

## IRISH THORACIC SOCIETY

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### DEATH FROM CHRONIC AIRWAYS DISEASE: PREVENTABLE FACTORS

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We reviewed death certificates in Northern Ireland for the year 1987 which might have included patients with chronic airflow obstruction (ICD codes 491, 492, 496, 416.9, 490, 799.1). 1. Two hundred and forty-eight cases were investigated by: 1. Review of general practitioner's case notes. 2. Review of all available hospital notes. 3. Postal questionnaire to the general practitioner. If death was definitely or possibly due to asthma or chronic obstructive airways disease a doctor (ETS) administered questionnaire was completed by the closest relative available. Two respiratory physicians confirmed the diagnosis and made an assessment of management in each case. There were sixty-one deaths due to chronic obstructive airways disease. Forty patients (68%) died in hospital. In the year before death 19 (32%) patients were admitted to hospital more than once and 12 (22%) were admitted on one occasion.

No. of cases having oxygen assessment and reversibility testing. (N=58)

Consultant	Oxygen	B2 Agonist Reversibility	Steroid Reversibility
Chest (N=23)	8 (35%)	9 (39%)	10 (43%)
Other (N=27)	4 (15%)	8 (30%)	8 (30%)

Adequacy of oxygen assessment prescribing and use in those receiving home oxygen (N=21)

Consultant	Total Home O2	Adequate Assessment	Adequate Prescribing	Patient Compliance	Current Smokers
Chest	11	6	3	1	5
Other	10	2	2	1	7

**Conclusion:** Management was inadequate in 91% of cases. Testing of responses to bronchodilators and steroids was performed in only a small proportion of cases, and very few received adequate oxygen therapy.

### FIVE YEAR FOLLOW-UP OF HYPERCAPNIC RESPIRATORY FAILURE IN PATIENTS WITH COAD

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We have previously described two subgroups of patients with hypercapnic respiratory failure (H.R.F.), one group returning to normocapnia (reversible H.R.F.) when the exacerbation settles (chronic H.R.F.).

The original data suggested that the patients who revert to normocapnia might have a better prognosis than the chronic group. We performed five year follow-up study on 49 of these patients.

Results	Reversible H.R.F.	Chronic H.R.F.
No.	22	27
Deaths	19	23
Age at death	70.2 (8.7)	68.6 (4.1)
Survival yrs	2.85 (1.5)	2.6 (1.4)
No. admissions	59	65
5 yr survival (%)	14	15

Data are mean (SD). None of these differences are significant. A significant number of reversible H.R.F. patients later present in normocapnic failure and a significant number become chronically hypercapnic on later admissions. We conclude that the clinical course and survival of the two groups are similar.

### SEQUENTIAL MEASUREMENT OF RENAL BLOOD FLOW IN HYPOXAEMIC RESPIRATORY FAILURE

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We have used a non-invasive technique to sequentially measure renal blood flow in hypoxic respiratory failure. Duplex Doppler ultrasound of renal intralobular arteries was performed on 16 patients with hypoxic respiratory failure ( $PaO_2 < 8.2$ ) while hypoxic and again following a greater than 20% improvement in arterial blood oxygen tension. (COPD-12, bronchiectasis-1, interstitial lung disease-2, asthma-1). An Acuson 128 computerised real-time sonography system with a 2.0 MHZ imaging transducer was used to scan the renal vessels via the translumbar route with the patient in the sitting position. Pulsatility Index (PI) was calculated as a measure of renovascular resistance. PI is obtained by dividing the difference between the maximum systolic height and the minimum diastolic height of the waveform by the mean height. A fall in PI corresponds to a fall in the distal resistance to flow. All results were paired observations with each patient acting as his or her own control. The data were analysed using Student's t-test. A rise in blood oxygen tension of greater than 20% was accompanied by a significant fall in PI ( $P < 0.001$ ). This study suggests that the correction of hypoxia reduces renovascular resistance and hence increases renal blood flow.

### ASSESSMENT OF TYPE I AND TYPE II PROCOLLAGEN PEPTIDE LEVELS IN BRONCHOALVEOLAR LAVAGE AND SERUM AS MARKERS OF FIBROTIC LUNG DISEASE.

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Lung fibrosis is characterised by increased deposition of collagen in the lung interstitium. Histological studies have demonstrated an increase in the relative amount of Type I to Type II collagen in the fibrotic lung. Deposition of newly synthesized collagen is accompanied by the extra-cellular cleavage of N- and C-terminal peptides from the procollagen molecule. Studies on several fibrotic disorders have indicated that measurement of these peptides in serum may be useful in monitoring fibrotic changes in tissue. The aim of the present study was to ascertain if levels of procollagen peptides in bronchoalveolar lavage (BAL) or serum reflect fibrotic disease in patients with interstitial lung disease (ILD).

BAL and serum levels of C-terminal Type I procollagen peptide (PICP) and N-terminal Type III procollagen peptide (PIIINP) were analysed in 16 patients with biopsy proven sarcoidosis and 4

patients with fibrosing alveolitis. No patient was on corticosteroid treatment at the time of study or during the six-month period preceding the study. Patients were divided into three categories: Category 1 = sarcoid patients with Stage 0 or Stage 1 disease as assessed by chest X-ray (i.e. no X-ray evidence of interstitial involvement, n=5); Category 2 = sarcoid patients with Stage 2 or Stage 3 disease (i.e. interstitial infiltrates on chest X-ray but no evidence of fibrosis, n=9) and Category 3 = sarcoid patients with Stage 4 disease and patients with fibrosing alveolitis (i.e. patients with fibrotic disease, n=6). BAL levels of PICP and PIIINP increased with increasing lung involvement, highest levels of both peptides being observed in Category 3 patients, (PICP vs Category: Fratio=3.43, p<0.05; PIIINP vs Category: Fratio=8.51, p<0.001). The increase in PICP levels observed in BAL was not, however, reflected in serum and although a trend towards increased serum PIIINP levels with disease category was observed this did not reach statistical significance. These results indicate that increased BAL levels of Type I and Type III procollagen peptides reflect fibrotic changes in the lungs of patients with ILD but that assessment of serum procollagen peptide levels is insensitive to these changes.

#### CHEST WALL RESECTION FOR PRIMARY TUMOURS

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During the period 1984-1991, 11 patients had a chest wall resection performed for a primary chest wall tumour. There were 8 males and 3 females, ranging in ages from 16-62 (average 42). Two of the tumours were benign and 9 were malignant. A resection margin of at least 2 cm was attempted in the malignant tumours. When the tumour involved the rib cage, the resection included the apparently normal rib above and below the lesion. Reconstructive techniques were necessary to close the resulting defect in only 2 cases; simple wound closure was sufficient in the other 9.

There were no post-operative deaths, and no major complications. Adjuvant chemotherapy was employed in 3 patients, and radiotherapy in 1. Two patients developed a local recurrence at 6 and 18 months, and both had further radical resections. Two patients died due to metastatic disease at 8 and 24 months. The remaining 9 patients (including the 2 with benign lesions) are alive and disease-free, between 4 months and 7 years following their initial resection.

In summary, primary chest wall tumours occur in a relatively young age group, and are frequently malignant. However, carefully planned management, involving close liaison between surgeon, oncologist, and radiotherapist, can result in satisfactory long-term survival.

#### BILATERAL PLEURECTOMY VIA MEDIAN STERNOTOMY

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Spontaneous pneumothorax is a serious condition, frequently recurrent and about 10-15% occur bilaterally. The traditional method of treating bilateral recurrent disease has been to perform two thoracotomies done simultaneously or more commonly sequentially. In this consecutive series we describe 16 cases where bilateral pleurectomy through a median sternotomy was performed to deal with patients known to have suffered from bilateral recurrent

pneumothoraces. Median sternotomy has been shown to be a less painful incision than thoracotomy and does not significantly impair the pulmonary status. All patients were male with an average age of 20.9 years. Their mean post-operative hospital stay was 6.5 days. Average blood loss was 288 mls, and only one patient required transfusions post-operatively. At six weeks follow-up, all patients were well and had returned to pre-operative activity levels; except for one who developed slight dyspnoea. The latter was found to have a recurrence of right pneumothorax which necessitated right thoracotomy at which time a leaking apical bulla not previously detected was found. There was no mortality or serious morbidity in the series. We conclude therefore that in patients who are known to suffer from bilateral recurrent pneumothoraces, bilateral pleurectomy via median sternotomy offers an attractive alternative to bilateral thoracotomy. It would appear to be a safe procedure involving a very acceptable length of post-operative stay. Re-admission for further surgery is of course also avoided in those cases.

#### THE VALUE OF BALF FINDINGS IN ASSESSING THE EARLY IMMUNE RESPONSE IN EXTRINSIC ALLERGIC ALVEOLITIS (EEA)

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The purpose of this study was to determine the cellular and humoral events occurring 6 hours after inhalation challenge in a group of pigeon breeders. Twelve subjects agreed to undergo bronchial inhalation challenge with either nebulized pigeon serum (Ps) (10) or saline (2). The development of characteristic symptoms was used to detect a positive response in combination with monitoring tests (WBC, body temperature and spirometry). An initial BAL was performed at zero hours, followed by inhalation challenge and a further BAL 6 hours later. Paired BALF samples were analysed for urea, albumin, total and differential WBC, interleukin-1, interleukin-2, and specific antibody concentrations. Analysis of data was performed where appropriate using the Mann-Whitney U Test, Wilcoxon signed ranks test and Spearman rank correlation coefficient.

There was a significant increase in total cells (p<0.001), lymphocytes (p<0.003), T-lymphocytes (p<0.001) and neutrophils (p<0.01) numbers/ml in responders. A monitoring score reflecting severity of patient response correlated with an increase in all cell types (p<0.01). There was a fall in specific antibody activity/ml of ELF in all patients, although less marked in responders (p<0.03 all comparisons).

In conclusion 1) Responders developed a BALF lymphocyte and neutrophilic "alveolitis" following inhalation challenge. 2) The degree of BALF "alveolitis" correlated with the severity of patient response. 3) Failure to demonstrate an increase in soluble immune proteins in responders is likely to have been strongly influenced by an increase in secretory substances between lavage procedures.

