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2005 - 2007
Editorial

This is a special year for the respiratory community of Hong Kong as the 2006 marks the 20th anniversary of the Hong Kong Thoracic Society and the 10th anniversary of the Hong Kong Lung Foundation. One of the celebration events was the Respiratory Health Walkathon and we have reported that in this issue of the Newsletter. The clinical meeting presented by Caritas Medical Center was also reported.

Congratulations to Dr. July Lam of United Christian Hospital for passing the respiratory exit examination and became a Fellow in Respiratory Medicine in December 2006. She shared her dissertation abstract with our members here. Winner of the 2006 Dr. Tse Yuen Man Memorial Scholarship was also reported.

Time flies and this is the final issue from our current editorial board. Thanks to all the authors for their great contributions. We hope that you have enjoyed the past 8 issues of the Newsletter and all our board members will continue to serve the chest societies in Hong Kong.

Instruction to Contributors

We welcome contributions from invited guests and members of the Hong Kong Thoracic Society and the American College of Chest Physicians (Hong Kong and Macau Chapter). Articles should be prepared with suitable word processing software (e.g., Word 2000®). Figures, table, pictures and photomicrographs should be saved in the same file. Please do not use the auto-indexing features. The file could be sent either by e-mail or by post (on a floppy disc or CD) to the Chief Editor. Please indicate to the Chief Editor if the material has to be returned after the editing process. The article would be printed in the same way as it is submitted. The accuracy of the materials published is the responsibility of the contributors. The contributors must ensure that the materials submitted do not infringe copyright.

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A Respiratory Health Walkathon, organized as part of the celebration events for the 20th anniversary of the Hong Kong Thoracic Society and the 10th anniversary of the Hong Kong Lung Foundation, was held successfully on the 5th of November 2006. More than 300 doctors, nurses, allied health professionals and patient groups turned out in full force to join the event which aims to raise community awareness of the importance of lung health and to educate public on various respiratory diseases.

The walkathon started from Hong Kong Coliseum, through footbridges and ended at Centenary Garden in Tsimshatui. We were honored to have Dr. Leong Che Hung, GBS, JP, Chairman of HKSAR Elderly Commission, accompanied by Dr. Loretta Yam, Dr. Thomas Mok and Mr. Alan Chan, Chairman of The Hong Kong Asthma Society to be our guests of honor and took part in a simple ribbon-cutting ceremony. At the opening ceremony, guests and dancers performed a ‘Respiratory Health Exercise’ to promote the benefit of exercise on lung health. To demonstrate the many ways to fight respiratory diseases, all participants also read out the following “Respiratory Health Declaration”:

After the ceremony, citizens attended health check and exhibition booths to learn more of lung health and various chest diseases. These included booths on ‘Obstructive Sleep Apnoea (OSA)’, ‘Smoking cessation’, ‘Lung function testing and health check’, ‘COPD & Asthma’, ‘Pneumonia & Influenza and Avian Influenza’, ‘Teach you how to read a chest radiograph’, and “early detection of respiratory diseases”.

The walkathon was very well received and widely publicized by the media.
Leong Che-hung, GBS, JP, officiated the opening ceremony of the Respiratory Health Walkathon

Group photo of the Walkathon
Exercise demonstration

Exhibition booths at the Walkathon
An Elderly Gentleman with Lung Infiltrates and Renal Impairment

Dr. CW Chow and Dr. ML Wong
Department of Medicine and Geriatrics, Caritas Medical Center

Case history

Mr. Wu, a 69-year-old gentleman, first presented to our unit in 2/2005. He was an ex-smoker and had a history of bilateral submandibular swelling for more than ten years. He had long-standing hypertension, was on adalat retard and also had a history of gastric ulcer in 1990.

He was admitted in 2/2005 for chest infection, with fever for 1 day, cough with scanty sputum. Physical examination was unremarkable except the bilateral hard submandibular swelling. Preliminary investigations showed an elevated white cell count (WBC) up to 17.7 x10^9/L and mildly deranged renal function test (urea was 8.1mmol/L and creatinine was 126umol/L). The chest X-ray (CXR) on admission showed infiltrates over the right lower zone and left middle zone (Figure 1). He was treated empirically with intravenous Augmentin but the fever did not respond. Sputum grew *Morganella Morganii* and repeated liver function test showed an isolated elevation in alkaline phosphatase (ALP), up to 257 IU/L. He was seen by the gastroenterology team and the antibiotics were changed to intravenous tazosin & gentamycin for probable cholangitis though subsequent ultrasound (US) and computer tomography (CT) of the abdomen could not confirm the diagnosis. The patient improved both clinically and radiologically and was discharged on 9/3/2005.

Figure 1

Figure 2
However, he defaulted follow up and went to China. CXR in 5/2005 showed a right hilar shadow and CT Thorax revealed additional bilateral hilar and mediastinal lymph node enlargement. During bronchoscopy, the opening of the R lower lobe (RLL) was noted to be narrowed and swollen. Biopsy from the posterior segment however showed chronic inflammation only.

The patient came back to Hong Kong in 6/2005 and he had no respiratory symptoms or systemic upset. Both submandibular glands remained hard with a size of 2 cm x 1 cm. There were no other palpable lymph nodes. Fine needle aspiration (FNA) of the submandibular glands yielded salivary gland only with no evidence of malignancy. Blood tests showed a normal WBC but the ESR was elevated to 85mm/hr. The RFT was deranged with a urea level of 7.4 mmol/L and creatinine level of 145 umol/L. US of both kidneys was unremarkable. The LFT was normal but albumin to globulin ratio was reversed. (albumin 31g/L and globulin 55g/L). CXR showed a persistence of irregular opacity over the right hilar region (Figure 2).

The sputum for AFB smears was negative on two occasions. Fibro-optic bronchoscopy (FOB) was performed on 28/6/2005; there was no endobronchial lesion and bronchial aspirate for AFB smear & culture were negative. Transbronchial biopsy from apical segment of RLL showed infiltration of lymphocytes, plasma cells and multinucleated giant cells, non-caseating granulomatous inflammation and fibrosis. The PCR for MTB DNA was however negative (Figure 3). Out-patient CT thorax and abdomen on 14/7/2005 confirmed no other mass lesion in both lungs. The abnormal findings included multiple enlarged lymph nodes in the pre-carinal, right paratracheal and bilateral hilar regions as well as striated enhancement pattern in both kidneys (Figure 4). He was referred to our respiratory clinic for follow up by our geriatric colleague but he defaulted again.

