ASSOCIATION OF RESPIRATORY TECHNICIANS AND PHYSIOLOGISTS

ISSUE NO. 24 MARCH 1985

BREATH

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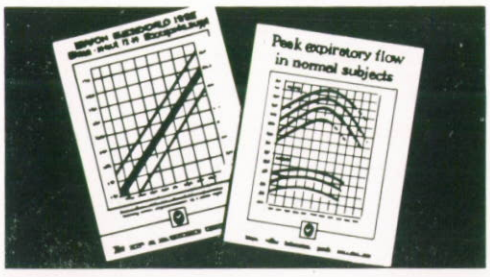
Understanding Asthma

Allen & Hanburys' Asthma Education Programme is designed to help you in the identification, counselling and treatment of your asthma patients. As part of this programme we are making available a number of support items which we feel will be useful to you and your patients. If you require any of these items please write to the address below.



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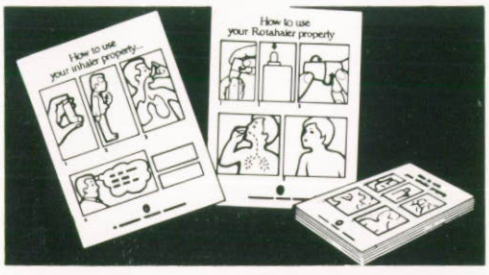
on normal Peak Flow Values in men, women and children.



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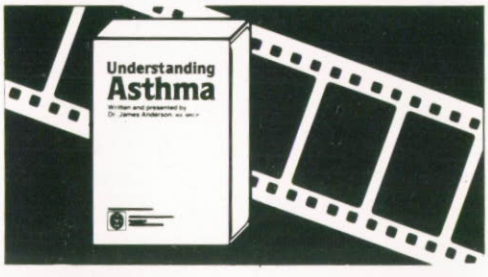
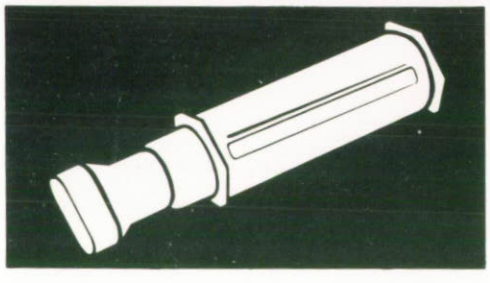
on correct usage of inhalers and Rotahalers.



"Understanding Asthma" Video
to aid doctors in educating patients about asthma – available on loan.

Patient Booklet
to encourage a greater understanding of asthma.



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Experience in lung function testing and blood gas analysis is required and all candidates must have followed a 2 year course of training and possess an ONC in Physiological measurement or an OTEC in Medical Physics and Physiological Measurement, or an equivalent qualification.

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Facilities include subsidised restaurant and social club with heated swimming pool and squash courts.

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Application form and job description available from the Unit Personnel Department, Parsons House, Charing Cross Hospital, Fulham Palace Road, Hammersmith, W6 8RF. Tel 01 748 2040 Ext. 2992.

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SENIOR PHYSIOLOGICAL MEASUREMENT TECHNICIAN (ECG) Job ref. 49/11A

Salary scale £6012-£7531 per annum.

Required full time.

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Salary scale £4867-£6229 per annum (pro-rata)

Required part time, working approximately eighteen and a half hours a week.

Application forms can be obtained from the Acting District Personnel Officer, Victoria Buildings, Church Street, Runcorn WA7 1LU, Telephone 74321 Ext.65. Closing date: 25th March 1985. (Please quote job reference numbers when applying).