#### DO INTERLEUKIN-6 AND CD22 PROVIDE EVIDENCE FOR B-CELL ACTIVATION IN EXTRINSIC ALLERGIC ALVEOLITIS

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Interleukin-6 is a cytokine produced by a variety of cell types

and one of its many described functions is the induction of differentiation of B cells and the stimulation of IgG secretion.

The purpose of this study was to determine the relationship between IL-6 and IgG in the bronchoalveolar lavage fluid (BALF) of patients with extrinsic allergic alveolitis (EAA), their asymptomatic equally exposed counterparts, and subjects with other interstitial lung disease and normal controls. A total of 57 patients were studied, 15 with EAA, 8 asymptomatics, 13 with IPF, 10 with active sarcoidosis, and 11 normals. IL-6 was determined by radioimmunoassay and IgG by enzyme linked immunosorbent assay (ELISA). A further ELISA assay for CD23 a product of activated B-cells was also performed in both BALF and serum. The results were analysed by using the Kruskal-Wallis one way analysis of variance, the Mann-Whitney U test and correlations performed using the Spearman Rank correlation coefficient.

Patients with EAA had significantly lower levels of IL-6 ( $p < 0.001$ ) than did their asymptomatic counterparts, whereas total IgG was significantly higher in EAA ( $p < 0.001$ ). The asymptomatic subjects also had significantly higher levels of IL-6 than the normal controls ( $p < 0.025$ ). Soluble CD23 was not detected in the BALF of any patient group, but was readily detected in serum. There was, however, no difference between any disease group and the control population.

These results suggest a mechanism by which asymptomatic subjects remain symptom free. This may be by virtue of an absence of B-cell activation.

#### INCIDENCE OF TUBERCULOSIS IN A COHORT OF HIV INFECTED PATIENTS: A TWO YEAR FOLLOW-UP STUDY

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The aims of this study were to assess the incidence of tuberculosis in the Irish human immunodeficiency virus (HIV) infected population, and to assess the usefulness of tuberculin skin testing as an indicator of active tuberculosis in this population. Between February and September 1988 thirty-eight HIV positive patients were recruited into the study. A skin test score was derived for each patient using the Multitest system. Patients were reviewed in January 1991, ten had died, three were lost to follow-up, and twenty-six were alive. The mean follow-up period was 22 months (range 6-34). Eleven patients were tuberculin positive on entry into the study; one of these developed tuberculosis. Twenty-seven patients were tuberculin negative; three of these developed tuberculosis. Differences in the incidence of mycobacterial infection between tuberculin positive and tuberculin negative individuals are not statistically significant. There was a strong negative correlation between Multitest score and advanced disease ( $R = -0.7$ ,  $p < 0.001$ ). The incidence of tuberculosis in the population which we studied is approximately 5% in tuberculin negative and tuberculin positive individuals; this has grave implications for Irish health resources.

#### IS A THREE DRUG REGIMEN THE BEST TREATMENT FOR TUBERCULOSIS?

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We present data on consecutive patients with tuberculosis with Rifater and comparison with patients treated with other regimens.

Time taken for patients who successfully completed treatment as planned to become consistently culture negative.

R=Rifampicin, E=Ethambutol, Z=Pyrazinamide, H=Isoniazid

	Months					
	1	2	3	4	5	6
RHE x 9 months (n=76)	58	76	88	96	99	100
RHEZ x 6 months (n=67)	52	86	98	100	100	100
Rifater x 6 months (n=98)	74	87	91	96	98	100

More patients are consistently culture negative when treated with Rifater at one month and two months compared to the other two regimens.

**Relapse rate:** To date of the 98 patients who have completed treatment 39 have one year or more post treatment follow-up. Two patients have relapsed with fully sensitive tuberculosis. Both patients admit non-compliance with treatment.

**Conclusion.** The three drug regimen of Rif, Inah, Pyrazinamide produces significantly faster consistent sputum culture conversion than other regimens. These results support a policy of treatment with Rif, Inah, Pyrazinamide without Ethambutol or Streptomycin in the management of tuberculosis.

#### PROGNOSTIC INDICATORS OF MORTALITY IN SURGICAL TREATED LUNG NEOPLASM

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This retrospective study seeks to examine the predictive factors of mortality in surgically treated lung neoplasms. Using computer-assisted intervention for presumptive lung neoplasm in the time interval July 1985 to December 1990.

Preoperative variables of (a) sex, (b) age and (c) cigarette smoking were evaluated while relevant diagnostic investigations were noted (bronchoscopy, mediastinoscopy and CT scan). Preoperative identification of tumour nature and extent was recorded and compared to postoperative primary histology and lymphnode status. Mean survival period was estimated while occurrence of metastatic disease and primary cause of death was ascertained from GP records and in-hospital data.

Using these variables it was undertaken to (a) identify the major cause of death in the defined population, (b) examine the relationship of preoperative variables and postoperative findings to patient survival. As the prevalence of lung neoplasm increases and the total patient population achieve greater life expectancy, it is the authors' opinion that such an evaluation of prognostic factors and patient mortality is a necessary undertaking to improve surgical practice and enhance patient care.

#### PRE-OPERATIVE PULMONARY CAPACITY AS A PREDICTOR OF SURVIVAL AFTER PULMONARY RESECTION IN THE ELDERLY

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We reviewed 55 patients over 70 years of age undergoing major

pulmonary resection to identify pre-operative risk factors for short and long term survival. Pre-operative tumour staging was by bronchoscopy, hilar tomography, CT scanning and mediastinoscopy and pulmonary function was assessed by spirometry and blood gases, and correlated with operative mortality and 5 year survival. Lung resection was indicated for squamous cell carcinoma (38), adenocarcinoma (12), large cell carcinoma (1), chondro-carcinoma (1), carcinoid (2), and tuberculosis (1). Fourteen patients had stage 1 tumours, 21 stage 2, and 19 stage 3. There were 8 hospital deaths (15%) and 4 were related to post-operative respiratory complications. Three of these had pre-operative FEV1 (Forced Expiratory Volume)  $\leq$  45% of predicted. Mortality related to low FEV1 (<45%) was 50%, compared to 10% for those  $>$ 45% ( $p < 0.05$ , Fisher's exact test). The absolute FEV1 was less important as 12 patients had FEV1  $<$  1,500 mls and 9 of these survived. Four patients with poor pre-operative lung function showed improved FEV1 after pulmonary resection. Kaplan-Meier curves showed an actuarial 1, 2 and 5 year survival rates at 49%, 37% and 28%, and survival was related to tumour stage.

This study shows that major pulmonary resection is feasible and worthwhile in the elderly and that pre-operative assessments, especially pulmonary function tests are useful predictors of post-operative recovery.

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#### DIFFERENCES IN ADHERENCE OF BRANHAMELLA CATARRHALIS ORGANISMS IN THE PRESENCE AND ABSENCE OF RESPIRATORY TRACT INFECTION

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*Branhamella catarrhalis* respiratory infection has a particular predilection for the elderly. It is considered that infection is preceded by oropharyngeal colonisation. Colonisation and consequent infection have been associated with the adherence characteristics of microorganisms, highly adherent bacteria being more likely to colonise epithelial surfaces. The aim of this study is to compare the adherence characteristics of *Branhamella catarrhalis* organisms (BCO) isolated from sputum of patients with clinical evidence of respiratory tract infection with those of BCO isolated from the oropharynx of asymptomatic elderly in the community. The adhesin test used was haemagglutination of human Group O red blood cells. BCO were collected from two groups. Group 1 ( $n=36$ ) patients with clinical evidence of infection. Group 2 ( $n=12$ ) asymptomatic elderly in the community whose throat swab contained a BCO. A Chi Square test (incorporating Yates' correction for continuity) found the two groups to be significantly independent ( $X^2 = 17.09$ ,  $p < 0.001$ ), group 1 having greater haemagglutination ability.

**Conclusion.** The BCO from patients with clinical evidence of respiratory tract infection are shown to be more adherent (by haemagglutination studies), than the BCO from the oropharynx of asymptomatic elderly in the community. This suggests that the adherence capacity of *Branhamella catarrhalis* organisms may play a role in the initiation of respiratory tract infection.

#### NEUTROPHIL ELASTASE LEVELS AND OXYGEN REQUIREMENT AFTER MULTIPLE TRAUMA

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The Adult Respiratory Distress Syndrome (ARDS) develops from conditions such as sepsis, multiple trauma, and pancreatitis, often after a "latent period" of 24-48 hours, during which inflammatory cells (particularly neutrophils) are thought to sequester abnormally within pulmonary microvessels where they release injurious products such as elastase. We have begun a major collaborative study of early inflammatory events in well-defined groups of patients at risk of ARDS, and now report our elastase findings in the first 20 patients with the severest category of multiple trauma (predicted mortality rate of 50% based on injury severity score - ISS). Blood was obtained at presentation (10 min - 2 hrs) and at days 1, 2 and 7 after injury for measurement by an RIA highly specific for total neutrophil elastase (normal range  $20 \pm 6.4$  ng/ml - mean  $\pm$  1SD), and a simple "O<sub>2</sub> requirement score" was based on concentration and duration of oxygen administration over the 7 days following admission. Nineteen out of 20 patients had initial elastase levels greater than 2SD above the normal range, 15 had levels greater than 50 ng/ml, and 10 had levels greater than 100 ng/ml, with 1 patient achieving 417 ng/ml. One patient (160 ng/ml elastase) developed ARDS but there was no significant relationship between elastase level at presentation or days 1, 2 or 7 after injury and the oxygen score, pulmonary complications or requirements for ventilation. These early data suggest that although neutrophil secretory events occur remarkably early and persist for several days after multiple injury, there is no direct relationship with the development of ARDS or lung complications requiring oxygen delivery.

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#### ANTIBODIES TO PSEUDOMONAS AERUGINOSA DO NOT PRECEDE ISOLATION FROM SPUTUM IN CYSTIC FIBROSIS (CF)

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IgG antibodies specific to *Pseudomonas aeruginosa* (PA) have been suggested as a means of identifying infection of the lungs before regular isolation from sputum occurs. Specific IgG antibodies to PA were measured in whole blood spot or serum from 108 adult and paediatric patients with CF (Thanasekaran, V. *et al.* Arch. Dis. Child. 1989; 64, 1599-603) by ELISA using soluble antigen, serotypes 01-17. Patients were followed for up to 20 months and serology was compared with sputum culture results. Forty patients consistently isolated PA and had highly positive specific IgG titres [mean 64.2 (27.0 SD) ELISA units, 99% upper CI (15.0)]. In 45 patients PA was never isolated and specific IgG was always within normal limits (5.3 (3.1)). IgG was increased (24.2 (4.5)) in three patients without isolation of PA and two patients developed positive titres without culture of PA. Of the remaining 18, PA was isolated before or during the study period. Fourteen patients had PA infection, 9 intermittently ( $<$ 3 isolations/year) and 5 chronically without a positive antibody response 7.26 (2.8)  $n=14$ ; 8.4 (2.9)  $n=5$ . Only 4 had an antibody response, either coincident with (2) or after culture of PA (2).