He presented to us in 10/2005 for malaise, weakness and acute renal failure (urea was 4 mmol/L, creatinine was 652umol/L, calcium was 2.08 mmol/L and albumin was 31g/L). The creatinine clearance was only 6.15 ml/min/1.73m² while the 24 hr urine protein was 0.78g/day and 24 hour urine calcium was 2.7mmol (normal range: 2.5-7.5 mmol). The US kidneys were however unremarkable and there were again no chest symptoms. Detailed history could not reveal any cause for the renal deterioration. The patient was an immigrant from China at the age of 53 and he had
worked as a farmer before. He then worked as a cleansing worker in HK for a few years before his retirement. There was no contact history with birds, chicken nor exposure to heavy metals. He had been taking Ling Zhi (靈芝) capsules between 4/2005 – 6/2005 but there was no history of NSAIDs, diuretics or antibiotics. He had also tried some proprietary herbal health tonic for 2 weeks in 10/2005 which was later confirmed to be non renal toxic.

The submandibular glands enlargement persisted and he later developed episcleritis over the left eye. HRCT thorax on 18/10/2005 showed smooth septal thickening in both upper lobes, multiple tiny nodules with upper lobe predominance. Many were subpleurally located and ran along the fissures. The enlarged nodes still persisted over bilateral hilar & paratracheal region (Figure 5). Lung function test had been attempted for 16 times but all failed. A second FOB was repeated on 19/10/2005. It showed no endobronchial lesion. Biopsy from posterior segment of RUL & apical segment of RLL revealed fragments of lung tissue only, with focal fibrosis and scanty histiocytes. The cultures of bronchial aspirate were negative for bacteria, AFB & fungus. Renal biopsy was subsequently performed on 21/10/2005. It revealed the pathological diagnosis of non-granulomatous interstitial nephritis (Figure 6). Anti-nuclear factor screening was positive and the titre was 1:160. Other relevant investigations included HBsAg, Anti-HCV antibody, cryoglobulin, HIV, VDRL, ANCA , dsDNA and ENA , serum protein electrophoresis and urine BJP were all negative. Further investigations including Mantoux test (MT) 2, urine culture, urine for AFB culture, serum cryptococcal Ag, galactomannon, brucella antibody, toxoplasma antibody were negative subsequently. The serum lysozyme was elevated to 1771 u/ml (normal range: 150-500u/ml) but the serum angiotensin converting enzyme level was normal.

Oral prednisolone 20mg tds was started on 20/10/2005. Gallium scan was performed on 26/10/2005. It showed mild uptake in the mediastinum and hilar. Both kidneys were “hot”. Follow up RFT showed improvement. The creatinine went down to around 350μmol/L. Repeated HRCT on 25/11/2005 showed resolution of the tiny lung nodules & septal thickening in both lungs. The steroid dosage was therefore gradually tapered off and titrated according to the renal function. Unfortunately he was complicated by open TB and was started on anti TB drugs since 12/05.
Discussion

Sarcoidosis was first described in 1877. It is a multi-system disorder of unknown causes. It occurs throughout the world and it affects all ages, genders and races. The age-adjusted annual incidence rate in the US was 35.5 per 100,000 for blacks and 10.9 for whites. In Japan, there had been 4774 reported cases between 1960-1999. The annual incidence rate is in the rising trend. It rose from 1.6/100,000 in 1960-1970 to 25.6/100,000 in 1970-1980. In China, the first reported case was in 1958. There had been 3000 reported cases in 1999. The highest prevalence rates have been reported in Scandinavian countries & the US African-American population, up to 50/100,000. Sarcoidosis shows a predilection for adults <40 years, peaks between 20-29 years old. There is slight female predominance. In Scandinavian countries, Germany & Japan, there is a second peak incidence in females > 50 years of age. The overall mortality is about 1-5%. Clustering of cases have been reported including seasonal (winter & early spring), geographical, occupational (history of exposure of metal dusts, fumes & organic antigens), familial (positive associations in HLA A1, B8, DR3, HLA B27 and negative associations with HLA B12 and DR4 ). Sarcoidosis are more common in non-smokers. The exact etiology is unknown but it probably results from a response to a persistent and poorly degradable antigenic stimulus. Potential etiological agents suggested to be involved in sarcoidosis includes infection such as viruses (herpes, Epstien-Barr, retrovirus, coxackie B virus, cytomegalovirus), borrelia burgdorferi, propionbacterium acnes, mycobacterium tuberculosis, other mycobacteria and mycoplasma. Other suggested agents include aluminum, zirconium, tcalc, pine tree pollen and clay.

The clinical features depend on ethnicity, duration of illness, site and extent of organ involvement and the activity of the granulomatous process. One-third of patients may present with non-specific constitutional manifestations like fever, fatigue, malaise, weight loss & night sweat. Almost 95% of patients have lung involvement. Other system involvement include skin, lymph nodes, eyes, liver, spleen, neurological, cardiac, renal, salivary gland, bone marrow and musculoskeletal system. Concerning the respiratory system, the patient may present as dry cough, dyspnea, chest pain and rarely haemoptysis. The most common type of pulmonary infiltrate is diffuse with an interstitial reticulonodular pattern and upper lobe predominance. The larynx, trachea & bronchi may also be involved, leading to stridor, airway obstruction and bronchiecstasis. Other uncommon manifestations include pleural effusion, chylothorax, pleural thickening, calcification, lymph node calcification and cavity formation. There may be clinical presentations affecting other systems such as uveitis, anaemia, overall lymphopenia, elevated ESR, ventricular dysrhythmia, cardiomyopathy, congestive heart failure, hypercalcaemia, hypercalcaemia, nephrocalcinosis, obstructive uropathy, and interstitial nephritis. Sarcoidosis may coexist with connective tissue diseases including rheumatoid arthritis, SLE, systemic sclerosis, Sjorgen’s syndrome and the spondyloarthropathies as they may share a common immunopathogenic mechanism. The diagnosis of sarcoidosis may then be difficult.