Meeting notice

The Hospital Physicists' Association

47 Belgrave Square
London SW1X 8QX
Telephone 01-235 6111
Telex 918453

Preliminary Notice and Call for Papers

MEETING ON:	Assessment of Respiratory Function
DATE:	Thursday 21st November 1985
VENUE:	Royal Infirmary, Bristol
Organised By:	HPA Physiological Measurement Topic Group (in association with ART & P and BES)

This meeting is intended to cover scientific and technical aspects of respiratory function measurements. Possible subject areas could include:-

review of established measurements

recent developments

quality control

If you are interested in presenting a paper at this meeting, please complete the form below and return to:-

Mr. M P Casebow
Dept. of Medical Physics & Biomedical Engineering
Plymouth General Hospital
Freedom Fields
Plymouth, PL4 7JJ.

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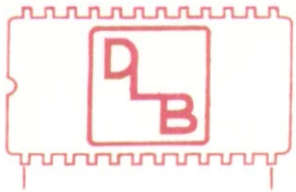

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- ☐ Lung function testing
- ☐ Clinical pharmacology
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- ☐ Other (please specify)

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Address .....

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Tel: .....

Breath is the journal of the Association of Respiratory Technicians and Physiologists. Original articles, reviews, correspondence or comment on subjects of scientific or general interest may be submitted to the Editor: D C S Hutchison, Chest Unit, King's College Hospital, London SE5 8RX. Material should preferably be typed on one side of the paper only, in treble spacing throughout. Photographs should be of good contrast, printed on glossy paper and unmounted. Tables and legends to figures should be typed on separate sheets.

Applications for advertisement space and for rates should be addressed to: Jane Jones, Respiratory Laboratory, London Chest Hospital, Bonner Road, London E2.

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Department of Clinical Measurement,
Ninewells Hospital,
Ninewells,
Dundee, DD22 1YB.
Tel: 0382 608111 ext. 2868

The Association of Respiratory Technicians and Physiologists
Spring Scientific Meeting, Saturday 20th April 1985
Littlewood Hall, Leeds General Infirmary

Programme

10.30	Registration and Coffee	
10.50	Welcome	G. Wade
11.00	Mechanisms of respiratory failure	Dr. S. Pearson Killingbeck Hospital, Leeds
11.30	Limitations of physiological testing in the evaluation of breathlessness	Dr. M. Muers St. James, Killingbeck Hospitals, Leeds
12.00	Effect of exercise on respiratory function in patients with obstructive airways disease	Dr. R. Hainsworth Dept. of Cardiovascular Studies, Univ. of Leeds
12.30	Lunch	
13.45	The mass spectrometer in respiratory gas measurement	R. Crawford Airspec Ltd.
14.15	Accuracy of gas analysis — an inter-laboratory study	Dr. D. J. Chinn Dr. Y. Naruse Dr. J. E. Cotes Univ. Dept. Occupational Health, Newcastle-upon-Tyne
14.45	Measurement of transfer factor for carbon monoxide during progressive exercise in healthy smokers and non-smokers	A. H. Kendrick J. Cullen H. Green M. Papouchado G. Laszlo Bristol Royal Infirmary
15.15	Airways resistance measured in three whole body plethysmographs in patients and in normal subjects	G. Wade Susan Baker Rosemary Bunting Killingbeck Hospital and Dept. Cardiovascular Studies University of Leeds
15.45	Closing remarks and Tea	

If you require overnight accommodation, please contact the Metropole Hotel, King Street, Leeds LS1 2HQ, Tel: 0532 450841 direct and mention the ARTP Meeting to claim the negotiated discount. The hotel is on King Street and is a short walk from the Infirmary and the railway station. If you travel by car you may park in the L.G.I. or University car parks on Friday evening, at the hotel or on parking meters near the hotel.

Prices including full English breakfast for Friday and/or Saturday nights.

Single room with bath — £17.50/person/night.
Twin double room with bath — £16.50/person/night.
Single room without bath — £14.50/person/night.
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Salary Scale £6012 – £7531

This post is based at the Bishop Auckland General Hospital, a developing district general hospital of 350 beds, situated in a pleasant rural area on the fringe of the Durham/North Yorkshire Dales.

We are looking for a suitably qualified, experienced and enthusiastic technician to work in the newly provided Pulmonary Function Laboratory, where he/she will be primarily responsible for the development of the pulmonary function service, but having also some commitment to the existing E.C.G. service and to other techniques yet to be finalised.