**Conclusion.** These preliminary results question the value of specific IgG to PA as an early indicator of infection when adequate microbiological facilities are available.

#### EX VIVO TUMOUR NECROSIS FACTOR SECRETION BY MONOCYTES FROM PATIENTS WITH CHRONIC PSEUDOMONAS AERUGINOSA PULMONARY INFECTION

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Tumour necrosis factor- $\alpha$  (TNF) is an important regulator of the inflammatory response to infection. Circulating immunoreactive TNF is elevated in CF and may be a factor in lung injury and cachexia associated with chronic *Pseudomonas aeruginosa* (PA) pulmonary infection. To define the role of circulating monocytes in the production of TNF we studied the *ex vivo* response to *E coli* endotoxin (LPS) of monocytes from six CF patients with chronic PA infection during symptomatic deterioration and five control subjects. Monocytes purified on Nycodenz medium were allowed to adhere for 2 hours and then cultured for 3 hours in RPMI medium with LPS (0, 25, 50 and 100 ng/ml). TNF in supernatants was determined by ELISA and related to the DNA content of adherent cells. Viability was 100% (Trypan blue). Spontaneous TNF release was greater in controls [2.65 U/ug DNA (1.1), mean (SEM)] compared with CF subjects (1.05 (0.20),  $p=0.04$ ). Monocytes from both groups responded significantly to LPS, though

mean values tended to be lower in CF subjects at all doses, eg. LPS 25 ng/ml; CF 2.95 (0.6) v c 4.52 (1.2),  $p=0.28$ .

**Conclusion.** These data indicate reduced spontaneous secretion of TNF in chronic gram negative infection in CF. This is reflected in the response to added LPS and suggests either a down regulatory process or inhibition of the normal response.

#### IS ASTHMA MORTALITY RISING IN IRELAND?

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In most Western countries asthma mortality rates in children and young adults have been rising during the 1980s. Mortality data for 1970 to 1988 were examined in order to determine if a similar rising secular trend has occurred in the Republic of Ireland.

Crude age specific and age adjusted mortality rates for males and females were calculated for individual years and groups of years. Because of the unstable composition of the child and young adult population in Ireland in recent years, it was considered necessary to adjust for age within the age group 15 to 44 years, the age group of primary interest. Standard mortality ratios for males and females combined were 120, 79, 102 and 100 for the years 1970-74, 1974-80, 1980-84, 1985-88 respectively.

There is as yet no evidence of an increase in the mortality from asthma in children and young Irish adults.

#### PULMONARY TALC GRANULOMATOSIS AND EOSINOPHILIA IN INTRAVENOUS DRUG MISUSERS

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Pulmonary talc granulomatosis (PTG) is induced by intravenous (IV) injection of an aqueous suspension of tablets. The clinical

were HIV-antibody negative and had obliterated upper limb veins. Patient 1 (female, 36 yrs) denied having symptoms; patients 2 and 3 (males, 28 and 23 yrs) had progressive dyspnoea on exertion, wheezing, fever, cellulitis and eosinophilia. All microbiological cultures were negative and birefringent "talc" crystals were seen in transbronchial biopsy (TBLB) or open lung biopsy (OLB) samples from the three patients.

Patient	CXR	CT-thorax	Gas transfer % pred	Blood-Eos %	BALF-Eos %	Sacc u/ml (9-35.7)	TBLB	OLB
1	nodule	nodule	57	8	0.9	12.4	Pos	—
2	nodular infiltrate	nodular infiltrate	56	19	10.4	37.8	Neg	Pos
3	nodular infiltrate ? BHL	nodular infiltrate + BHL	65	29	24.8	19.2	Neg	Pos

(Eos: eosinophils; BALF: broncho-alveolar lavage fluid; BHL: bilateral lymphadenopathy)

features, often with laboratory findings similar to sarcoidosis, appear after prolonged misuse (10-40 tablets daily for 1-10 years). The first report of PTG in the Irish literature was by Hill *et al*; (IJMS, 1990: 159, 147-8). We have seen two further patients who presented with similar clinical features despite the infrequent attendance of IV drug misusers at this hospital. All three patients

Dyspnoea, reduced gas transfer and an abnormal CXR in an intravenous tablet misuser is suggestive of PTG. Demonstration of birefringent "talc" crystals in BALF or biopsy tissue is required because of the clinical similarities with other granulomatous disorders. The association of eosinophilia with PTG in our three patients is intriguing but unexplained.

**PULMONARY TALC GRANULOMATA IN HIV POSITIVE INTRAVENOUS DRUG ABUSERS - THE CLINICOPATHOLOGICAL IMPLICATIONS**

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Birefringent pulmonary talc granulomas are often found in lung biopsies from intravenous drug abusers (IVDA) but their clinicopathological significance remains undefined. We compared the diagnoses in 8 HIV-positive patients (mean age 33 yrs) found to have polarisable talc granulomas (TG) by transbronchial biopsy at bronchoscopy with 26 HIV-positive IVDA patients without this finding (mean age 28 yrs). No TG were found in 21 other HIV-positive non-IVDA patients with pulmonary disease. (TG+ = TG at biopsy, TG- = TG at biopsy).

Diagnosis	TG- patients (n=26)	TG+ patients (n=8)
<b>Total Bronchoscopies</b>	<b>33 (79%)</b>	<b>9 (21%)</b>
PCP only	3 (9%)	3 (33%)
Bacterial Pneumonia	13 (39%)	2 (22%)
PCP+Bacterial Pneum.	1 (3%)	1 (11%)
AFB	1 (3%)	2 (22%)
NSIP/Non-diagnostic	15 (46%)	1 (11%)

(PCP=Pneumocystis Carinii Pneumonia, AFB=Mycobacterial infection, NSIP=Non-specific interstitial pneumonitis).

These 2 groups differ significantly (P<0.01, X<sup>2</sup> test) with TG+ patients having more non-bacterial (PCP & Mycobacterial) infection and the TG- patients having more bacterial infection and non-specific pneumonitis.

The incidence of TG in lung biopsies may relate to the biopsy size and the nature of the street preparation of drug used, but the finding of distinct patterns of infection suggests that variations in macrophage function between these groups may be important in determining which patients develop a granulomatous response to intravenously injected foreign material.

**AN ASSESSMENT OF ORAL THEOPHYLLINE IN PATIENTS WITH "IRREVERSIBLE" CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

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The clinical value of oral sustained release theophylline was examined in 37 patients with chronic obstructive pulmonary disease who did not demonstrate a bronchodilator response ("irreversible"). The study was a single blind placebo-controlled, crossover design consisting of two randomised 4 week treatment periods comparing placebo and theophylline twice-daily.

There were 37 patients (6F) who were valid, aged 67.4 (6.6) yrs, with baseline spirometry - FEV1 1.06 (0.53) l/s, FVC 2.44 (0.88) l/s, FEF 25-75 0.44 (0.33) l/s.

**Results.** After 4 weeks therapy there were no changes in spirometry, peak flows, symptom scores, 6 minute walking test and 2 quality of life questionnaires (Chronic Respiratory Disease Index, Nottingham Health Profile Index).

**Conclusion.** Theophylline fails to improve the quality of life in "irreversible" COPD.

**AN EVALUATION OF COMBINATION BRONCHODILATOR THERAPY IN COPD FOLLOWING MAXIMAL DOSES OF A SINGLE INHALED AGENT**

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A randomised double blind, placebo-controlled, crossover study using eight protocols involving initially a maximal dose of one bronchodilator (salbutamol or ipratropium bromide) delivered by inhalation over 30 minutes and the subsequent addition of another inhaled bronchodilator and/or oral theophylline at 90 minutes.

There were 8 (1F) C.O.P.D. patients, aged 58.4 (3.1) yrs, current smokers (mean pack years 34.1 (8.4)). FEV1 was identified as the primary efficacy variable and subjected to formal statistical analysis.

**Results.** Following maximal doses of either inhaled salbutamol or ipratropium bromide, a two way analysis of variance (ANOVA) looking at delta FEV1 over 180 minutes could find no additional benefit for supplemental bronchodilator therapy (p<0.09).

**SURVIVAL FOLLOWING RESECTION OF OESOPHAGEAL CARCINOMA**

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Carcinoma of the oesophagus has both a high operative mortality and poor long term survival to the extent that the need for resection is strongly questioned. We retrospectively analysed the actuarial survival of 218 consecutive patients who underwent resection for squamous or adenocarcinoma of the oesophagus between 1977 and 1986. The aim was to determine whether the overall survival was acceptable considering the risk of surgery, and to enhance our knowledge of tumour biology by comparing the survival of patients whose tumours displayed specific histological features.

Overall survival (including operative mortality) was 20% at two years, 13% at 5 years and 2.8% at 10 years. The probability of survival was decreased by male sex (N.S.), lesion of the cardia (N.S.), oesophago-gastrectomy rather than Ivor Lewis resection (<0.02), adenocarcinoma (N.S.), poor differentiation (N.S.), extraoesophageal local spread (N.S.), positive lymph nodes (<0.05), mediastinal rather than abdominal node involvement (N.S.), and involvement of proximal resection limit (N.S.).

These results suggest the need to make the diagnosis earlier, reduce perioperative mortality, extend resection proximally and develop adjuvant therapies aimed at ablating nodal spread.

**SURVIVAL AFTER CONSERVATIVE PULMONARY RESECTION FOR NEOPLASM**

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The aim of conservative pulmonary surgery for cancer is to remove minimal lung tissue while retaining maximum lung function and without affecting cancer clearance.