The staging of sarcoidosis is based on the posteroanterior chest radiogram, from stage 0 to stage IV. Stage 0 represents a normal chest radiograph. Bilateral hilar lymphadenopathy (BHL) is classified as stage I. BHL plus pulmonary infiltrate is classified as stage II. Stage III disease includes pulmonary infiltrate without BHL and pulmonary fibrosis is classified as stage IV. The lung function test would be restrictive, with decrease in TLC, FEV1 & FVC and DLCO. Bronchoscopic biopsy finding includes widespread non-caseating epitheloid granuloma which may contain cytoplasmic inclusions such as asteroid bodies. In the lung, about 75% of the granulomas are located close to or within the connective tissue sheath of bronchioles, subpleural or perilobular spaces (a lymphangitic disturbance). The bronchoalveolar larvage shows an increase in CD4/CD8 ratio > 3.5 with a sensitivity of 53% and specificity 94%. The classical CT findings include widespread small
nodules with a bronchovascular and subpleural distribution, thickened interlobular septae, architectural distortion or conglomerate masses. The Kveim-Siltzbach test (intradermal injection of sarcoid tissue) is no longer performed. The Tuberculin test is negative in 80% of patients which is related to the depressed cell-mediated reactivity to tuberculin & other antigens. The lysozyme and serum angiotension-converting enzyme (ACE) are elevated but the serum ACE may also be elevated in lymphoma, TB, asbestosis or silicosis and hence is not specific for sarcoidosis. The radiotracer scanning with Gallium-67 can localizes inflammatory foci but it is not suggested for routine use because it is non-specific and a negative scan does not exclude the disease.

There is no good randomized control trial concerning the treatment of sarcoidosis. Steroid is often used for significant and symptomatic disease. The ATS/ERS/WASOG criteria for considering steroid in sarcoidosis are as follows: progressive symptomatic pulmonary disease, asymptomatic pulmonary disease with progressive loss of lung function, cardiac disease, neurological disease, eye disease not responding to topical therapy, symptomatic hypercalcaemia, other symptomatic or progressive extrapulmonary disease. The initial dosage is often prednisolone 20-40mg/day (or 0.5-1.5mg/kg/d) and clinical response is evaluated after 1-3 months. The dosage is gradually tapered to 5-10mg/day and continued for a minimum of 12 months for responders. Monitoring for relapse is indicated after tailing off steroid and relapse patients may require long term, low dose therapy. Immunosuppressive agents such as methotrexate (MTx), azathioprine (AZA) can be used in refractory cases or as an steroid sparing agents but are often limited by their own side effects. According to the Cochrane review including 5 studies with trials concerning MTx, chloroquine, cyclosporine A & pentoxifylline, the data on lung function, CXR scores and dyspnea were largely inconclusive. There were 2 studies on MTx & pentoxifylline showing association with a steroid sparing effect which was apparent at 12 months but not at 6 months.

There were isolated case reports demonstrating the usefulness of infliximab but the evidence is not conclusive. The phase 2 randomized controlled trials on 138 patients for using infliximab showed a statistically significant improvement in FVC of 2.5% at 24 weeks. Post hoc exploratory analysis suggested that patients with more severe disease tend to benefit more from infliximab treatment. The use of interferon for the treatment of chronic hepatitis C may induce or exacerbate sarcoidosis. The poor prognostic factors for sarcoidosis include the followings: stage II, III, IV disease, age of onset >40, black race, cardiac involvement, chronic uveitis, cystic bone disease, lupus pernio, neurosarcoidosis, nephrocalcinosis, chronic hypercalcaemia & progressive pulmonary fibrosis. Concerning the natural history of sarcoidosis, about 70% of patients will recover (with or without treatment) with minimal or no residual manifestations. There are about 20% of patients having permanent loss of some lung function or some permanent visual impairment and 1-5% of patients may die of respiratory insufficiency, cardiac or CNS damage.

References:

5. Hunninghake GW, Costabel U, Ando M et al. ATS/ERS/WASOG statement on Sarcoidosis. Sarcoidosis Vasc
The 11th Congress of the Asian Pacific Society of Respirology (APSR) was held from 9th to 11th in November at Kyoto, Japan which was attended by a delegation of more than sixty members of the Hong Kong Thoracic Society and the American College of Chest Physicians (Hong Kong and Macau Chapter). Members including Prof. WK Lam, Prof. Mary Ip and Dr. Christopher Lai were invited speakers who delivered talks in workshops or symposia at the Congress. Dr. CM Chu and Dr. James Ho presented in the oral presentation session. Dr. Julie Wang (QMH) and Dr. Fanny Ko (PWH) won Best Poster Award in the poster presentation session and to them we offer our heartfelt congratulations.
Dr. James Ho, speaking at the conference

Dr. Julie Wang, one of the winners of the best poster award

Dr. Fanny Ko, one of the winners of the best poster award
To increase public awareness of chronic obstructive pulmonary disease (COPD), a talk on “如何戰勝慢性阻塞性肺病” was delivered to the public in the Cultural Center on November 25, 2006. This talk was organized by the Hong Kong Thoracic Society, the American College of Chest Physicians (HK & Macau chapter) and 聖雅各福群會企業拓展(協作). The talk was attended by more than 150 participants and the general public showed a lot of interest to this disease and had many interactions with the speaker in the “question and answer session”.

Dr. Fanny Ko received souvenir from representative of 聖雅各福群會

The talk was well attended by the public
Dr Tse Yuen Man Memorial Scholarship

Dr. Loretta YC Yam
Hong Kong Lung Foundation Chairman

The Dr. Tse Yuen Man Memorial Scholarship was set up in 2004 in remembrance of the heroic acts of the late Dr. Tse Yuen Man, a former trainee in Respiratory Medicine, who offered her life to save patients with the severe acute respiratory syndrome (SARS) in 2003. The scholarship is awarded to a higher form student of the TWGHs Mrs. Wu York Yu Memorial College, the Alma Mater of Dr. Tse Yuen Man. The award is offered annually to winners of an essay competition on respiratory disease selected by a panel consisting of Council Members of the Hong Kong Lung Foundation. Miss Chan Tung-Ni was awarded the scholarship for the year 2006 and the title of her essay was “How to prevent and stop smoking among young people in Hong Kong”.

Dr. Chan Yuk-Choi presenting the prize to Miss Chan Tung-Ni
Background
This is a proposal of the scientific subcommittee of the Hong Kong Thoracic Society to gather all the health statistics in relation to respiratory diseases to provide comprehensive information on the burden of lung disease in Hong Kong, their treatment and economic cost to society. The project and the document produced will be part of the 20th anniversary celebration of the Hong Kong Thoracic Society and 10th anniversary celebration of the Hong Kong Lung Foundation.

Overall Objective
To provide comprehensive information from available data on the incidence, consequence, and trend of respiratory diseases and the economic burden of these diseases in Hong Kong necessary for inform policy-making.