Informal discussion of the post is welcomed and interested applicants are invited to telephone Miss J. Reynolds, Unit Personnel Officer (0388) 604040, Ext. 302 for further information.

Temporary residential accommodation can be provided.

Application forms and details from the Unit Administrator, General Hospital, Bishop Auckland, Co. Durham, to whom they should be returned

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SOUTHERN DERBYSHIRE HEALTH AUTHORITY
DERBY CITY HOSPITAL, UTTOXETER ROAD, DERBY

CHIEF PHYSIOLOGICAL MEASUREMENT TECHNICIAN

£7718 per annum — £9627 per annum

Applications are invited from suitably qualified and experienced officers for the post of Chief Physiological Measurement Technician based at the Derby City Hospital but also serving other hospitals within Southern Derbyshire Health Authority.

The recently extended department is equipped for non-invasive cardiology procedures, respiratory function testing and pressure monitoring.

In addition the department is responsible for first line maintenance of monitoring equipment. The scope of work in the department is increasing and poses a challenge to the leadership skills and managerial abilities of the successful applicant who will be responsible to the Senior Chief Technician. The staffing complement is 8 technicians and great emphasis is placed on the on-going departmental training programme for their professional and academic advancement.

Preference will be given to candidates who hold HTEC qualification and membership of the relevant professional bodies.

Further details, job description and application form are available from Mrs. B. Banyard, Personnel Assistant, Derby City Hospital, Uttoxeter Road, Derby DE3 3NE.

Closing date: 2 weeks from the appearance of this advertisement.

NOTE FROM THE EDITORS

Vacancies advertised in *Breath*

We are glad to accept advertisements for job vacancies in *Breath* but regret that we are unable to take responsibility for verifying that the conditions of the post are as advertised. We strongly advise applicants for any post to check on the terms and conditions of service and particularly on special items such as equipment or training facilities. We would be glad to hear of any such errors that arises in job advertisements appearing in *Breath*.

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Committee can then communicate, through a rather complicated structure, with the Professional and Technical Trainers National Committee, with the NHS Training Authority and through these to the National Committees of the Regional Training Officers and Regional Scientific Officers.

HTEC

HTEC is supported by the FAMT Central Council and further steps are being taken to ensure that this becomes a fully recognised qualification. Individual consultants and various medical and scientific bodies have been asked for their views on the need for such a qualification and their replies have in general been encouraging, the exceptions being those received from the Regional Scientific Officers. All the replies will be collected and presented to the DHSS.

Integration

The FAMT has passed on its comments on integration to the staff and management sides of the Whitley Council and to Mr Gregory at the DHSS. Polite replies have been received from Mr Gregory and from the management side — but, as usual, nothing from the staff side!

Negotiations on all these matters will continue and I hope that I will be able to give you details of positive progress when I report to you again next year.

One-Day Symposium in Physiological Measurement, Queens Medical Centre, Nottingham. 31st May 1985.

The TRPMG Committee is holding a one-day symposium in Physiological Measurement. The programme will cover a wide variety of topics as technical presentations and posters and should be of interest to all Physiological Measurement Technicians.

Lunch will be included and a trade exhibition will be held. Further information can be obtained from Miss G. Lowe, secretary TRPMG Committee, Cardiothoracic Department, Derbyshire Royal Infirmary. Tel. 0332 47141, Extension 2601.

Annual General Meeting of the Association

The Annual General Meeting took place on 6th October, 1984 at Lodge Moor Hospital, Sheffield. We are much indebted to Denise Lee and her colleagues for arranging the meeting and making us all welcome, to the speakers for their interesting papers and to the many firms who sponsored the meeting.

The following papers were given in the scientific section of the meeting:

1. How the Pulmonary Function Unit can help in the diagnosis of occupational lung disease.
   Dr. John Dornan
2. Patient Associations — trials and tribulations.
   Dr. Steven Brennan.
3. High dose bronchodilators.
   Dr. Paul Anderson.

