

Collaboration Update

## Guangzhou Medical University & AstraZeneca Advancing understanding of COPD in China

“ We have a long history of COPD research in China and AstraZeneca’s focus on COPD means we have a great deal in common. We are interested in the mechanisms of the disease; the causes of exacerbations and disease progression. I first met with what was then Astra in 1983 and have maintained a relationship with the company ever since. We really appreciate the partnership with AstraZeneca. ”

Professor Nanshan Zhong, Director, State Key Lab of Respiratory Disease and National Clinical Research Center for Respiratory Disease, Guangzhou Medical University

Guangzhou Medical University, one of the world’s leading centres for research into respiratory disease, and AstraZeneca have been working together to advance the scientific understanding of Chronic Obstructive Pulmonary Disease (COPD). COPD is the third leading cause of death in China, where rising levels of air pollution are believed to be a contributing factor. Together, we are pursuing a common desire to find better ways of diagnosing and preventing incidence.

### Guangzhou Medical University (GMU)

- Located in Guangzhou, a city of 14 million people northwest of Hong Kong.
- GMU’s Institute of Respiratory Diseases is China’s only ‘state key laboratory’ for respiratory diseases, appointed by the National Ministry of Science and Technology.
- Ranked the leading respiratory centre in China for the past 6 years.
- GMU Medical Director Professor Nanshan Zhong is the foremost respiratory expert in China. He is internationally acclaimed for his research, including the identification of the SARS Coronavirus in 2003.

### Collaboration in practice

Our respiratory team joined forces with the Guangzhou Medical University (GMU) to conduct the first study on COPD in China. Our team had previously carried out COPD studies in many western countries and was interested in comparing earlier findings with those from China, where COPD prevalence is high and rising rapidly. 9.9 percent of people in China over 40 years of age suffer from COPD, yet more than half of them are not even aware of the disease.

The primary objective was to investigate exacerbations in the COPD cohort and relate these to different trigger factors. While it’s well known that environmental factors play a significant role in respiratory disease, it isn’t clear how these factors relate to exacerbation of symptoms or how environmental influences might interact with known triggers of COPD exacerbations, such as viruses or bacteria.

The elevated levels of air pollution in China represented an opportunity to investigate any links with air pollution and other known triggers. And the large population of Guangzhou city and the university hospital’s established work in respiratory disease provided access to a sizeable cohort of COPD patients.

## 2 years of patient monitoring brings results

The GMU hospital's laboratory of respiratory disease conducted a two-year study into the reasons for disease progression by observing 318 patients with COPD and comparing them with 86 healthy controls.

A subgroup of 203 patients and 51 healthy controls was followed on a daily basis. Patients used Blackberry devices to answer daily questions about their symptoms. As soon as there were signs of an exacerbation, a study nurse arranged for the patient to visit the clinic for sputum tests as well as nasal swabs. Researchers also monitored local pollution levels, humidity and temperature daily, in order to explore possible links to COPD exacerbations.

Professor Zhong said: "Early diagnosis, prevention and treatment of diseases like diabetes and hypertension have made significant progress, but COPD remains one of those diseases that needs some real scientific breakthroughs regarding early indication and intervention.

"The pooling of expertise in this collaboration has gone a long way towards a better understanding of COPD, and potentially which therapies might suit different types of COPD patients. Our hope is that the study results will help healthcare workers in China to realise that COPD is both preventable and treatable."

### Research findings to date

One of the most interesting findings from the study was that COPD exacerbations peaked in March, whilst exacerbations due to viral infections were more frequent in winter. The month of March also had the highest levels of particulate matter (PM10) and the team found that these high levels of air pollution resulted in higher frequencies of COPD exacerbations the following week.

16% of the patients monitored were women who had never smoked. It is thought that their disease may be due to exposure to biomass fuels while cooking over open fires.

Recently, the team has identified that the COPD exacerbations fall into 3 different groups based on the type of the inflammation in the lungs, and early indications are that these relate to different exacerbation triggers such as viral or bacterial infections and air pollution. In addition, an analysis of predictive factors for frequent exacerbations is nearing completion.

The study has been published in the Journal of Thoracic Disease. An abstract was presented at the European Respiratory Congress in 2014 and another was presented at this year's American Thoracic Society congress.

### What's Next?

"We've had some really interesting finds, and we're working closely with GMU on detailed analysis of the data," said Christopher. "One of the major goals is to publish our findings but we're also interested in patient segmentation and predicting exacerbations with biomarkers, to assist our internal drug discovery and development programmes. If we can find out who is more susceptible to exacerbations and why, that would be fantastic. If we can predict, we can potentially direct certain patients to more targeted COPD therapies."

## What's special about the collaboration?

### AstraZeneca perspective:

"It's never easy to run collaborations with partners on the other side of the world. But this has been a great three-way collaboration between AstraZeneca in Europe, AstraZeneca in China and the Guangzhou Medical University," said Christopher McCrae, Associate Principal Scientist. "Having AstraZeneca colleagues in China has helped things run smoothly and ensured a highly successful collaboration."

### Guangzhou Medical University perspective:

"This close collaboration with AstraZeneca gives us two sources of expertise and a common ground for COPD research. Both parties benefit enormously from the collaboration," said Professor Zhong. "This study is really important for China and other developing countries. Such a study has never before been carried out in this country. We have produced a lot of data from our research, which we are now analysing in order to arrive at a greater understanding of COPD and how best to prevent and treat it."

### Dr Rongchang Chen, Director of Guangzhou Institute of Respiratory Diseases, said:

"From the beginning, we've collaborated very well. We have found new phenomena, in terms of the link between risk factors and exacerbations and what the biomarkers are. In the future, as we develop China's largest respiratory research centre here in Guangzhou, we would like to also develop our relationship with AstraZeneca's research centre in Shanghai, to continue working together on shared interests and goals. We now have a very good history of working together which forms the basis for continued collaboration in China."