Specific aims
- To quantify the numbers of deaths and amount of disease caused by respiratory disease in Hong Kong in 2004
- Compare the burden of respiratory disease with that of other major killers in Hong Kong- Ischemic heart disease and cancer
- Describe the recent trends in respiratory disease
- Provide information on utilization of health care resources and economic costs of respiratory diseases in Hong Kong

Research plan and methods
The framework of the project will be based on the Burden of Lung Disease Project in the United Kingdom published by the British Thoracic Society this year.1

The following diseases will be studied:
- Tuberculosis
- Cancers of the respiratory tract
- Asthma
- Chronic obstructive lung disease
- Pneumoconiosis
- Infections: acute respiratory infection, influenza and pneumonia (lower respiratory infection)
- Bronchietasis
- Sleep apnea
Significance
The burden of lung disease study will provide comprehensive information on the incidence, consequence and causation of lung disease for health authorities in making decisions on health policies relating to lung disease. This is particularly important in a context where increasingly well informed people demand more health services and interventions than available resources can finance. Decision-makers at all levels are increasingly required to evaluate the impact of health policies, to justify adoption of new ones and to ensure that information is available for comparison. The information will also be very useful for evaluating the impact of health policies and to justify the adoption of new ones.

References:
A single centre experience of aetiologies, angiographic findings and outcomes of life-threatening haemoptysis in Hong Kong

Dr. Judy Lam  
Department of Medicine and Geriatrics, United Christian Hospital

Background

Life-threatening haemoptysis is one of the most dreaded of all respiratory emergencies. Recent local data concerning life-threatening haemoptysis and their outcomes are lacking. This study aims to provide a comprehensive account of aetiologies, angiographic findings and outcomes of life-threatening haemoptysis in a local centre in Hong Kong.

Methods

A retrospective cohort of consecutive patients with life-threatening haemoptysis admitted to the United Christian Hospital from January 2000 to January 2005 was studied. The patient characteristics, aetiologies of haemoptysis, radiographic and bronchoscopic findings, angiographic findings, any interventions and their outcomes were recorded. The results of bronchial artery embolization (BAE) were further analyzed; and any factors associated with recurrence of haemoptysis were explored.

Results

There were 94 patients included in the cohort. Tuberculosis (68%) and bronchiectasis (43.6%) were the two commonest causes of life-threatening haemoptysis. There were 62 patients who received specific interventions; including one received emergency surgery while BAE were attempted for the remaining cases. The technical success rate of BAE was 88.5%. Fifty-four patients completed BAE and were available for further analysis. Ninety-eight percent of cases achieved control of bleeding till discharge. No major complications occurred. The 1-year and 3-year recurrence rate were 22.2% and 36.0% respectively. All recurrence of life-threatening haemoptysis was either due to sequelae of tuberculosis (87.5%) or idiopathic bronchiectasis (12.5%). The presence of systemic-pulmonary shunt was associated with a high chance of recurrence (p=0.027).

Conclusions

Tuberculosis and bronchiectasis account for more than two-third of life-threatening haemoptysis and its recurrence. The immediate success and long term outcome of BAE is satisfactory in our centre; while the complication rate is low. BAE is proved to be a safe and effective mean for control of life-threatening haemoptysis. Being able to identify systemic-pulmonary shunt may help earlier and allow more aggressive treatment of these cases.
This section serves to bombard the trainees with questions covering the basic concepts in respiratory medicine. Questions asked will be discussed in the next issue. Specialists and trainers are invited to give their brief discussions. In no way is it meant to be exhaustive or comprehensive, it only serves to highlight important concepts. Specialists are welcome to offer questions (and the discussions) for this section. Trainees are also welcome to give comments, particularly when there is query on what had been published. Please send them to the editor email: fannyko@cuhk.edu.hk

Questions for the next issue:

1. **What are the physiologic changes involved in high altitude?**
   (from Dr. Angus HY Lo, Pamela Youde Nethersole Eastern Hospital)

2. **What is tracheobronchomalacia?**
   (from Dr. Sai-On Ling, Kowloon Hospital)

3. **What environmental hazards are present for the air travellers with respiratory problems and what are the possible measures?**
   (from Dr. Henry Kwok, Hospital Authority Head Office)
How to calculate the doubling time of a solitary pulmonary nodule?

Dr. Wai-Kei Lam
Department of Medicine, North District Hospital

Solitary pulmonary nodule (SPN) is defined as a single spherical lesion of 3 cm or less in diameter completely surrounded by lung without any associated atelectasis or lymphadenopathy. It is usually an incidental finding and can be seen on 0.09-0.2% of chest x-rays (CXR) in mass screening studies. Radiologically the spatial (size, margin, internal characteristics, density, calcifications) and temporal (post-contrast enhancement and growth rate) characteristics of an SPN can suggest benign or malignant aetiology. Resection is advisable for nodules with high probability of malignancy. Difficulty arises from nodules having low to intermediate probability of malignancy, technically difficult for fine-needle aspiration or transbronchial biopsy, size being too small for a reliable positron-emission tomography evaluation in patients who are operable but with a relatively high operative risk. Repeat imaging for any nodule growth, or more precisely observing volume doubling time of the nodule is an often-employed strategy when a single imaging study is inconclusive.

Doubling time calculation is based on an exponential growth model. Suppose in the beginning there is one tumor cell and each tumor cell divides into two cells every day:

| Day | 1   | 2   | 4   | 8   | 16  | 32  | 64  | ...
|-----|-----|-----|-----|-----|-----|-----|-----|-----
| Number of tumor cells | 1   | 2   | 4   | 8   | 16  | 32  | 64  | ...

\[
= 2^3 = 2^6
\]

There are three “doublings” in the number of tumor cells from the end of day 3 to end of day 6. The number of doublings can be counted on the graph, or calculated as \(\log_2(64) - \log_2(8) = 3\). Assuming tumor volume is proportional to the number of tumor cells (say, by a factor of \(\alpha\)), the “number of doublings” a tumor has undergone from an initial volume of \(V_1\) to a volume of \(V_2\) can therefore be expressed as:

\[
\text{Number of doublings} = \log_2(\alpha V_2) - \log_2(\alpha V_1) = \log_2\left(\frac{V_2}{V_1}\right)
\]

Doubling time is the time required per doubling. In the above example the doubling time is 3 days / 3 doublings = 1 day. With a known time interval between \(V_1\) and \(V_2\),

\[
\text{Doubling time} = \frac{\text{time interval (Ti)}}{\text{number of doublings}} = \frac{\text{Ti}}{\left[\log_2\left(\frac{V_2}{V_1}\right)\right]}
\]
Changing logarithm base 2 to logarithm base 10 (for the ease of calculation using conventional calculators) \(\log_2 X = \log X / \log 2\),

\[ T = \log 2 / \log \left( \frac{V_2}{V_1} \right), \]

or \[ T = \log 2 / [3 \log (d_2/d_1)] \]

by assuming a spherical volume \( V = \frac{4}{3} \pi \left( \frac{d}{2} \right)^3 \) with \( d \) as the diameter of the sphere, and as \( \log (x^y) = y \log (x) \).