Between 1986 and 1991, 31 segmental or sublobar pulmonary resections were performed for cancer. In 50% of patients, tumour

was detected at incidental chest x-ray and most lesions were peripheral. Thirteen patients had sub-optimal preoperative lung function. Eighteen patients had squamous cancer, 5 had adenocarcinoma, 4 had bronchiolo-alveolar adenocarcinoma, 2 had small cell and 2 had carcinoid. Seventeen were T1N0M0, 10 were T2N0M0, 2 were T1N2M0 (and 2 were carcinoid).

There was no hospital mortality nor significant morbidity in the early post-operative period. Follow-up ranged 2 to 60 months (mean 28 months). Five year actuarial survival was 67% for T1N0M0 and 57% for all stages. Nine patients died within 3 years of operation and two more died later. Distant metastases were common at the time of death while only one patient had local recurrence.

With early detection of cancer and no nodal metastases, long term survival is achievable in suitable cases of non-small cell carcinoma, following conservative pulmonary resection.

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#### SOLITARY PULMONARY NODULE AND SMALL CELL LUNG CANCER - IMPROVED SURVIVAL

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Small cell lung cancer (SCLC) is almost always metastatic at presentation and long term survival poor despite treatment. Rarely SCLC may present with a radiologically solitary pulmonary nodule (SPN).

We have reviewed the outcome in this group of patients over a 7 year period and compared it with 2 similar groups of age and sex match who presented to our unit for consideration of surgical intervention and who had either limited disease where the primary lesion was central (LD) or who had peripheral lesions associated with mediastinal lymph node involvement (ED). In those 25 patients with SPN survival range was 6-92 months (median survival 23 months). In 14 with LD survival range 10-84 months (median survival 17 months) and in those with ED survival range was 1-14 months (median survival 7 months). Statistical analysis confirms a significantly improved survival (with  $p < 0.02$ , Chi square) in those patients with solitary pulmonary nodule compared to the other groups. Whether this improved prognosis is due to the time lead for small peripheral lesions or to differences in biological behaviour is discussed.

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#### A SEVEN YEAR AUDIT OF BRONCHO-PULMONARY SURGERY IN A PAEDIATRIC POPULATION

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We reviewed 27 consecutive patients undergoing broncho-pulmonary surgery between July 1984 and July 1991. Twenty-eight operations were performed. Age at time of surgery ranged from 1 to 137 months (mean 56 months). The main indications for surgery were bronchiectasis,  $n=7$ , lobar emphysema,  $n=7$ , sequestration,  $n=3$ , congenital bronchial stenosis,  $n=2$ , bronchogenic cyst,  $n=2$ , foreign body inhalation,  $n=2$ , AV fistula, bronchial adenoma, haemothorax, gunshot wound and empyema,  $n=1$ .

Twenty-three patients had lobar resections and 2 had pneumonectomy. Two patients underwent resection of a stenosed left main bronchus with end to end anastomosis. Two foreign bodies were removed, 1 at thoracotomy and 1 by bronchotomy. One patient who suffered oesophageal trauma had pulmonary decortication and closure of an oesophageal fistula. There was one peri-

operative death (3.5%) in a patient with complex heart disease with tracheo-bronchial obstruction due to vascular compression. Total correction of the cardiac anomaly with right middle lobectomy was first performed. A further right lower lobectomy was performed 2 months later because of failure to wean from ventilation. The child succumbed during the procedure. No broncho-pleural fistula occurred. Post-operative stay ranged from 5 to 43 days (mean 15 days).

All patients were well at discharge and at follow-up ranging from 1 month to 7 years. The two patients who underwent bronchial resections and anastomosis had bronchoscopy at 2 months showing widely patent bronchial trees.

These results show excellent outcome of corrective surgery of congenital, suppurative and traumatic pulmonary disease in both infants (<1 yr old), in whom 8 procedures were performed with 1 death and children (>1 yr old) in whom 19 procedures were performed with no mortality.

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#### CARDIAC DYSRHYTHMIA IN TOTAL THORACIC OESOPHAGECTOMY: A PROSPECTIVE STUDY

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Total thoracic oesophagectomy (TTO) has only recently become established in elective and emergency oesophageal resection and is thought to have some advantages by improving lymphatic clearance and thus long-term survival, allowing construction of an anastomosis in a clean field to healthy well vascularised oesophagus and improvement in postoperative reflux. A specific and significant association of cardiac dysrhythmias with thoracic surgical procedures is well established. Prophylactic measures have remained on an empirical basis. We have examined the incidence of this complication in 20 patients undergoing TTO. Patients were randomly allocated to be preoperatively digitalized or not by a standard oral regime. Digoxin was given postoperatively for 9 days and levels adjusted according to serum radio-immunoassay. Continuous screen ECG monitoring commenced at anaesthetic induction for 96 hours then by alternate-day 12-lead ECG. Of 9 patients preoperatively digitalized, 5 (55%) suffered arrhythmia. Of 11 who were not digitalized, 7 (64%) suffered dysrhythmia ( $p < 0.05$ ). The overall incidence of arrhythmia was 60% (12 patients). These results indicate a high incidence of arrhythmia in the first 96 hours postoperatively, which is not significantly reduced by prophylactic digoxin.

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#### PROPHYLACTIC DIGITALIZATION IN THORACIC OESOPHAGEAL SURGERY

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A specific and significant association of cardiac arrhythmias with thoracic surgical procedures led to the use of digitalis as an empirical prophylactic measure to control this complication. In a consecutive series of 80 patients undergoing thoracic surgery of oesophagus, patients were randomly allocated to be preoperatively digitalized or not by a standard oral regime. Digoxin was given postoperatively for 9 days and levels adjusted according to serum radio-immunoassay. Continuous screen electrocardiographic

monitoring commenced at anaesthetic induction for 96 hours and on alternate days until discharge. All arrhythmias were recorded and assessed 'blindly' by a cardiologist. Equal numbers were digitalized or not, and there were no arrhythmias detected. Fifty-four patients underwent surgery for malignant disease. Of 26 patients digitalized, 12 suffered arrhythmia (46%). Of 28 who did not receive digoxin, 9 suffered arrhythmia (32%). Overall, 39% of patients with malignant disease suffered arrhythmia compared to none with benign disease (chi-square  $p < 0.002$ ).

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#### STAPLES VERSUS SUTURES IN THE CLOSURE OF THORACOTOMY WOUNDS: A PROSPECTIVE, DOUBLE-BLIND, RANDOMIZED TRIAL

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Over a 12-month period, patients attending the Regional Cardio-Thoracic Surgical Unit of the Royal Victoria Hospital, Belfast, and undergoing thoracotomy for benign and malignant disease, were randomly allocated to one of two groups for closure of their wounds, either with Prolene sutures or metal staples. Each group contained 50 patients.

Patients were reviewed at five days (100%) and at ten days (100%) and at the Outpatient Department four weeks later (95%). Following removal of their sutures and staples, the wounds were examined for any evidence of discharge or wound complication on all of these occasions. The two groups were similar for age, sex, aetiology and wound care characteristics.

There was no difference in morbidity or rate of wound infection but stapling was significantly faster, less painful, more cost effective and had consultant surgeon preference. Use of staples carries no risk of accidental needle-stick injury and should, therefore, be safer than suturing for the user.

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#### THE RETROSTERNAL SUTURE - A NEW TECHNIQUE IN CORRECTION OF PECTUS DEFORMITY

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Operative correction of pectus deformity involves insertion of metallic retrosternal bridge, pin or wire to support the correction during healing. Whilst ensuring stability during this period the bar requires a second operation for removal and necessitates insertion of a foreign body into the wound. We have devised a new method of support which avoids these problems and performed this on 12 patients (age 6-22 years). A standard excavatum or pectus carinatum procedure was performed. A Polydioxone (PDS1) suture is passed through the costal cartilage on one side of a centimetre from the cartilage incision edge and passed under the sternum by Roberts forceps grasping the sharp end of the needle and keeping its curve in the horizontal plane. The needle is then passed through the contralateral costal cartilage. The other end of the suture is drawn under sternum to the opposite side and is tied to form a double support. Two or three sutures may be used according to the length of the mobile segment of the sternum. We have performed this procedure on 7 patients with pectus excavatum and 5 with pectus carinatum with no wound infections and a satisfactory cosmetic result and 6 month follow-up. We recommend this one stage procedure for minimum hospital stay, morbidity and a satisfactory cosmetic result.

#### BOERHAAVE'S SYNDROME INDUCED BY CORTICOSTEROID IMMUNOSUPPRESSION

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Spontaneous perforation of the oesophagus is the most serious and rapidly lethal perforation of the gastrointestinal tract in which survival without appropriate surgical intervention is rare. Delayed diagnosis is not uncommon and contributes to overall mortality, yet diagnosis can be confirmed or excluded by simple methods if there is awareness that atypical presentation may occur in up to one-third of cases. A 61-year-old male presented with an acute abdomen. He had undergone renal transplantation 10 years previously and was on maintenance doses of prednisolone and azathioprine. After a delay of 4 days the diagnosis of Boerhaave's syndrome was made. Three-tube drainage of the oesophagus and feeding jejunostomy were instigated. By 12 days his abdominal wound had dehisced. Nipam swallow confirmed closure of the defect 3 months and 7 days after perforation. His recovery was complicated by wound dehiscence, recurrent septicaemia and infected haematoma, but he remains well 1 year after admission. In this unique case a combination of atypical presentation and long-term immunosuppression contributed to intrinsic disease in the oesophagus and morbidity postoperatively. However, survival is possible.

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#### "GARDEN SHRAPNEL" - PENETRATING CHEST INJURIES IN A NON-CONFLICT, NON-ASSAULT SETTING

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Much of the history of thoracic trauma relates to military injury and new conflicts add to the fund of medical knowledge. We present two cases of penetrating chest trauma sustained while working with agricultural equipment. The first case demonstrates the potential for a lawn mower to project a nail that can penetrate the thorax. The entry point was through the left nipple and at thoracotomy the nail was found lodged in the lower lobe. The second case highlights the danger of mechanical hedge cutters. In this case the entry wound was above the left nipple and the metal nail was found in the right chest. Probing the entry wound did not reveal the intra-thoracic entry point, nor was there any injury to the intra-thoracic structures. Both patients made a full recovery following removal of the nails at thoracotomy. We conclude that mechanical garden cutting implements are capable of ejecting foreign bodies with enough force to enter the thorax, that standard chest radiographs adequately localise these objects and that removal at thoracotomy is a safe procedure.

