among those aged 40–65
- The financial benefits of increasing retirement age will fall short of expectations with increasing numbers of people claiming state benefits and pensions due to health-related incapacity and early retirement
- We believe that a key priority should be to keep these younger individuals with COPD at work, or develop strategies to help them to get back to work – we need to ensure this group of people remains active and productive
- Employers can take an active role in supporting employees to remain in the workplace and stay employed for longer; it is known that at least one in five people eventually give up work because of COPD
- Prevention, such as smoking cessation, effective diagnosis and management of COPD at an early stage are essential to combat the ongoing threat to health. We believe that COPD should be identified early and treated appropriately in order to keep people productive for longer so that they can contribute to the financial wellbeing of their families and to the economic growth of nations, and to ensure a better quality of life for those with the disease
- Although COPD is an incurable condition, it is preventable and treatable. Priority should be given providing access to appropriate interventions such as a pulmonary rehabilitation, pharmacological treatments, self-management and patient education to help bring COPD under control and reduce exacerbations
- A joint effort is required by all stakeholders – politicians, payors, health professionals, employers, unions, patients, advocacy groups and the public – to develop effective strategies for maintaining and improving the health of 40–65 year olds with COPD

Call to action:

Governments must act to address the increasing COPD epidemic by developing comprehensive national strategies. These national strategies need to promote the prevention of COPD, improve diagnosis, and enable provision of optimal healthcare and education. In addition, approaches that improve wellbeing and enable people of working age with COPD to continue to work should be included in a national strategy rather than just the traditional focus on clinical care.

Increased awareness of COPD and its symptoms is vital; only about half of the 210 million people worldwide who are estimated to have the disease have been diagnosed. We encourage those with symptoms such as a persistent cough with phlegm, breathlessness or a wheezy chest, particularly smokers, to visit their healthcare provider for a lung function test.

Payors and health authorities need to provide input into deciding the most relevant measures to accurately assess the benefit and value of treatment, given the overall goal of keeping patients active and productive. The novel budget impact model, developed as a global tool, can be used to define the true economic costs of COPD for an individual country.

Healthcare professionals need to measure the health status of each patient to assess the full impact of COPD symptoms on the patient's life and design their management plan to address this, instead of focusing solely on one clinical measure, for example pulmonary function.

There needs to be a joint effort by all involved to improve education for healthcare professionals to identify symptomatic patients and ensure early diagnosis and access to appropriate integrated care.

Key questions to be addressed:

How can we keep individuals with COPD active and productive, thereby maintaining their contribution to society and addressing the key driver of cost associated with this condition?

How should clinical services be organized to meet the daily needs of patients aged 40–65 years?

Bearing in mind the varied ways in which patients aged 40–65 years are affected by COPD, how do we take a broader view of the disease to better manage the whole patient?

How can we understand the personal impact of COPD on an individual and adjust the management of COPD accordingly?

The Initiative

The COPD Uncovered initiative is a compendium of research and analysis undertaken by experts in respiratory health. COPD Uncovered was initiated by Education for Health and Novartis Pharma AG. Novartis Pharma AG is providing financial support for this initiative, including by commissioning a number of underlying studies. COPD Uncovered is administered by a secretariat from Tonic Life Communications. The studies and analyses underlying the COPD Uncovered Report were commissioned by Novartis Pharma AG.

The Report

The first COPD Uncovered Report was issued on World COPD Day 2009 and reviewed the serious global issues surrounding COPD and the considerable impact this condition has on both individuals and society, as well as highlighting key areas that urgently need to be addressed.

The COPD Uncovered reports have been authored by the following individuals, supported by Novartis, with editorial assistance from medical education specialists from Chandler Chicco Agency (CCA) and updated by Tonic Life Communications:

- Monica Fletcher, lead for COPD Uncovered, Chief Executive, Education for Health and Chair, European Lung Foundation
- Professor Thys van der Molen, Department of General Practice, University of Groningen

- Professor Neil Barnes, Consultant in Respiratory Medicine, London Chest Hospital, London
- John Walsh, President and CEO, COPD Foundation

Novartis

Novartis provides healthcare solutions that address the evolving needs of patients and societies. Focused solely on healthcare, Novartis offers a diversified portfolio to best meet these needs: innovative medicines, cost-saving generic pharmaceuticals, preventive vaccines, diagnostic tools and consumer health products. Novartis is the only company with leading positions in these areas. In 2009, the Group's continuing operations achieved net sales of USD 44.3 billion, while approximately USD 7.5 billion was invested in R&D activities throughout the Group. Headquartered in Basel, Switzerland, Novartis Group companies employ approximately 100,000 full-time-equivalent associates and operate in more than 140 countries around the world. For more information, please visit <http://www.novartis.com>.

The information included in this report (2010 edition) and the first COPD Uncovered report in 2009 was sourced from the following investigations, the results of which have been published separately, or are planned for publication:

- **Qualitative research:** Qualitative research was conducted by the market research company, Brintnall & Nicolini commissioned by Novartis. Patients aged between 45–68 years, their partners and children were recruited through physician referral, COPD patient registries and patient associations in the UK, Germany, France, Spain and the U.S.A. total of 85 COPD patients (UK=13, Germany=16, France=14, Spain=14, U.S.A.=28) participated in the study together with 41 partners and 10 children. The emotional and social challenges faced by COPD patients, their partners and/or children were explored during semi-structured (formal projective exercises plus open discussion) focus group, triad and diad interviews. Projective exercises involved non-comparative rating scale exercises, picture-based stimuli and sentence completion tasks.