We are extremely grateful to the following firms who sponsored the meeting:

Allen and Hanburys Ltd.
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Concorde Laboratories Ltd.
Cory Bros. (Chesebrough Pond's Ltd.)
Gould Medical Ltd.
Kontron Instruments.
Medic-Aid Ltd.
Mercury Electronics (Scotland) Ltd.
Micro Medical Instruments.
P. K. Morgan Ltd.
Vygon (UK) Ltd.

We hope to hold a Training Seminar for supervisors next year when the ARTP's information leaflets which are currently being written will be launched. These will relate to each section of the manual and will help standardise teaching text. We hope to include practical sessions as well as sessions on how to undertake continual assessment of students.

Education and training questionnaire

This was originally designed for the Training Workshop on various aspects of training student technicians and the training manual. However, to gain an accurate representation of opinions it has been circulated to all heads of departments within England and Wales. We await replies before a detailed analysis is performed. Please complete this questionnaire if you have not already done so, or contact us if you have not received a copy. Your opinions are important!

Standardisation in respiratory physiology laboratories

Another questionnaire is due to be circulated, relating to how different tests are performed and reported within individual laboratories. There is a need for standardisation of test procedures in the United Kingdom for the following reasons:—

1. to enable student technicians to be trained and eventually assessed according to standard procedures;
2. for multicentred trials where tests are being performed in several different centres and then compared.
3. to allow comparison of tests performed at different laboratories.

Please spend some time completing this questionnaire so that the ARTP can eventually publish standard procedures.

Syllabi: B Tec National and Higher National Certificate

We are reviewing the content of all syllabi, with a view to writing a standard unit for the respiratory physiology section in the physiological measurement option. This would help to standardise what is being taught at the two levels.

Assessment of the In-Service Training Manual

The ARTP has been considering for some time the problem of final assessment. Proposals were formulated similar to those of the Trent Region, who first assessed their students in September 1983, and following discussion within the newly formed MPPM National Training Committee a common final assessment format has been agreed for all disciplines. This is to consist of a written paper (with some professions using existing professional examinations), a practical session, an oral and a completed log book, with entry to assessment through a completed training manual which has been continually assessed by the supervisor. Discussions are taking place in earnest with a planned starting date for assessment set at September 1986.

Updating of In-Service Training Manual

Any updating has to be submitted to the NHS Training Authority by September 1985. Please contact us with any changes and/or additions you feel should be considered.

Finally, I will end this report with a vote of thanks to all members of the Education committee for the hard work and effort they have put in on behalf of the Association.

The Federated Associations of Medical Technology

Update by Sally Gough

Papworth Hospital

I have reported on the proceedings of the FAMT for some years now but as always the main theme is Education. A number of important events have taken place in the last year.

1. Merger of TEC and BEC

We have now seen the merger of the two original Education Councils into a single body known as the Business and Technician Education Council or BTEC. The FAMT was invited to comment on BTEC's policy document for the future and has replied at some length; two representatives were asked to attend a meeting to discuss the proposed policy.

Dorothy Battye and myself went to the meeting, held at Baden-Powell House, in London. 'Be prepared' should indeed have been our motto, especially when we discovered that we were in the select company of delegates from areas such as Banking, Marine Engineering, Atomic Energy and the Tourist industry to name just a few. The early part of the day was spent in small discussion groups and later on each group reported back and took part in a general discussion with members of the BTEC Council. The Council members, it appeared, had been appointed at the personal invitation of Sir Keith Joseph, from industry, business, technology and education; but where was the National Health Service? The NHS is after all a major user of further education facilities and one might have expected to see representatives from, for example, Physiological Measurement, Medical Laboratory Scientific Officers, Catering, Nursing or Administration. In fact, the only formal contact BTEC has had with any group within the NHS has been with the FAMT; no contact has ever been made with the new NHS Training Authority.