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#### THE VALUE OF BASELINE IMMUNOLOGICAL PARAMETERS IN THE INTERPRETATION OF THE IMMUNOPATHOLOGY RECORDED IN THE ASTHMATIC AIRWAY

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Nine (2F) normal subjects undergoing general anaesthesia for arthroscopic examinations of traumatic knee injuries, gave informed consent for peroperative endobronchial biopsies via fiberoptic bronchoscopy.

Normal subjects - median (range) age 30 (21-41) yrs had no past medical history of wheeze, cough, sinusitis or smoking, were non atopic with normal spirometry and normal bronchial hyper-responsiveness to histamine median (range) 16 mg (12-36).

**Results.** Cells/unit area; T lymphocytes 0.9, CD45RO (memory) 1.1, macrophages RFD1 0.3, RFD7 0.05 and MHC Class II expression 0.06 relative absorption/unit area. When compared to the same parameters recorded in asthmatics post inhaled corticosteroid an important observation is the capacity of corticosteroids to correct the T cell abnormality but to exacerbate the macrophage indices further while maintaining an abnormal level of HLA-DR expression.

#### ICOSANOID PRODUCTION BY RESPIRATORY EPITHELIAL CELLS

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The eicosanoids, metabolites of arachidonic acid (AA), modulate a wide range of cellular processes and their production by respiratory epithelial cells may play a role in diseases such as asthma, bronchitis and bronchial carcinoma.

The AA metabolism of epithelial cells from the respiratory tract was investigated. Normal respiratory epithelial cells in sufficient quantities for direct study are difficult to obtain. However, bronchial mucosa (n=4) was collected from patients undergoing surgery for lung cancer and mucosa from the upper respiratory tract (n=5) from patients with cancer of the head and neck. Histology confirmed that no tumour was included in any of the tissues. Isolated cells were prepared by enzymatic dissociation in 0.3% collagenase (Type IV, Sigma) for 2 hours at 37°C. Cell yield and viability were assessed by ethidium bromide/acridine orange staining and fluorescent microscopy. The cells were incubated with 2 uCuries of tritiated AA [<sup>3</sup>H AA] for 30 minutes with or without calcium ionophore A23187. Labelled eicosanoids released into the supernatant were separated by reversed phase high performance chromatography on a Zorbax C-18 column. They were identified by coelution with authentic standards and by the use of cyclooxygenase (indomethacin) and lipoxygenase (nordihydroguaiaretic acid, NDGA) inhibitors.

The major <sup>3</sup>H AA metabolite (>60%) of bronchial epithelial cells was 15 hydroxyeicosatetraenoic acid (15 HETE). No cyclooxygenase activity was detected in contrast to a previous study on cultured cells. Twelve lipoxygenase activity (>40% 12 HETE) predominated in cells from the upper respiratory tract. The cyclooxygenase product prostaglandin E<sub>2</sub> (PGE<sub>2</sub>) was detected in 4 out of 5 preparations and PGF<sub>2</sub> alpha was found in 2 preparations.

AA metabolism by epithelial cells appears to vary depending on their location in the respiratory tract.

#### CONTRASTING EFFECTS ON ANTI-ASTHMA DRUGS ON AIRWAY RESPONSIVENESS TO DIRECT AND INDIRECT STIMULI

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Inhaled β-agonists and corticosteroids, mainstay therapies in asthma, reduce airway responsiveness (AR) to a number of stimuli

which has been attributed to the airway smooth muscle action of β-agonists and to the anti-inflammatory properties of steroids. Budesonide causes a similar reduction in AR to both the direct spasmogen, metacholine (Mch) and to Metabisulphite (MBS), an indirect stimulus, but has a greater effect on the mast cell stimulus, AMP probably by inhibiting mast cell function. As β-agonists suppress mast cell function *in vitro* and have putative anti-inflammatory properties *in vivo*, we compared the effects of a single dose of terbutaline 0.5 mg against AR to AMP, Mch and MBS which is believed to stimulate airway sensory nerves. AMP may also activate sensory nerves. As cholinergic mechanisms may underlie the action of AMP and MBS we also compared the effect of a potent antimuscarinic agent and bronchodilator, ipratropium in a single dose, 1 mg, against these challenges with its known ability to abolish AR to Mch. In double-blind placebo-controlled manner 12 mild asthmatic subjects underwent bronchial challenge with doubling doses of Mch, MBS or AMP (PC<sub>20</sub>), 30 minutes after receiving terbutaline via a Turbuhaler and 45 minutes after nebulised ipratropium. Terbutaline afforded equivalent protection to challenge with Mch and MBS but had a significantly greater effect on AR to AMP. By contrast ipratropium, in a dose which caused a 37-fold reduction in AR to Mch did not alter AR to either MBS or AMP

	Mch	MBS	AMP
Terbutaline	2.5±0.6*	2.2±0.4	3.4±0.6**
Ipratropium	5.2±0.4**	0.3±0.2	0.1±0.2

Data are mean ± sem doubling dose protective effect compared to placebo. \*p<0.01, \*\*p<0.001.

Thus neither MBS- or AMP-induced bronchoconstriction is mediated through cholinergic pathways. The mechanism of action of MBS remains unclear. Terbutaline reduces AR to Mch and MBS by functional antagonism but its additional effect against AMP suggests that it may be inhibiting airway mast cells *in vivo*.

#### EFFECT OF HEAT AND MOISTURE RETAINING MASK ON EXERCISE INDUCED ASTHMA

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It is probable that heat and moisture loss is the stimulus to bronchoconstriction in those susceptible to exercise induced asthma (EIA). Currently inhaled beta-2-agonists or sodium chromoglycate administered before exercise are the treatments of choice. The purpose of this study was to test the hypothesis that a heat and moisture retaining mask worn during exercise would prevent the development of EIA.

Ten patients were randomly allocated to exercise with or without the mask on two separate occasions. The forced expiratory volume in one second (FEV<sub>1</sub>) was measured before and immediately after exercise, and in four minute intervals during recovery. Exercise was performed on either a cycle ergometer or treadmill, until a pulse rate of 80% maximum predicted for age and sex was achieved.

The significance of the differences was assessed using student t-test.

The mean percentage reduction in FEV<sub>1</sub> on exercise without the mask was 33.7% (SEM 3.2), and with the mask 9.1% (SEM 6.1), (P<0.01).

It is concluded that wearing a mask during exercise is an effective measure for the prevention of EIA and compares favourably with drug prophylaxis.

**PLASTIC BULLET INJURIES TO THE CHEST.  
TRAUMA SCORE RATING MAY NOT REFLECT  
SEVERITY OF INJURY**

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Plastic bullets have been exclusively used in public disorder and riot control in Northern Ireland since 1975 and were intended to be more accurate and no more damaging than the rubber Bullet which they replaced. They have been available to police forces in the UK, Hong Kong, South Africa and Israel in civil disturbance control. Improved understanding of ballistics had led to the recognition of important differences in penetrating wounds to the chest caused by high and low velocity bullets, but information on non-penetrating blunt trauma caused by plastic bullets is scant. We present a unique experience among 80 patients attending hospitals in Belfast over a 13-year period. In this time, over 543,000 plastic bullet rounds have been fired, incurring 4 fatalities directly attributable to chest injury, and a range of severe to minor injuries with respect to revised trauma score and TRISS methodology. These scoring systems fail to adequately reflect the severity of injury in this series of patients and are discussed, with recommendations to doctors who may be confronted with injuries induced by this weapon.

**HYPERHIDROSIS - A PROSPECTIVE STUDY ON  
THORACOSCOPIC SURGICAL MANAGEMENT**

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Hyperhidrosis of the upper limbs and axillae represent a severe disability. Many patients with this condition are told to tolerate it as the existing surgery for the condition is time consuming, arduous and frequently ineffective.

We have prospectively studied the outcome in 27 consecutive sympathectomies carried out in the upper thorax using two small stab incisions through which we inserted a 30° thoracoscope and a diathermy probe. The sympathetic ganglia on the 1st - 4th ribs are identified and cauterised.

	No.	100%	75%	Temporary Failure	Horner's Syndrome	Sympathetic Pain
	27	25	2	1	0	2
Left Arm	14	13	1	1	0	1
Right Arm	13	12	1	0	0	1

Thoracoscopic sympathectomy represents an effective and safe technique, for the treatment of hyperhidrosis with minimal short and longterm sequelae. Consequently, surgical management for this condition should be advocated.

**ASSESSMENT OF PATIENT EDUCATION IN ASTHMA  
MANAGEMENT**

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The wide range of asthma medications may adversely affect inhaler technique and compliance and this underlies the importance of patient education in asthma management. We prospectively compared two asthma education programmes: (A) instruction by a doctor in inhaler technique and supply of literature; (B)

comprehensive education by an asthma nurse including verbal and video instruction about asthma and correct usage and side effects of treatment. Sixty patients were randomised into groups A and B: 2 patients in group A and 12 in group B failed to complete the study. Basic spirometry, symptom severity (using a 10 cm visual analog scale) and inhaler technique (scale 1 to 7) were measured before entry and after 4 weeks. At the start and end of the study patients also completed a 21-part life-style questionnaire (ALQ) and a 36-part multiple choice questionnaire (MCQ) designed to assess patients' understanding of asthma.

Measurement	Group A	Group B	A v B
PFR-pre	361 ±22	394 ±32	NS
PFR-post	387 ±21*	428 ±29*	NS
Symptoms-pre	5.4 ±0.5	5.4 ±0.6	NS
Symptoms-post	6.1 ±0.4	6.7 ±0.5	NS
ALQ-pre	5.7 ±0.2	5.4 ±0.3	NS
ALQ-post	5.8 ±0.2	5.2 ±0.2	NS
Inhaler tech-pre	5.0 ±0.3	5.4 ±0.3	NS
Inhaler tech-post	5.5 ±0.2	6.5 ±0.3*	p<0.003
MCQ-pre	71. ±2.1	7.5 ±2.4	NS
MCQ-post	10.7 ±2.4	21.9 ±1.8**	p<0.003

(mean ± SEM; pre v post changes: \*p<0.01, \*\*p<0.001)

We conclude that a formal education programme is of significant benefit to the management of asthmatic patients, which is particularly reflected in improved inhaler technique and understanding of the condition.