Publications arising from this research:

1. Fletcher M et al. A qualitative multi-centre study exploring the burden of COPD on patients aged 45–68 years and their families. *Primary Care Resp Journal* 2010;19(2):A23.

- **Quantitative survey:** An independently conducted, in-depth quantitative survey was undertaken among people with COPD in six countries (Germany, U.S.A., UK, China, Turkey and Brazil) to discover the personal, social and health economic impact and needs of individuals and families. This was a cross-sectional survey of 2,426 patients aged 45–67 years of age with a diagnosis of COPD. Interviews were conducted by telephone or face-to-face and the questionnaire used for the survey was developed around established instruments and included the EQ-5D for assessing quality of life, the Work Productivity and Activity Impairment questionnaire (WPAI), and additional questions on the impact of COPD on income and lifestyle.

Publications arising from this research:

1. Fletcher MJ et al. *COPD Uncovered: An International survey on the impact of chronic obstructive pulmonary disease (COPD) on a working age population* *BMC Public Health* 2011,11:612
2. Fletcher MJ et al. *The role of anxiety and depression in COPD and its relationship with disease severity. Abstract and poster presented at the American Thoracic Society Congress, May 2011.*
3. Fletcher MJ et al. *How much do COPD patients smoke? A global survey. Abstract and poster presented at European Respiratory Society Congress, 22 September 2010.*
4. Fletcher MJ et al. *A qualitative multi-centre study exploring the burden of COPD on patients aged 45–68 years and their families. Abstract and poster presented at the International Primary Care Respiratory Group Congress, June 2010.*

5. Fletcher MJ et al. Patients of working age with COPD have reduced quality of life in comparison to available population norms; an international survey. Abstract and poster presented at the American Thoracic Society Congress, 18 May 2010.
 6. Fletcher MJ et al. COPD has significant social and economic impact on a working-age population of COPD sufferers; an international survey. Abstract and poster presented at The American Thoracic Society Congress, 18 May 2010.
 7. Fletcher M et al. Health care utilization in COPD: the burden carried by primary care practitioners. *Primary Care Resp Journal* 2010;19(2):A1.
- **Economic modelling:** A budget impact model was developed to explore the economic impact of COPD in a working age population including costs associated with healthcare utilization, lost productivity, early retirement and mortality. This model was developed as a global tool for easy adaptation and use by individual countries using their own data. The UK was used as a case study to explore the cost impact of COPD across four areas: healthcare utilization, impaired productivity, lost productivity resulting from early retirement due to COPD, and mortality before the age of retirement. Full details of the budget impact model methodology, inputs and sources are given in the publication below.

Publications arising from this research:

1. Baldwin M et al. A novel method to estimate the economic impact of COPD in patients of working age. Poster presented at COPD7 International Multidisciplinary Conference 2 July 2010.

References

- 1 COPD Uncovered report 2009.
- 2 World Health Organization. Chronic obstructive pulmonary disease. Available online at: <http://www.who.int/respiratory/copd/en/>. Accessed October 2010.
- 3 National Institutes of Health. National Heart, Lung, and Blood Institute. Morbidity and mortality: 2007 chart book on cardiovascular, lung and blood diseases.
- 4 US Census Bureau. Current 2009 Population Survey, 2009 annual social and economic supplement. Available online at: http://www.census.gov/hhes/www/cpstables/032009/hhinc/new02_001.htm. Accessed October 2010.
- 5 Office for National Statistics. Annual survey of hours and earnings. Available online at: http://www.statistics.gov.uk/downloads/theme_labour/ASHE_2008/2008_age.pdf. Accessed October 2010.
- 6 Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease. Updated 2009. Available online at: <http://www.goldcopd.com/GuidelinesResources.asp?l1=2&l2=0>. Accessed October 2010.
- 7 MetLife Mature Market Institute. Boomer bookends. Insights into the oldest and youngest boomers, February 2009. Available online at: <http://www.metlife.com/assets/cao/mmi/publications/studies/mmi-studies-boomer-bookends.pdf>. Accessed October 2010.
- 8 MetLife Mature Market Institute. Boomers: the next 20 years. Ecologies of risk, 2008. Available online at: <http://www.metlife.com/assets/cao/mmi/publications/studies/BoomersTheNext20YearsEcologiesofRisk.pdf>. Accessed October 2010.
- 9 Fletcher MJ et al. Patients of working age with COPD have reduced quality of life in comparison to available population norms; an international survey. Abstract and poster presented at the American Thoracic Society Congress, 18 May 2010.
- 10 Fletcher MJ et al. COPD has significant social and economic impact on a working-age population of COPD sufferers; an international survey. Abstract and poster presented at The American Thoracic Society Congress, 18 May 2010.
- 11 Fletcher M et al. Health care utilization in COPD: the burden carried by primary care practitioners. Primary Care Resp Journal 2010;19(2):A1.
- 12 Wouters EF. Economic analysis of the Confronting COPD survey: an overview of results. Respir Med 2003;97(Suppl. C):S3-14.
- 13 Baldwin M et al. A novel method to estimate the economic impact of COPD in patients of working age. Abstract and poster presented at COPD7 International Multidisciplinary Conference, 2 July 2010¹.
- 14 Fletcher MJ et al. How much do COPD patients smoke? A global survey. Abstract and poster presented at European Respiratory Society Congress, 18 September 2010.
- 15 Mannino DM, Buist AS. Global burden of COPD: risk factors, prevalence, and future trends. Lancet 2007;370:765-73.
- 16 Salvi SS, Barnes PJ. Chronic obstructive pulmonary disease in non-smokers. Lancet 2009;374:733-43.

¹the model has been modified to include the economic impact of excess mortality due to COPD and based on mortality rates from the Office of National Statistics (2009)