MPPM National Training Committee

At one of the Harrogate meetings a working party was formed whereby members of the FAMT Central Council could have regular discussions with the Professional and Technical Training Officers; the working party now has official Committee status. ARTP members are linked to this important new Committee through the FAMT. The

ARTP NEWS

Chairman's Report

Sue Hill
Birmingham General Hospital

AGM and Spring Meeting

We owe grateful thanks to Denise Lee and her colleagues for inviting us to Sheffield for the AGM and providing such an interesting programme; also to Marion Geary and her colleagues at Stoke Mandeville, the venue of the Training Workshop and Spring Meeting. For those of us who stayed overnight in the Spinal Village it certainly made us aware of the everyday difficulties faced by the physically handicapped.

Included in the programme of the Spring Meeting was a product development session which gave us representatives of our sponsors the opportunity to speak about their products and any new research and development. This proved to be very successful and we hope to repeat it again in the future. I would like to extend the Association's thanks to our sponsors for their support which we hope will continue over the coming year.

Tenth Anniversary

The tenth anniversary of the formation of the Association falls in October 1985. It is to be held in Wales — details will follow later. I hope that all members will endeavour to attend and make this a special event.

Charitable status

The Charities Commission have replied to our application for registration under the Charities Act of 1960, stating that subject to amendments to the Constitution, which we hope will be moved later, the Association is acceptable for registration. It is hoped that once the Constitution is in a totally acceptable format a printed booklet will be produced.

Talks with The British Thoracic Society

These are still in their early stages, with communications on a personal basis between individuals in the Association. We still have yet to meet for any formal discussions.

One of our main objectives, once a link has been established, will be to encourage support for the in-service training programme and for the further educational requirements of the service.

Dr. Duncan Empey, Editorial, British Journal Diseases of the Chest

In the July issue Dr. Duncan Empey, Consultant Chest Physician, London Chest Hospital, featured the ARTP in his editorial. We are most grateful to Dr. Empey for his support and encouragement and for bringing the Association to the attention of the many readers of this journal who work in chest medicine.

Change of Secretary

We have had a change of secretary during the last year. Sally Gough's commitment at FAMT and on other committees increased and she has therefore relinquished the post to Dena Muirhead from Derbyshire Royal Infirmary. I am grateful to Dena for taking on this task.

Membership Secretary

We have appointed Sonia Jackson from Frenchay Hospital as Membership Secretary during the year. This has involved up-dating our computer records and altering our renewal system; many thanks to Sonia for her hard work.

Finally, I would like to thank Sally Gough for all the hard work and effort she relentlessly puts into representing the Association at FAMT and Higher Committees; Gillian Lowe, our PRO Officer for the excellent organisation, sponsorship and forward planning of our meetings; Gloria Holbrooke for keeping us financially on the straight and narrow; Derek Cramer, who as past Chairman, is invaluable on Executive; Donald McDonald, our new addition last year; and finally, Janie Jones and Dr. Duncan Hutchison, without whom there would be no *Breath*, which is such a credit to the Association.

Education Report

Sue Hill

The following is a brief summary of the major items of the year.

Careers Leaflet

The Association Careers Leaflet has been completely rewritten and is currently being printed ready for distribution to our many enquirers (school leavers through to National Careers Advisers). It has been aimed at the person coming into the profession with 'O' levels and therefore hoping to follow the B Tec National Certificate course. It is intended to give an insight into what the profession is about and into its career structure.

Training Workshop

This preceded the Spring Meeting at Stoke Mandeville Hospital. It was a follow-up to last year's workshop, when we launched the respiratory physiology in-service training manual, and was planned to gain feedback on how the manual was being used for the training of student technicians. It was a very successful day, even though the attendance was small. A report of the proceedings appeared in the June issue of *Breath*.