**TUMOUR NECROSIS FACTOR, RESTING ENERGY  
EXPENDITURE AND CACHEXIA IN CYSTIC FIBROSIS**

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Tumour necrosis factor/cachectin (TNF) is a primary mediator of the host response to infection and inflammation. In addition, systemic metabolic effects of TNF, such as lipolysis, proteolysis, weight loss and increased resting energy expenditure (REE) have been demonstrated. It is not clear whether TNF contributes to the systemic manifestations of chronic infection such as seen in cystic fibrosis. To test the hypothesis that chronic elevation of TNF levels might contribute to abnormalities of intermediary metabolism we studied 20 clinically stable chronically infected, patients with cystic fibrosis and 10 age and sex matched healthy controls. REE was measured by indirect calorimetry in the morning after a 12 hour fast, and blood drawn for measurement of TNF, noradrenaline, non-esterified fatty acids and glycerol. TNF and REE were significantly greater in patients compared to controls as shown below, and the patients had anthropometric evidence of cachexia. {mean (SD), \*p<0.01 vs control, AMA = arm muscle area, BMI = body mass index}.

	TNF (pg/ml)	REE (% predicted)	AMA (cm <sup>2</sup> )	BMI (kg/m <sup>2</sup> )
Controls	23.7 (19.3)	101 (11)	34.0 (10.2)	22.3 (1.9)
CF patients	95.9 (63.2)*	121 (9)*	22.5 (10.1)*	19.2 (2.7)*

Plasma adrenaline and non-esterified fatty acids were also significantly elevated in patients compared to controls. Significant relationships (multiple linear regression) were demonstrated between REE and TNF (r=0.58, p<0.02) and AMA and TNF (p=0.54, p<0.02).

**Conclusions.** This data suggests a causative link between circulating TNF levels, elevated resting energy expenditure and cachexia in cystic fibrosis, and may explain some of the abnor-

malities of intermediary metabolism seen in such patients. Therapies aimed at the modulation of TNF production or its activity in the systemic circulation may have a role in the management of patients with cystic fibrosis.

#### ONCOGENE EXPRESSION IN BARRETT'S OESOPHAGUS AND OESOPHAGEAL ADENOCARCINOMA

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Barrett's oesophagus may develop into a dysplasia with up to 240 times increased risk of developing oesophageal carcinoma, which is associated with a 2-5% two-year survival. The proteins encoded by oncogenes have functions related to the control of cell proliferation and differentiation which have been implicated in the development of a number of human malignancies. We have examined the expression of oncoprotein products using immunohistochemical methods in 9 patients with oesophageal carcinoma with surrounding Barrett's dysplasia. RAS oncoprotein was expressed in 11% of tumours as opposed to 40% of 'intestinal' type dysplasia and 56% of high grade dysplasia. FOS oncoprotein was expressed in 11% of tumours as opposed to 20% of 'intestinal' and 44% of high grade dysplasia. MYC oncoprotein was detected in 22% of tumours as opposed to 60% 'intestinal' and 78% of high grade dysplasia. This differential expression of oncogene products in tumour and dysplasia may be of help in understanding not only tumour biology but may be a potential marker of impending malignancy.

#### USE OF STANDARDIZED PROTOCOL FOR TREADMILL AND BICYCLE EXERCISE

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It is difficult to relate tests on a treadmill to those on a bicycle because of the many different protocols in use. We studied 16 patients with chronic cardiac failure using a new standardized exponential protocol (STEEP) designed for both exercise modalities. Peak results using STEEP treadmill, STEEP bicycle and modified Bruce treadmill protocols are shown below:

	STEEP Treadmill	STEEP Bicycle	Modified Bruce
Time min.	6.79 ±2.42*	5.34 ±1.95*	9.00 ±3.02*
Peak O <sub>2</sub> consumption (VO <sub>2</sub> ml min <sup>-1</sup> kg <sup>-1</sup> )	16.66±4.09	15.01±3.72*	17.13±4.52
Heart rate (beats min <sup>-1</sup> )	126.1±4.09	133.7±3.72*	134.0±20.3

Mean ± SD; \*p<0.05 compared to other groups, ANOVA with Scheffé test.

NYHA classes II and III were separated well by the STEEP protocols (STEEP treadmill 9.16±1.00 vs 4.92±1.14 min, p<0.0001; STEEP bicycle 7.08±1.27 vs 3.98±1.08 min, p<0.0001). VO<sub>2</sub> was very similar at equal exercise times in both STEEP protocols. The STEEP protocols relate extremely well to each other in terms of VO<sub>2</sub> and should simplify assessment of patients with exercise limitation due to respiratory or cardiac disease. As with other bicycle protocols, a lower peak VO<sub>2</sub> was recorded by the STEEP bicycle test compared with the two treadmill tests, but the similar heart rates indicate equivalent physiological stress.

#### MANAGEMENT OF CHRONIC ALVEOLAR HYPOVENTILATION WITH NASAL INTERMITTENT POSITIVE PRESSURE VENTILATION

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Twelve patients with respiratory failure and chronic alveolar hypoventilation have been treated for one to twenty-six months by nasal intermittent positive pressure ventilation. Of these twelve patients, four had pneumonectomies for TB, four have had thoracoplasties for TB, and four have kyphoscoliosis. The median daytime arterial oxygen increased from 6.66 KPA to 9.77 KPA and median daytime arterial carbon dioxide decreased from 7.03 KPA to 5.70 KPA. Spirometric values remained unchanged, but exercise tolerance and general well being improved. Nasal intermittent positive pressure ventilation offers the patient a more comfortable, less cumbersome and more adaptable method of ventilation than the previously used negative pressure devices.

#### THE ENDOCRINOLOGY OF BARRETT'S OESOPHAGUS

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Barrett's oesophagus is a metaplasia in which a previously squamous epithelium develops into a columnar epithelium with up to 240 times increased risk of developing oesophageal carcinoma which is associated with a 2% two-year survival. Other workers have consistently found the dysplasia which develops, to be gastric in type with a mixed endocrine cell population. We have investigated the endocrinology of Barrett's oesophagus using immunohistochemical methods. Thirteen patients who underwent oesophageal resection had Barrett's changes around their tumours. In 5 patients in this group with intestinal type dysplasia, as opposed to the more common gastric type dysplasia, we detected cell populations for GIP, CCK, secretin and motilin, whereas the gastric type dysplasia expresses gastrin, serotonin, pancreastatin and somatostatin. Neither type expressed lower small bowel or colonic markers such as enteroglucagon, neurotensin or PYY. The carcinomas themselves are generally devoid of endocrine cells. This study indicates that endocrinological typing of Barrett's oesophagus may help in detecting impending development of oesophageal carcinoma.

#### PULMONARY IMPEDANCE - A BIPHASIC VARIATION DURING BREATHING?

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The Forced Oscillation Technique (FOT) enables rapid measurement of pulmonary impedance in an effort independent manner during natural breathing. Previous studies have shown that the method, since it involves no maximal respiratory manoeuvres, is acceptable to a larger number of patients than spirometry. However, when compared with conventional spirometry it shows a high degree of variability. Part of this variability of impedance occurs within each respiratory cycle. We investigated the variation in pulmonary impedance during each cycle and the effect of gating

pulmonary impedance measurements to specific points in the respiratory cycle. Thirteen normal nonsmokers (10 males, mean age 33 yrs, and 3 females mean age 33 yrs) underwent a 1 minute continuous FOT measurement using Siemens Siregnost 5 FOT device with a transthoracic electrical resistance method for respiratory gating (The Brattle Physiological Synchronizer) and a data acquisition program.

Impedance did not remain constant throughout the respiratory cycle. A characteristic biphasic variation in pulmonary impedance with peak values occurring close to mid-inspiration and mid-expiration was identified. Without gating, the mean impedance was 3.34 mbar/l/s  $\pm$  1.01 mbar/l/s, or 30% of the impedance value. When impedance data was gated to peak inspiration (I), or lowest impedance values in each cycle (L) or functional residual capacity (FRC), mean impedance values showed standard deviations representing 17%, 16% and 15% of mean gated impedance respectively.

This reduction in the variability of impedance measurement may represent a significant advance in the future application of this test.

THE EFFECT OF METHACHOLINE ON NASAL TRANSMUCOSAL POTENTIAL DIFFERENCE

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Transmucosal potential difference is caused by the transmembrane movement of ions, controlled by ion channels. Neurotransmitters regulate the activity of ion channels, possibly through regulation of G proteins. Nasal mucosa generates an electrical potential difference which is significantly higher in cystic fibrosis. Amiloride has been shown to decrease nasal potential difference. This study was proposed to test the hypothesis that the parasympathetic system might attribute to the transmucosal potential difference.

In a double-blind placebo controlled study, six healthy volunteers had nasal transmucosal potential difference recorded at four minute intervals during twelve minute periods of rest, before and after treatments, during exercise and recovery. The treatments were either placebo, 0.24 mls normal saline each nostril, or methacholine 10 mg in 0.24 mls solution each nostril, or methacholine 10 mg in 0.24 mls solution each nostril. Exercise was performed on a cycle ergometer, each achieving a pulse rate of 80% maximum predicted for age. Student t-test was used to assess the significance of the results.

Placebo did not significantly alter the potential difference at rest. There was a significant rise during exercise ( $P < 0.05$ ). Application of methacholine significantly increased readings at rest ( $P < 0.01$ ). There was a further rise during exercise ( $P < 0.02$ ).

It is concluded that nasal transmucosal potential difference is increased by cholinergic receptor stimulation.

COMPARATIVE EFFECTS OF INHALED DIURETICS ON AIRWAY RESPONSIVENESS

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Frusemide (FUR) attenuates asthmatic bronchoconstrictor responses (AR) to indirect stimuli by undetermined mechanisms

which may be distinct from its renal actions as the related diuretic bumetanide has little effect in asthma. To investigate this we compared the effects of FUR with those of piretanide (PIR), a structurally and functionally similar loop diuretic and the non-loop diuretics acetazolamide (ACETA), a carbonic anhydrase inhibitor, and amiloride (AMIL), which inhibits epithelial Na<sup>+</sup> flux at the distal tubule against the indirect spasmogen effects of metabisulphite (MBS). In double blind randomised manner 10 mild asthmatic subjects inhaled FUR 40 mg, PIR 24 mg, ACETA 500 mg, AMIL 7.5 mg or matched placebo (P) immediately before MBS challenge. Doubling concentrations of MBS (0.6-80 mg/ml) were nebulised from a dosimeter until FEV<sub>1</sub> fell by 20% and log PC<sub>20</sub> was calculated by linear interpolation.