For example on CXR a mass is 0.8 cm in diameter and 200 days later its diameter increases to 1.0 cm, the doubling time of the mass is \( 200 \times \log 2 / [3 \times \log (1.0/0.8)] = 207 \) days. There is a margin of measurement error. The 95 % limits of intra-observer agreement of diameter measured was found to be 1.32 mm for SPN less than 2 cm in diameter on computerized tomography (CT). Put this into our example it would result in an error of about ± 40 days for the estimated doubling time.

Bronchogenic carcinoma usually has a doubling time from 20 to 400 days, though in adenocarcinoma and bronchioloalveolar carcinoma the doubling time can be as long as 1346 days. Infection, infarction, lymphoma or fast-growing metastasis from choriocarcinoma and osteosarcoma have doubling time less than 20 days. Measurement of SPN diameter can be performed on the screen on any picture archiving and communication system (PACS) station. With the advent of multi-detector CT volume of the nodule can be measured directly. This does not assume the shape of the nodule being a sphere and is particularly useful for nodules with asymmetrical growth. Computer-assisted algorithm can minimize inter-observer variability on volumetric measurement.

Practically one can follow-up SPN 5 mm or smaller with CT at 3, 6, 12, 24 months, or 6-monthly for less than 4 mm nodules and 3-monthly for 4-8 mm nodules. Some has advocate it is sufficient to repeat CT at one year for nodule ≤ 4 mm and at 6 months for nodules 4-7 mm in size. Nevertheless non-invasive or invasive diagnostic methods should be considered for nodules greater than 8 mm. No change in SPN size on CXR for 2 years only has a 65 % positive predictive value for a benign outcome. A CT should be performed to further characterize the nodule, and a one more-year CXR follow-up is recommended.

References:
Is intrapleural fibrinolytic therapy useful in the treatment of parapneumonic effusion or empyema?

Dr. CY Chan
Department of Medicine, Pamela Youde Nethersole Eastern Hospital

Bacterial pneumonia and its complication is one of the most frequent pathologies in clinical practice associated with hospitalization. Parapneumonic pleural effusion was the most common among these complications that affect up to 40% of patient and their morbidity and mortality were 3–7 times higher than those without pleural effusion.\(^1,2\) The hospital stay was prolonged in patient complicated with parapneumonic pleural effusion especially in those with purulent fluid, underlying diseases, surgical drainage with/without decortication, with unfavorable radiological outcome and higher pleural fluid levels of lactate dehydrogenase.\(^1\)

The evolution of parapneumonic effusion can be divided into three stages: exudative stage, fibrinopurulent stage and organizing stage, which represent a continuous spectrum. Apart from effective antibiotic therapy, treatment of patients with parapneumonic effusion consists mainly of drainage of the pleural fluid especially for those patients belong to category 3 or 4 by ACCP consensus criteria\(^3\): a large, free-flowing effusion (≥ 1/2 hemithorax), loculated effusion or effusion with thickened parietal pleura; pleural fluid bacteriology study showed pus or positive Gram stain or culture; pleural fluid biochemistry study showed pH < 7.20 or glucose level <60mg/dL.

The most common treatment modality for drainage of parapneumonic effusion for the past several decades has been tube thoracostomy. The chest tube should be placed in the dependent part of the pleural effusion. Tube mal-position relative to fluid loculations, fluid debris and viscosity and the progression to organizing stage are the primary reasons for failure. Well positioned smaller sized chest tubes, under either ultrasound or CT scan guided, are effective for drainage of pleural fluid in fibrinopurulent stage\(^4\) and they are shown to have a lower complication rate than the non-image-guided procedure.\(^5\) However, large size chest tubes are generally recommended for patients requiring drainage of viscous pleural liquids.\(^6\)

Intrapleural instillation of fibrinolytic agents in the treatment of hemothorax and postpneumonic empyema was first described in mid-twentieth by Tillett and Sherry.\(^7\) However its usage was later dampened due to the considerable side effects. Because of catheter occlusion by viscous, fibrin-rich fluid and cellular debris or the existence of fibrin strands that prevent subsequent fluid drainage, the use of fibrinolytic agents became popular again since 1970s.

Several studies supported the use of intrapleural fibrinolytic therapy. Andreas H Diacon and colleagues studied fifty-three patients with complicated parapneumonic pleural effusion, category 3 and 4. In those streptokinase-treated patients, they had a higher response rate 82% vs 48%, \(p = 0.01\) and fewer surgical referrals (45% vs 9%, \(p = 0.02\)) compared with saline-treated patients.\(^8\) Similar results obtained in the study of children with complicated parapneumonic effusion by Chih-Ta Yao and colleagues.\(^9\) Those children received intrapleural streptokinase had a earlier response in terms of the duration of fever after
admission (13.8 ± 5.3 days vs 17.9 ± 7.0 days, p < 0.05), duration of fever after chest tube insertion (5.3 ± 3.1 days vs 7.9 ± 4.6 days, p < 0.05), amount of pleural drainage within first 3 days (815.9 ± 481.0 ml vs 278.9 ± 237.6 ml, p < 0.05), and fewer surgical referrals (2/20 vs 9/22, p < 0.05). Other studies by Gulsen Ekingen and colleagues and Panagiotis Misthos and colleagues also showed intrapleural fibrinolytics therapy resulted in a higher clinical successful rate, shorter length of stay and fewer needs for surgical intervention than tube thoracotomy alone. They also suggested that tendency of decreased rate of drainage together with persistent fever and respiratory symptoms, despite treatment may be a clue for early surgical intervention.

However, the recent Multicenter Intrapleural Sepsis Trial (MIST1) reported data from the first large multicenter, double-blind randomized controlled trial of streptokinase (250 000 IU twice daily for 3 days) compared with placebo in patients with parapneumonic effusion did not support the use of intrapleural streptokinase. In the study, 454 patients with pleural infection were randomly assigned to received either intrapleural streptokinase or placebo. They showed no benefit to streptokinase in terms of mortality, rate of surgical intervention, radiological outcomes or length of hospital stay. The proportion of patients who died or needed surgery at 3 months after randomization was similar for the streptokinase and placebo groups (31% vs 27%, p = 0.43). On the other hand, the serious adverse events (chest pain, fever and allergy) are more common in streptokinase treatment group than in placebo group (7% vs 3%, relative risk 2.49 [95% confidence interval, 0.98 to 6.36]; p = 0.08). Some had suggested that the different findings of MIST1 report may be contributed to the difference of the population, no objective protocols for surgical referrals in different studies and the difference in the size of chest drain catheters.