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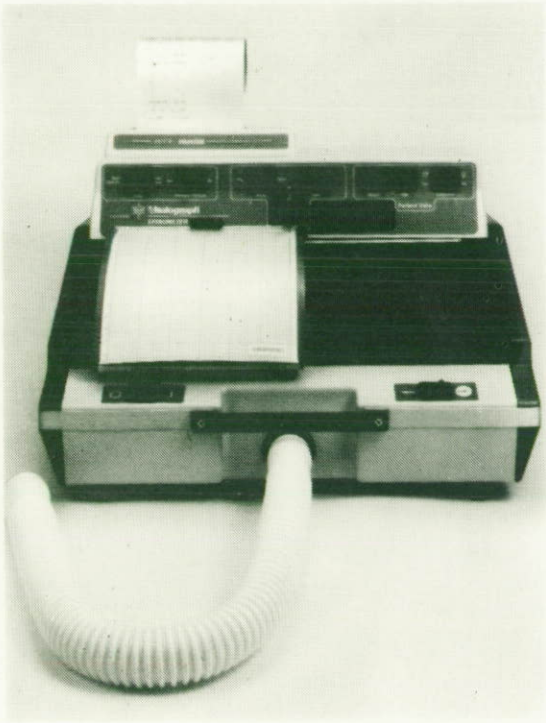

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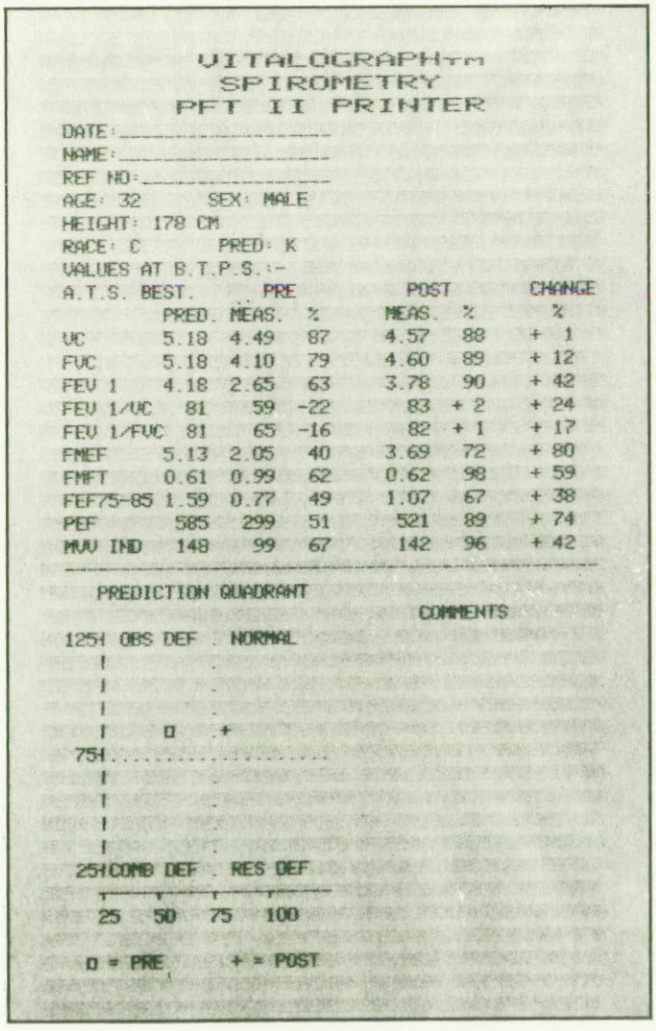

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FVC	5.18	4.10	79	4.60	89	+ 12
FEV 1	4.18	2.65	63	3.78	90	+ 42
FEV 1/VC	81	59	-22	83	+ 2	+ 24
FEV 1/FVC	81	65	-16	82	+ 1	+ 17
FMEF	5.13	2.05	40	3.69	72	+ 80
FMFT	0.61	0.99	62	0.62	98	+ 59
FEF75-85	1.59	0.77	49	1.07	67	+ 38
PEF	585	299	51	521	89	+ 74
MVV IND	148	99	67	142	96	+ 42