FUR reduced AR to MBS by 1.9 doubling dilutions (D.D.) compared to P. Both PIR and ACETA had a smaller, but still significant protective effect, 1.3 and 0.8 D.D. respectively, whereas AMIL did not alter AR to MBS.

	Mean $\pm$ sem log PC <sub>20</sub> MBS (mg/ml)			
P	FUR	PIR	ACETA	AMIL
0.79 $\pm$ 0.08	1.37 $\pm$ 0.11**	1.29 $\pm$ 0.09*	0.99 $\pm$ 0.06*	0.78 $\pm$ 0.08
	**P<0.001, *P<0.02			

Thus as PIR, a potent inhibitor of renal Na<sup>+</sup>K<sup>+</sup>/Cl<sup>-</sup> transport, has similar, albeit lesser, effects on asthmatic airways to FUR, the shared renal mechanisms of these agents may underlie their airway actions. The action of FUR is unlikely to involve changes in transepithelial Na<sup>+</sup> flux but may be partly mediated through inhibition of carbonic anhydrase, a property which distinguishes its diuretic effect from bumetanide.

SERUM AGALACTOSYL IgG LEVELS IN SARCOIDOSIS

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Serum agalactosyl IgG (G<sub>0</sub>) has been shown to be elevated in tuberculosis, Crohn's disease and rheumatoid arthritis - which are characterised by T-cell dependent inflammation. We examined G<sub>0</sub> levels in sarcoidosis - a disease also associated with T-cell inflammation. G<sub>0</sub> levels were measured in sera taken (i) at an early symptomatic stage of disease ('early' sample) and (ii) following  $\geq$  3 yr follow-up ('final' sample). Patients were allocated to one of four groups on the basis of disease outcome on follow-up: Group 1 - resolution of symptoms without corticosteroid treatment (n=12); Group 2 - resolution of symptoms following treatment (n=6); Group 3 - continued symptomatic disease with treatment (n=14); Group 4 - unresolved but stable disease (no treatment, n=4). G<sub>0</sub> levels were normalised for age and expressed as % deviation from the mean normal value. Levels  $>10\%$  above normal are deemed elevated. Group 1 patients exhibited a significant decrease in G<sub>0</sub> levels ( $p < 0.05$ , paired t test) following resolution of symptoms, although mean G<sub>0</sub> levels were within 2 standard deviations of normal for both 'early' (7.0 $\pm$ 1.6) and 'final' (3.4 $\pm$ 1.8) samples. 'Early' G<sub>0</sub> levels were elevated in Group 2 patients (19.2 $\pm$ 4.5). These decreased to normal following resolution of symptoms (9.8 $\pm$ 3.2;  $p < 0.05$  paired t test). No decrease in G<sub>0</sub> levels was observed in Group 3 ('early': 10.6 $\pm$ 1.9; 'final': 9.0 $\pm$ 1.7) or Group 4 ('early': 16.2 $\pm$ 3.5; 'final': 13.9 $\pm$ 4.1) patients, with the latter group

exhibiting continually elevated mean  $G_0$  levels. These preliminary results suggest that, as in other diseases, serum  $G_0$  levels may reflect episodes of T cell-dependent tissue damage in sarcoidosis and that serial  $G_0$  measurements may be useful in evaluating the need for and response to corticosteroids treatment.

#### EFFECT OF NEDOCROMIL SODIUM ON CHEMILUMINESCENCE AND MIGRATION IN NORMAL AND ASTHMATIC LEUCOCYTES

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Neutrophils and monocytes which migrate to inflammatory sites and whose resting metabolism is largely based on anaerobic glycolysis display an increase in oxygen consumption and hexosemonophosphate shunt (HMPS) activity (glucose consumption) upon phagocytosis of bacteria or other particles. These metabolic changes are accompanied by the generation of highly reactive oxygen species including free radicals, the purpose of which is to help in the destruction of foreign particles engulfed by phagocytes. However, extracellular release of radicals can contribute to the pathogenesis of diverse types of inflammatory reactions and tissue injury including asthma. Nedocromil sodium is a drug developed for the prophylactic treatment of asthma and airway inflammation.

We examined the effect of nedocromil sodium on the generation of reactive oxygen species (chemiluminescence) by neutrophils and mixed leucocyte migration in normal and asthmatic subjects. Cells isolated by dextran sedimentation and lymphoprep density gradient were incubated in the absence and presence of nedocromil sodium (concentration range  $10^{-12}$ M -  $10^{-2}$ M) for 15 mins at 37°C. Ionophore stimulated luminol enhanced chemiluminescence was measured in an LKB luminometer. Chemotaxis was measured in a modified Boyden chamber.

The chemiluminescence response of asthmatic neutrophils was enhanced ( $239 \pm 33$  mV/5 x  $10^5$  cells, n=8 (p<0.05) compared with normal neutrophils ( $130 \pm 12$  mV/5 x  $10^5$  cells, n=21). Nedocromil sodium had no effect.

Random migration and serum induced chemotaxis were not significantly different in asthmatics and normal individuals (random migration, normal  $23.0 \pm 1.1$   $\mu$ m, n=6; asthmatic  $29.0 \pm 2.3$   $\mu$ m, n=8; chemotaxis, normal  $44.6 \pm 4.2$   $\mu$ m, n=6; asthmatic  $60.4 \pm 8.7$   $\mu$ m, n=8). However, nedocromil inhibited leucocyte chemotaxis in a dose dependent manner in both normal and asthmatic subjects with the drug being more effective at inhibiting chemotaxis in asthmatic subjects (IC<sub>50</sub> = 1 nM) than in normal controls (IC<sub>50</sub> = 1  $\mu$ M).

Thus nedocromil may exert its anti-inflammatory effect by retarding leucocyte migration rather than by inhibiting the production of tissue damaging free radicals.

#### THE VALUE OF SERUM CD23 AND IL-2R IN THE DIFFERENTIATION OF PATIENTS WITH PULMONARY INFECTION AND IMMUNOLOGICALLY MEDIATED DISEASE

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Both sIL-2R and sCD23 have been reported as raised in the serum patients with inflammatory disease. This study was performed in

order to determine whether serum levels of these two soluble receptors would differentiate patients with pulmonary infections and other pulmonary disease from normals and subjects with no pulmonary involvement. A total of 79 individuals were investigated. These included 18 with asthma, 15 with pulmonary tuberculosis (PT), 8 asymptomatic Pigeon breeders (AS), 12 patients with Pigeon breeders' disease (PBD), 18 patients with myocardial infarction (MI) and 8 normals. Data was analysed using the Kruskal-Wallis one way analysis of variance and the Mann-Whitney U test. Correlations were performed using Spearman Rank correlation coefficient. There was no significant difference in either CD23 or IL-2R between any group when compared to normals; there was no relationship between CD23 and IL-2R except in those patients with MI where a positive correlation was obtained  $R_s=0.427$ , p<0.05. This suggests that neither CD23 or IL-2R are useful in differentiating absolutely, those patients with pulmonary disease. Further longitudinal studies are currently being performed in order to assess the predictive value of CD23 and IL-2R.

#### TUBERCULOSIS AMONG HEALTH SERVICE EMPLOYEES

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The incidence of tuberculosis (TB) in health care workers is uncertain. We sought to clarify this by examining all Northern Ireland TB notification forms from 1982-1990.

One thousand and twenty-four cases of TB were notified during this period. In 931 (91%), it was stated whether the patient had worked in the National Health Service (NHS). Sixty-eight (6.6%) NHS employees were identified. Follow-up excluded 4 who were wrongly classified. Seventeen were excluded as being older than 64/retired from NHS work 5 years or more. The remaining 47 (4.6%) consisted of 37 pulmonary and 10 non-pulmonary cases. Four had previously been treated for pulmonary TB (5-40 years age). Fourteen (29.8%) were nurses, 7 (14.9%) doctors (5 of these of Indian origin), 4 (8.5%) laboratory workers and 4 (8.5%) domestic staff. Only 1 case had been detected by screening. Seventeen (36%) had a history of BCG vaccination. TB cases in NHS employees were not significantly increased compared with the general population aged 15-64 (Standardised Incidence Ratio 125.4; 95% CI 92.1-166.7).

We conclude that health service employees do not appear to have an increased risk of TB, although further standardisation of rates by age group could increase the estimate. The low pick-up rate by routine screening of workers suggests that this practice may not be cost-effective.

#### TUBERCULIN CONVERSION IN MEDICAL STUDENTS AFTER ELECTIVE PERIODS IN THE DEVELOPING WORLD

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We have studied the tuberculin status of fourth year medical students of University College, Cork before and after summer elective periods in the developing world (mainly Africa) for the three years 1988-90 inclusive: 43 students (23 females; 20 males) age range 22-25 were investigated. Tuberculin testing prior to departure and on return was done using the Mantoux test 1:1000

solution. Induration  $\geq 10$  mm at 48-72 hours was read as positive. Thirty-two students (74 per cent) were tuberculin negative prior to departure. Chest x-rays were done on all students before going on elective (all normal) and on tuberculin converters on return. Results show that 9 students (28 per cent of tuberculin negatives) were tuberculin converters. Two conversions occurred in 1988, 6 in 1989, and 1 in 1990. Conversion differences from year to year were not statistically significant (Fisher's exact test). All repeat chest x-rays remained normal. All converters remain well at up to 3 years of follow-up. Although numbers investigated to date are limited, the results suggest that tuberculin conversion is a hazard for Irish medical students on developing world elective periods.

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#### AUDIT OF COMMUNITY ACQUIRED PNEUMONIAS: THE EFFECT OF A SIMPLE ASSESSMENT PROTOCOL

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We report an audit of 72 patients admitted to the Respiratory Unit with a diagnosis of community acquired pneumonia (CAP) over two 3 month periods. During the first period a total of 40 patients (age  $58 \pm 20$  years, 23 males) were admitted. The initial retrospective assessment of 8 risk factors were judged to be incomplete in 34 (85%) patients [14 (33%) recorded 7/8]. The causative organism could be identified in 17 (43%). Fourteen (35%) received oral antibiotics. Of the 26 (65%) who received IV therapy, 7 (18%) had no identifiable risk factors. There were 6 deaths - all had multiple risk factors.