So far, there is no final consensus for the usage of intrapleural fibrinolytic agents in the treatment of parapneumonic pleural effusion. In the ACCP guideline published in 2000, fibrinolytic therapy, VATS and surgery are all acceptable treatment approaches for managing patients with category 3 and 4 parapneumonic pleural effusion and these interventions were associated with the lowest mortality and need for second interventions. One should consider these treatment modalities depending on the clinical progress of individual patient and the availability of the thoracic surgical support in their hospitals.

**Regimen of intrapleural fibrinolytic therapy used in various studies:**

<table>
<thead>
<tr>
<th>Trial, Year</th>
<th>Fibrinolytic agent</th>
<th>Treatment dosage per day, IU</th>
<th>Duration of treatment</th>
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<tr>
<td>Davies et al, 1997</td>
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<td>3</td>
</tr>
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<td>Bouros et al, 1999</td>
<td>Urokinase</td>
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<td>Tuncozgur et al, 2001</td>
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<td>Diacon et al, 2004</td>
<td>Streptokinase</td>
<td>250,000</td>
<td>Up to 7</td>
</tr>
<tr>
<td>Chih-Ta Yao et al, 2004</td>
<td>Streptokinase</td>
<td>12,000/kg</td>
<td>3 - 5</td>
</tr>
<tr>
<td>Gulsen Ekingen et al, 2004</td>
<td>Streptokinase</td>
<td>25,000/kg, up to 250,000</td>
<td>n/a</td>
</tr>
<tr>
<td>MIST1, 2005</td>
<td>Streptokinase</td>
<td>500,000</td>
<td>3</td>
</tr>
<tr>
<td>Panagiotis Misthos et al, 2005</td>
<td>Streptokinase</td>
<td>250,000</td>
<td>3</td>
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</table>
References:
What is the role of a pharmacist in the care of asthma patients who need to use spacer device?

Mr. Yu-wah So, Queen Mary Hospital
Department of Pharmacy, Queen Mary Hospital

It is important to ensure that patients with asthma are having good compliance with their inhaled medication. Pharmacists in both the community and hospital have the roles in teaching patients how to use their inhalers properly and telling them the key messages to enhance their compliance.

Nowadays, there are many different forms of inhalers and these include dry powder and aerosol formulations. Generally, dry powder formulations, such as accuhaler, turbuhaler and twisthaler (not available in Hong Kong yet), are easy to manipulate. However, the cost of dry powder formulations is much higher than the metered dose inhalers (MDI). To overcome the difficulty for patients to coordinate the actuation and inspiration when using the MDI, the use of MDI together with a spacer device is recommended. This is especially true for the young children and the elderly. Although Autohaler is simple to use, its high particle velocity has the disadvantage of excessive oropharyngeal deposition. A MDI with a spacer device is in fact a cost effective treatment for asthma patients.

Generally speaking a spacer can serve in two roles:
1. to ensure adequate drug delivery in patients who fail to use the MDI properly.
2. to reduce drug deposition in the mouth as a spacer can reduce the drug particle velocity.

Several designs of the spacers are available in the market. Volumatic spacer is designed for use together with salbutamol and betamethasone MDI. (In August 2006, the manufacturer of the Volumatic in the United Kingdom had discontinued the supply of Volumatic because of factory closure. The Committee on Safety of Medicines (CSM)expressed concern over cessation of use of Volumatic may affect the control of airway diseases in patients due to suboptimal drug delivery and thus advised patients who were already using Volumatic to continue using it. Volumatic, however, was re-introduced to the market in February 2006 by the same manufacturer. Nebuhaler is another spacer devise which is designed to be fitted with budesonide and terbutaline MDI. Aerochamber plus and space chamber can be used with any MDI devices as their ends are made up by soft plastics and thus can be easily fitted to devices of various sizes and shapes. In theory, larger spacers are better than smaller ones as the bioavailability of the drug increased with the size of the spacer.

Here are some tips for using the spacer devices:
1. Hold the device in such a way that the valve is closed when you are delivering medications to it. The valve may be opened due to gravitational force. Try to tilt the device so that the mouth piece is at a level higher than the drug canister side.
2. Repeat breathing through the mouthpiece for at least 2-3 times to make sure the aerosol has been inhaled from the device. The mouth can stay with the spacer device during expiration and it is unnecessary for the mouth to leave the mouthpiece very time during expiration. Although the timing between the inhalation and the actuation of the MDI device is not very important when a spacer device is being used, one still should not wait too long to
inhale the drug from the spacer after the drug was delivered to the spacer from the MDI and the spacer itself is not a closed system. There are some space between the spacer adapter and the canister of MDI.

3. Spacers should be cleansed twice a week. The device can be washed in warm water using a mild detergent and leave it to dry naturally. It is unnecessary to rinse the spacer with clean water again. Detergent used for cleaning the spacer can reduce the water surface tension and thus can prevent the building up of electrostatic charge in the inner surface of the device.

4. Do not rub or dry the inside of the spacer device with a cloth or towel as this may increase the electrostatic charge and this could increase drug deposition in the spacer and decrease drug delivery to the patients.

Most of the metered dose inhalers available now are chlorofluorocarbon (CFC)-free inhalers. Pharmacist should remind the patient that the taste and feel of the inhaler may be different from the previous CFC inhalers. The use of CFC was banned as it is harmful to the environment, particularly to the ozone layer of the Earth.

The role of the pharmacists is not only to teach patients the correct inhaler technique. Pharmacists should also educate the patients the importance of drug compliance. Some patients may adjust the dosage of drugs themselves without prior consultation to physicians. Some patients even stop the inhaled corticosteroid due to steroid phobia. Pharmacists by helping the patients to understand the nature and use of the drugs can enhance compliance and thus improve the treatment outcome.

References:
Medical Biostatistics

Dr. Julie Wang
University Department of Medicine, Queen Mary Hospital

Confounding and Multivariate Analysis
In previous chapters, we have largely discussed about the use of statistical tests for comparing two groups of variables, with either continuous or categorical data. The student’s t tests, chi-square and other nonparametric tests are basically methods for investigating the association between one independent variable and one dependent variable. In concluding the findings of such a comparison, it is assumed that other factors that can as well affect the outcome of dependent variable have been eliminated or balanced off in the two study groups.

In reality, there are multiple factors interplaying together to bring about an outcome. For instance, the occurrence of asthma and its severity are contributed by many factors like age, gender, exposure to allergens, exposure to precipitants and genetic influence etc. To analyse the effect of one potential new risk factor in the development of asthma, it is important to take into account of those known important risk factors, and have their effects adjusted for, before a reliable association can be established for the new risk factor.

