

## **LUNG FUNCTION IN CHINESE ADULTS IN HONG KONG**

### **Objectives:**

1. To obtain updated reference values of lung function (spirometry, lung volumes and carbon monoxide diffusing capacity, peak expiratory flow rate ) for Chinese adults in Hong Kong
2. To evaluate the effect of smoking on lung function in adult Chinese in Hong Kong

### **Methods:**

***Design:*** Multicenter cross-sectional study

***Participants:*** Subjects aged 18 and over were recruited by random digit dialing. A symptom questionnaire was administered over phone to identify subjects for lung function testing. For determination of predicted lung function values, only non-smokers without history of disease which might affect lung function were included. For the effect of smoking, all smokers were invited for lung function testing.

***Lung function measurements:*** This was done in Lung Function Laboratories of eight regional hospitals in Hong Kong. Lung function testing was performed according to American Thoracic Society recommendations, using the same model of computerized lung function system.

### **Results:**

The study was conducted between 2002 to 2005. Subject recruitment and lung function testing were completed in early 2003. Data analysis and preparation of publications were conducted since August 2003.

#### **Spirometry:**

Evaluable data of 1089 (494 males and 595 females) healthy non-smokers aged 18 to 80 years were analysed. Age and height were found to be the major determinants of forced expiratory volume in one second (FEV<sub>1</sub>) and forced vital capacity (FVC), with a linear decline of height-adjusted values with age in both sexes. Spirometric values of this population have increased compared to Chinese populations of similar sex, age and height two decades ago. Reference values derived from Caucasian populations were higher than our values by about 5 – 19%, and the degree of over-estimation varied with age, sex and lung function parameter. We also demonstrated that the blanket application of correction factors for Asian populations may not be appropriate. In this study cohort, the distribution-free estimation of age-related centiles was more appropriate for the determination of lower limits of normal.

#### **Lung volumes and Carbon monoxide diffusing capacity (DLCO):**

Data from 753 and 589 subjects were analysed for lung subdivisions and DLCO respectively . Total lung capacity and residual volume were lower than that of Caucasian studies, but higher compared with that from a previous studies in Hong Kong Chinese two decades ago. Predicted DLCO was lower than most Caucasian references but DLCO corrected for alveolar volume were higher, probably reflecting the lower lung volumes in our subjects.

Peak expiratory flow rate:

This was done with the mini-peak flow meter. There has been no good local data previously. Preliminary analysis shows that our predicted values are intermediate between that of Caucasian studies and a previous Chinese study done in Guangzhou.

Effect of smoking:

The data of 410 men who smoked for more than one pack year were analysed. Preliminary analysis showed that about 27% of subjects had mild to moderate airflow obstruction, previously undiagnosed to have chronic obstructive pulmonary disease. The most severe ones were probably already diagnosed to have COPD and did not come forward for testing in this community-based study.

### **Conclusions:**

Updated reference values for spirometry, lung subdivisions, carbon monoxide diffusing capacity and peak expiratory flow rate have been obtained from healthy non-smoking Chinese adults in Hong Kong. There were substantial differences from those in Caucasian studies as well as previous data from Hong Kong. Our findings underscore the need to use reference values of lung function parameters based on updated data derived from local populations or those matched for ethnicity and other socio-demographic characteristics. We would recommend that the prediction equations for normal values based on the data in this study be used in Hong Kong, replacing that of the currently used formulae in Hong Kong.

The prevalence of previously undiagnosed airflow obstruction in smokers in Hong Kong was high. The use of spirometry for early detection of airflow obstruction is advocated.

### **Publications or presentations:**

#### ***Abstracts:***

Reference values of spirometry for adult Chinese in Hong Kong.

Ip MS, Ko FW, Lau ACW, Yu WC, Tang KS, Choo K, Ling SO, Chan JW, Chan MMW. 9th Congress of Asia Pacific Society of Respiratory , Hong Kong, December 2004

#### ***Full papers:***

Updated spirometric reference values for adult Chinese in Hong Kong and implications on clinical utilization. Ip MS, Ko FW, Lau ACW, Yu WC, Tang KS, Choo K, Chan MMW. (Submitted to Chest, under revision, pending acceptance decision)

Reference values for lung volumes and carbon monoxide diffusing capacity in Hong Kong Chinese. Ip MS, Lam RWK, Ling SO, Yu WC, Choo KL, Ko FW, Tang KS, Chan J, Chan MMW. ( Pending submission to International Journal of Tuberculosis and Lung Disease)

Manuscripts on effect of smoking on lung function and reference values for peak expiratory flow rate are still under preparation.

***Monograph:***

A monograph will be prepared and distributed to doctors in Hong Kong in order to disseminate the reference values for lung function obtained in this study and to maximize on their clinical utilization. The monograph is expected to be ready the end of 2005 for distribution.

**Participating Centers :**

Kowloon Hospital , Northern District Hospital, Princess Margaret Hospital, Prince of Wales Hospital, Pamela Youde Nethersole Eastern Hospital, Queen Elizabeth Hospital, Queen Mary Hospital, Tuen Mun Hospital.

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