Following analysis of the first study period, a simple protocol for the assessment and treatment of community acquired pneumonias was produced and circulated amongst junior doctors. The aims were to 1) improve the awareness of severity of CAP. 2) increase the diagnostic yield and 3) to rationalize the antibiotic use and route of administration.

In the second period, 32 patients (age  $54 \pm 21$ , 16 males) were admitted. Initial assessments of severity were completed in 21 (65%) cases [29 (90%) recorded 7/8]. Causative organisms were identified in 13 (41%). Intravenous therapy was commenced in 18 (56%) patients, 16 of whom had one or more risk factor. Oral antibiotics were used in 14 (44%), 4 patients had one and 2 had two risk factors. There were 4 deaths, three directly attributable to pneumonia.

In conclusion 1) the introduction of these guidelines has increased awareness of risk factors associated with CAP and improved initial assessment; 2) this study has led to a more rational route of administration of antibiotics; 3) death rates were similar in both study periods. However, all patients who died had multiple risk factors present on admission.

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#### OXYGEN CONCENTRATORS-RESTRICTED PRESCRIBING

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Before the introduction of open prescribing of oxygen concentrators in Northern Ireland an interim scheme was introduced on 1st August, 1986 and ran until 30th April, 1989. During this period prescription of oxygen concentrators was restricted to patients recommended by consultant physicians. A total of 49 oxygen concentrators was installed.

The following criteria for prescription were suggested by the Ulster Thoracic Society:- 1: Usually chronic obstructive pulmonary disease due to chronic bronchitis or emphysema with/without right heart failure, whose lifestyle or work is severely limited. 2. Non-smoker. 3. A baseline steady state arterial oxygen tension, on room air, of less than 6 kPa (50 mmHg).

The charts were reviewed in 47 out of 49 cases and diagnosis, survival and adherence to the above guidelines were ascertained. All survivors (12) completed a questionnaire. The diagnoses were COPD 18, COPD with cor pulmonale 9, pulmonary fibrosis 11, bronchiectasis 5, cystic fibrosis 2, kyphosis 1 and bronchiolitis obliterans 1. 7/12 of the survivors were instructed to use the concentrator for more than 15 hours daily. One survivor continued to smoke. Prior to installation the survivors had a mean FEV1 of 0.68 litres and a mean PaO2 of 5.96 kPa. The deceased had a mean FEV1 of 1.0 litres and a mean PaO2 of 6.58 kPa. If 9 patients with pulmonary fibrosis are excluded from the deceased group, mean FEV1 was 0.58 litres and mean PaO2 was 6.60 kPa. The patients with pulmonary fibrosis had a mean FEV1 of 1.56 litres (range 0.7 litres to 3.05 litres). Many patients with pulmonary fibrosis had a relatively high or normal FEV1. Their mean survival time was 7.2 months compared with 20.6 months for patients with COPD.

Although the prescription of oxygen concentrators was restricted to consultant physicians and based on set criteria, many concentrators were inappropriately prescribed. The measurement of FEV1 contributes little to assessing the need to long term oxygen therapy.

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#### AN INVESTIGATION INTO THE VALUE OF PROPOFOL AS A SEDATING AGENT IN FIBREOPTIC BRONCHOSCOPY

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We investigated 43 patients undergoing day case fibreoptic bronchoscopy randomised to receive either propofol or midazolam.

The required level of sedation was achieved faster with propofol (mean (SD), 125 (39.7) seconds compared to midazolam, 179.1 (55.8) seconds,  $p < 0.0001$ ). Both groups tolerated the procedure in similar fashion. There was no significant difference in the oxygen desaturation profile.

Significantly faster recovery was noted with propofol than with midazolam in terms of time to recall name and date of birth 2.3 (1.8) versus 6.3 mins (8.7),  $p < 0.045$ . Alertness scored with the digital symbol substitution test score returned to pre bronchoscopy values in the propofol group at 30 mins, 36.2 (18.3) versus 13.5 (9.2) in the midazolam group,  $p < 0.0001$ . The deterioration in the midazolam group persisted at 90 mins 23.1 (13.8) versus 39.3 (18). In conclusion, propofol has a similar efficacy to midazolam with the advantage of rapid recovery.

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#### REASONS FOR CESSATION OF SMOKING IN PATIENTS WITH LUNG CANCER

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Some patients with lung cancer give up smoking suddenly, totally, and effortlessly weeks to months before the diagnosis is

made. In order to further evaluate this phenomenon we prospectively studied the reasons for cessation of smoking, and difficulty in doing so, in consecutive patients with lung cancer; patients with chronic obstructive pulmonary disease (COPD) served as controls. Twenty-eight patients and 19 controls were studied. Both groups were evenly matched in terms of age, sex, and pulmonary function. The mean age of both patients and controls was 65 years. Eighteen patients (64%) and 12 controls (63%) were male, FEV<sub>1</sub> for patients was 1.4 L (0.6) (mean and SD) and for controls was 1.2 L (0.7). Fifty per cent of the patients and seventy per cent of the controls had ceased smoking on entry into the study. One patient and no control subject had ceased smoking effortlessly through loss of interest in cigarettes. Reasons for stopping are given below.

#### Reasons for stopping smoking

	Cancer patients	COPD patients
Doctors advice	5	4
Expense	0	0
Dyspnoea	1	2
Other symptoms	5	1
Lost interest	1	0
Other	2	6

#### DIAGNOSIS OF MALIGNANT PLEURAL MESOTHELIOMA - C.T. FEATURES

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The diagnosis of diffuse pleural mesothelioma by chest x-ray is often not easy because the fluid, when present, obscures other radiological signs. Needle biopsy and fluid cytology have a low pick-up rate. CT scanning is finding an increasing place in the diagnosis of pleural diseases.

The diagnostic specificity and sensitivity of computed tomography in malignant pleural mesothelioma was assessed in patients attending Hairmyres Hospital over a 4 year period. The specificity of this investigation was 100% when CT appearances were typical (n=15), 80% when typical or suggestive (n=35), and 65% when suggestive (n=20). The sensitivity was 97% when the appearances were suggestive or typical (n=59) and 57% when typical (n=35). When compared with findings at thoracotomy in 38 cases, CT proved accurate in demonstrating the location of gross disease but less helpful in predicting infiltration of contiguous structures and mediastinal lymph node involvement. CT features indicating inoperability by radical extra-pleural pneumonectomy were present in 12% of 58 patients referred for surgical opinion.

#### THE ATS NODAL MAP - A C.T. DEMONSTRATION

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The American Thoracic Society (ATS) has proposed the use of a mapping scheme when describing mediastinal lymph node metastasis in bronchogenic carcinoma. The map references major anatomical landmarks which are identifiable at mediastinoscopy. Numerical coding is used to denote specific nodal groups. Importantly for radiologists this scheme is ideally suited to modern cross-sectional imaging methods and in particular computerised tomography (C.T.) and magnetic resonance imaging (M.R.I.).

Benefits from the generalized acceptance include the avoidance of vague terminology, thus:-

- Accurate correlation of normal/abnormal nodal size with site.
- A more planned and uniform approach to decision making regarding biopsy route.
- Accurate comparison of multi-institutional data.

This exhibit utilizes calcified mediastinal lymph nodes seen on axial CT scans to demonstrate this classification and thereby act as a teaching aid to its wider acceptance.

#### LASER TREATMENT OF ENDOBRONCHIAL HAEMANGIOMA

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Dublin.

Endobronchial haemangioma is a rare superficial malformation in which treatment by laser has been reported on only four previous occasions. We report a case of a woman with long standing severe asthma who had had several episodes of haemoptysis over a three month period and had recently complained of additional exertional dyspnoea with wheeze.

Physical examination showed a grossly obese lady with FEV<sub>1</sub>/FEV = 0.78/1.20 litres. At fiberoptic bronchoscopy a haemangioma was seen at the junction of the left upper and lower lobes. The patient was admitted as a day case and a flexible bronchoscope was passed under midazolam sedation. A light guide from Neodymium : Yttrium Aluminium Garnet (ND : TAG) Laser (System Laser Technology Ltd.) was introduced through the bronchoscope (Olympus IT20) and aimed at the lesion for one second at 46 watts. The lesion immediately vaporised without haemorrhage and little evidence of its existence could be seen on repeat bronchoscopy at one and six months later.

It is interesting to note that the power and duration of the laser therapy we used (i.e. 46 watts for one second) is considerably less than that typically used in the treatment of endobronchial obstruction.

#### DUBLIN A SMOKE FREE CITY?

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Over the last decade, Dublin has suffered with a high incidence of smog. E.C. maximum smoke concentration limits in urban air were regularly breached. Increases in hospital admissions and mortality were noted by Kelly and Clancy. The government response was to introduce the Air Pollution Act 1987. The marketing, sale and distribution of fuels part of this act became effective from the first of Sept. 1990. *Note:* This act only covers the marketing, sale and distribution of smokey fuels in the greater Dublin area, but does not govern the use of these fuels.

The Department of the Environment has released figures which indicate a 50% reduction in smoke levels during the first year of operation of the above act. This demands further consideration.

When one analyses the associated meteorological data, winter 1990/91 is seen to be predominantly wet and windy, and therefore not conducive to smog formation. Winter 1989/90 with long periods of high pressure and temperature inversions favoured smog formation. However for the month of February these weather patterns did not pertain, and in fact February 1991 shows increased smog levels over the same month in the previous year. On the

basis of this it is premature to decide that the smog problem has been solved, and it is important that monitoring and evaluation continue.

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THE ROLE OF SINGLE PHOTON EMISSION COMPUTED  
TOMOGRAPHY IN THE DIAGNOSIS OF PULMONARY  
EMBOLUS

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In an attempt to evaluate Spect imaging in pulmonary embolus

we compared spect and conventional planar and ventilation perfusion scans performed on eleven patients referred with suspected pulmonary embolus. Spect and planar V/Q scanning appeared equally sensitive in detecting clinically significant ventilation/perfusion mismatches in three of eleven patients. Nevertheless, spect scanning enabled further segmental localisation of a perfusion defect using axial sections in one patient and enabled identification of further subsegmental defects not seen on planar scans in one other patient. The ability to segmentally localise defects and identify subsegmental defects are sufficient to recommend spect scanning as a favourable alternative to planar scanning in the diagnosis of suspected pulmonary embolus.