Apart from randomized controlled clinical trials, epidemiological studies of risk factors for diseases are all time favourite research objectives in the medical literature. The difficulty of these studies often lies in the sorting of intermingling effects of various factors which appear to influence the outcome, such factors could either be genuine risk factors for the disease under study, or are conditions which are so closely associated with a known risk factors that they appear to be linked to the disease. This situation is referred to as confounding.

The highlights of this chapter are the understanding of confounding, and various methods that can provide solution to handling of confounders, in particular, multivariate analysis.

1. Confounding
   Definition of confounding variable
   Why do we need to control for confounders?
   Control strategies for confounders

2. Multivariate Analysis
   The General Linear Model
   Choice of Multivariate Regression analysis with regard to different types of variables
   Types of variables
1. Confounding

Definition of Confounding variable

“A confounding variable is a risk factor for the disease under study and is also associated with the exposure under study. While the confounder must be a risk factor for the outcome under study, this relationship need not be causal. Age and sex are the examples of variables which often are confounders without being causal risk factors.

A factor which meets the definition for confounding but is an intermediary in the exposure-outcome pathway is not a confounder. For example, if a high fat diet causes increased cholesterol which in turn results in an increased risk of myocardial infarction, the intermediary variable cholesterol is not a confounder.”

In other words, there is no need to control for
1. variables which are not associated the study variable,
2. variables which are not risk factors for the study outcome
3. one which is an intermediary between the study variable and the outcome.

Looking at Figure 1 and 2, Variable B is a confounder whereas Variable C is not.

![Figure 1](image1.png)

![Figure 2](image2.png)
Why do we need to control for confounders?

A confounder can totally or partially accounts for the apparent effect of the study exposure on the outcome. It may mask or even reverse an underlying true association, or create a false association.

Therefore, they can result in bias, which lead to systematic errors in the association to be studied. Such bias cannot be corrected with simple statistical methods like student’s t test, chi-square tests etc, since they are designated for handling random error.

Control strategies for confounding

Control strategies for confounders are implemented during design of study, therefore, they are supposed to be considered well in advance during study planning.

a. Randomization - randomizing study subjects into different study arms can balance the proportion of confounders in each arm, thereby, eliminating the potential biases. This applies to randomized controlled clinical trials, where the results in different study arms can be compared directly using simple statistical tests.

b. Restriction – in restriction, the investigator allows only subjects in one category of the potential confounding variable to be included in the study. For instance, in studying the association between asbestos exposure and lung cancer, in order to control for cigarette smoking, which being an important confounder, the investigator can restrict the study to non-smokers only, thus eliminating its effects.

c. Stratification – this refers to the study of disease occurrence in different stratum of a confounding variable. Pack years of smoking is an important variable for development of COPD, therefore, the risk of smoking on COPD can be studied separately according the different stratum of smoking history measured in pack years.

d. Matching – one could also perform matching to several major confounding variables in each study subject, and use statistical tests of paired data for analysis subsequently. Like in studying whether a variable A is associated with the development of OSA, one could match age, gender and BMI for the participants, and compare the prevalence or incidence of OSA between groups.

e. Multivariate Analysis – this is a powerful statistical method that allows managing multiple confounders at the same time by statistical modeling. It is frequently used in most observational epidemiological studies, where specific measures like randomization and matching cannot be performed.

2. Multivariate Analysis

The General Linear Model

This statistical method provides a model which uses all observations collected in the study, in an attempt to explain the reality with an equation as much as possible.
No matter how powerful it is, a poorly designed study with major sampling error, like missing information or serious bias in major aspects and variables, can never be reliably adjusted by the model.

The principle of finding the best estimate of an equation is by minimizing the sum of the squared error of each term in the equation, this approach is called the least-squares solution.

The equations below are examples of the general linear model (GLM), y is the unique dependent variable, whereas x represents different independent variables, b is a measure of the strength of association of x with y. “General” means that there are many variations associated with either y or x, and “linear” refers to a linear combination of all x terms.

In the multiple linear regression model as shown below, the risk factors for severity of OSA using RDI as a surrogate marker is being studied. And in the example of multiple logistic regression model, predictors for cancer associated death are evaluated.

The various procedures for multivariate analysis, e.g. multiple linear regression, multiple logistic regression, the log-linear regression and discriminant function analysis are all based on the general linear model.

General Linear Model:

\[ y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + \ldots \]

Multiple Linear Regression Model:

\[ \text{RDI} = a + b_1 \text{AGE} + b_2 \text{GENDER} + b_3 \text{BMI} + b_4 \text{RACE} + b_5 \text{LDL} + b_6 \text{FBS} + \ldots \]

Multiple Logistic Regression Model:

\[ \text{Cancer Death} = a + b_1 \text{AGE} + b_2 \text{GENDER} + b_3 \text{STAGIING} + b_4 \text{SMOKING} + b_5 \text{SURGERY} + b_6 \text{CHEMOTHERAPY} + \ldots \]
Choice of Multivariate Regression analysis with regard to different types of variables

**Choice of Appropriate Procedure to be used in Multivariate Analysis**

<table>
<thead>
<tr>
<th>Characterization of variables to be Analysed</th>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Appropriate Procedure</th>
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<td>Continuous</td>
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<td>Nominal</td>
<td>Some are categorical and some are continuous</td>
<td>Group the continuous variables and perform log-linear analysis</td>
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</tr>
<tr>
<td>Nominal</td>
<td>All are continuous</td>
<td></td>
<td>Discriminant function analysis; group the continuous variables and perform log-linear analysis</td>
</tr>
</tbody>
</table>

**Types of variables**

a. **Continuous variables** – data being measured on a continuous scale, e.g. age, height and weight etc. This measurement allows the investigators to understand the variable under study to the finest detail. Besides, during analysis, a variable of continuous data can always be grouped into different categories according to the investigators’ interest. For instance, grouping patients’ age at 10-year interval like 0-10, >10-20, >20-30, >30-40 … turn the variable into an ordinal one; or grouping the patient’s age into <65 or ≥ 65 will have transformed the data into a binary one. Transformation of data in turn implies an alteration of analytical procedures to be used.

b. **Ordinal variables** – ordinal data has an internal ranking which represent a order of severity, importance or favouritism etc. Good examples are measurement of pain sensation, degree of satisfaction of a consumer product or agreement on a newly implemented policy etc.

c. **Binary variables** – variables that can only have 2 outcomes, like alive or dead, yes or no, male or female etc.

d. **Nominal variables** - naming variables with no measurement scale, eg eye colors, skin colors and races etc.

e. **Categorical variables** - include ordinal, binary, and nominal variables
References:

In the face of the rapid developments in sleep medicine, this book seeks to present the current knowledge in the pathophysiology, clinical presentation, diagnosis, and treatment of sleep apnea. New physiological approaches to modelling sleep and recent pathophysiologic findings in upper airway mechanics as well as the importance of inflammatory and oxidative processes and the underlying genetic aspects are discussed to open up new avenues of investigation for better understanding and improved therapeutic options. Besides the well-known CPAP therapy, chapters describe novel therapeutic methods that are currently under investigation and highlight their future prospects, limitations as well as recommendations for practice.

The excellent contributions to this volume will be stimulating reading to pneumologists, sleep and ENT specialists, neurologists, dental surgeons, cardiologists, obstetricians, general practitioners as well as public health specialists.

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<td>San Diego, USA</td>
<td>43rd Annual Meeting of The Society of Thoracic Surgeons</td>
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### Useful Websites

#### Medical Societies

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<thead>
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<th>Website</th>
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<tr>
<td>Hong Kong Thoracic Society</td>
<td><a href="http://www.medicine.org.hk/hkts/home.htm">homepage</a></td>
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<td>ACCP (HK &amp; Macau Chapter)</td>
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<td>Canadian Lung Association</td>
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<td>European Respiratory Society</td>
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<td>National Heart, Lung and Blood Institute</td>
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<td>The Federation of Medical Societies of HK</td>
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#### Publications

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<td>Thorax</td>
<td><a href="http://www.thoraxjnl.com/">website</a></td>
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The Official Journal of ACCP is now on-line but is only available to subscribers (Fellows, members or affiliated members). Trainees are welcome to join at a very privilege rate (US$30 per year). Applications should be directed to ACCP (USA) through their trainers (who must be a Fellow of the ACCP). Proof and detail of training (tentative period of training) is required. Any query can be directed to the Secretary, ACCP (HK and Macau Chapter) (see page 1). Browsing of information is available on the ACCP website: http://www.chestnet.org/membership/categories.html

Membership News

♦ As of November 16, 2006, there are 739 Members (203 Ordinary members, 5 Honorary members, 68 Life members and 463 Associate members).

♦ To be eligible for Life membership, 3 years of full membership prior to the application is necessary. Please write to the Honorary Secretary (Dr W M Chan, Intensive Care Unit, Queen Mary Hospital, Pokfulam, Hong Kong) and send with a cheque of HK$2,000. Acceptance will be decided in the Hong Kong Thoracic Society council meeting.

♦ For membership renewal, please fill in the application/renewal form (available at http://www.fmshk.com.hk/hkts/member.htm) and send to Dr Loletta So (address as on the form) with the subscription (HK$100/200 for associate/ordinary members respectively), (cheque payable to HONG KONG THORACIC SOCIETY LTD). Members who had their names deleted should re-apply as new members. For enquiry, or checking your membership status, please reach Dr Loletta So by email (loletta.so@hotmail.com) or fax (852 2515 3182) (Please supply your name and fax number). Apology for not entertaining telephone enquiry.
Hong Kong Lung Foundation Fellowship

The fellowship is open to medical practitioners, allied health professionals, scientists, students and others for travelling abroad to engage in research, study and training in order to gain experience in modern methods of diagnosis, prevention and treatment of diseases of the respiratory system. Please note that priority will be given to active members of the Hong Kong Thoracic Society.

The Hong Kong Lung Foundation Fellowship has three types of Awards as specified below:

1. Open to members of the medical profession granting a sum up to HK$50,000 for training of 3 to 9 months and a sum up to HK$60,000 for training of over 9 months.
2. Open to members of the nursing/paramedical profession granting a sum up to HK$30,000.
3. Open to all members of the medical, nursing and paramedical profession granting a sum up to HK$30,000 for attending conference or short training course of 3 months or less.

Hong Kong Lung Foundation Fellowship which opens its application twice a year in June and December. Applicants should submit the application forms to the Hon Secretary of the Hong Kong Lung Foundation, not later than 30th June and 31st December of each year.

Application procedures and application form of Fellowship program can be downloaded from Hong Kong Lung Foundation Website:
http://www.hklf.org/HKLF/hklf_fellows_e.htm

Hon secretary: Dr KS Chan, Pulmonary & Palliative Care Unit, Haven of Hope Hospital, Tseung Kwan O, Kowloon, Hong Kong. Fax: 2703 8799  Email: chanks@ha.org.hk

Hong Kong Lung Foundation Research Grant

The Hong Kong Lung Foundation was established in 1996 to nurture advancement in clinical practice in the field of lung diseases in Hong Kong Special Administration Region. As from January 2001, the foundation shall award research grants, on an annual basis, to fund research projects being performed in the HKSAR. This aims to enhance the research culture and standards of local clinicians and health-care professionals in the field of respiratory medicine and related disciplines.

Please refer to the Hong Kong Lung Foundation Research grant regulations, which must be strictly adhered to. The completed application form and other required documents must be returned to the Honorary Secretary of Hong Kong Lung Foundation by 30th November of each year. Email submission is also acceptable and should be sent to: chanks@ha.org.hk.

Application procedures and application form of Research Grant can be downloaded from Hong Kong Lung Foundation Website:
http://www.hklf.org/HKLF/research_grants_0304_e.htm

Hon secretary: Dr KS Chan, Pulmonary & Palliative Care Unit, Haven of Hope Hospital, Tseung Kwan O, Kowloon, Hong Kong. Fax: 2703 8799 Email: chanks@ha.org.hk
**Pneumoconiosis Compensation Board (PCFB) Research Fund**

The Pneumoconiosis Compensation Board (PCFB) set up a research fund in 1996 with the purpose to support projects that are related to the prevention, diagnosis, assessment of disability and treatment of pneumoconiosis in Hong Kong. Individual or group are invited to apply. Interested parties may visit the website: www.pcfb.org.hk or contact the PCFB at Tel: 2541 0032, Fax: 2541 0211 or Email: contact@pcfb.org.hk.

**Pneumoconiosis Compensation Board (PCFB) Training Grant**

The Pneumoconiosis Compensation Board (PCFB) has established a training grant to facilitate health-care workers and occupational safety and health personnel to enhance their knowledge and skills in pneumoconiosis. This scheme aims to encourage eligible applicants to attend overseas training programmes or conferences that are related to the topic of pneumoconiosis. A maximum grant of HK$ 100,000 will be allowed for a suitable course longer than 6 months, and HK$ 50,000 for a course of 6 months or less. Interested applicants may contact the Board Secretariat, Trophy Mak at 2541 0032, or contact the PCFB at Tel: 2541 0032, Fax: 2541 0211 or Email: contact@pcfb.org.hk.