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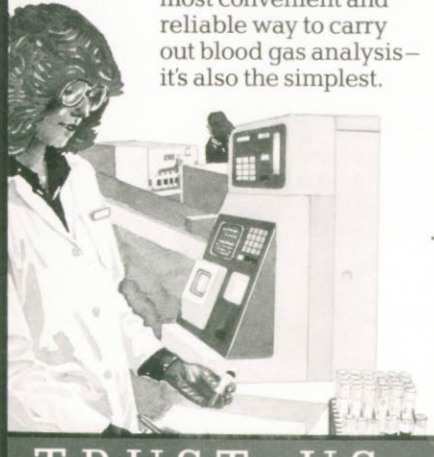

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HOW'S YOUR CONSTITUTION?

by Sally Gough

Papworth Hospital

(From a talk given to ARTP at the Annual General Meeting, October 1984.)

In the Spring of 1984, I asked the membership of the ARTP to let me have their comments on our Constitution. From the four replies received, I drew the conclusion that the majority of members were reasonably satisfied with the Constitution as it stands. I have however, taken the opportunity of examining the Constitution in some detail, and although it has served us well for nearly ten years, I feel that it is time to make some radical changes in certain sections.

Membership of the ARTP

A number of changes have taken place in Education, in Whitley Council regulations and in departmental staffing; we also need to take account of the fact that not all ARTP members are working for the NHS. I therefore propose that the number of Membership categories should be increased from four to six, as follows:

1. *Student Member*

   Student members should be employed on a student grade in Respiratory Medicine or Physiology or an allied grade and be following a BTEC (MP/PM) course and the National In-service Training Manual.

2. *Associate Member*

   Associate members of the association shall be employed in Respiratory Medicine or Physiology or an allied discipline and shall

   (i) Hold the BTEC (MP/PM) in Physiological Measurement or an associated subject approved by the Council *and* have successfully completed the National In-service Training Manual in Respiratory Physiology

   or

   (ii) Have a relevant degree and be following the National In-service Training Programme in Respiratory Physiology.

3. *Full Member*

   Full members of the association shall be employed in Respiratory Medicine or Physiology or an allied discipline on a Technician Grade or above and shall

   (i) Hold the NC (MP/PM), a higher degree or equivalent qualification acceptable to the Council

   or

   (ii) Have not less than 6 years experience in Respiratory Medicine or Physiology or an allied discipline.

4. *Honorary Members*

   Individuals may be invited to become Honorary members without voting rights, at the discretion of the Council of the Association.

5. *Life Members*

   Retiring members may become life members without voting rights at the discretion of the Council of the Association. The level of payment is yet to be decided.

6. *Affiliate Members*

   Individuals employed by commercial organizations may be admitted as non-voting affiliate members at the discretion of the Council of the Association.

To clarify some of the changes:

Associate membership: it is important to recognise that the students have undertaken a teaching programme and that graduates need to complete the National In-service training manual.

Full membership: Here we recognise a higher level of academic achievement, but section (ii) draws attention to our experience that good technicians are not made by qualifications alone; many other attributes are required, such as a firm but friendly disposition and the ability to cope with any adverse conditions.

Life membership: when the Constitution was first put together, ARTP members were too young to be considered for this category — now they are ten years older!

Council of the Association

The Council should have far more impact upon the proceedings of the Association, particularly in the major decisions which have to be taken on Education. The Executive should not have to make all these decisions by itself; it is there to put into effect the Association's policy but the Council should be the body making that policy.

I would therefore like to see the twice yearly Council meetings expanded to at least four times a year so that the individual members at the "grass-roots" can, through their Council members, more readily influence the policy of the Association and steer it in the direction they wish it to go. This process could be assisted by proportional representation. For instance, East Anglia and Trent have only one representative each on the Council, but Trent has 22 members in all and East Anglia only 4! The Association may be doing itself a disservice in that it may be excluding willing and able people from serving on the Council and Executive.

I see no reason for major changes in other parts of the Constitution at the present time, though other members may well do so.

Comments please on the Constitution to Sally Gough or to the Editor, Breath.

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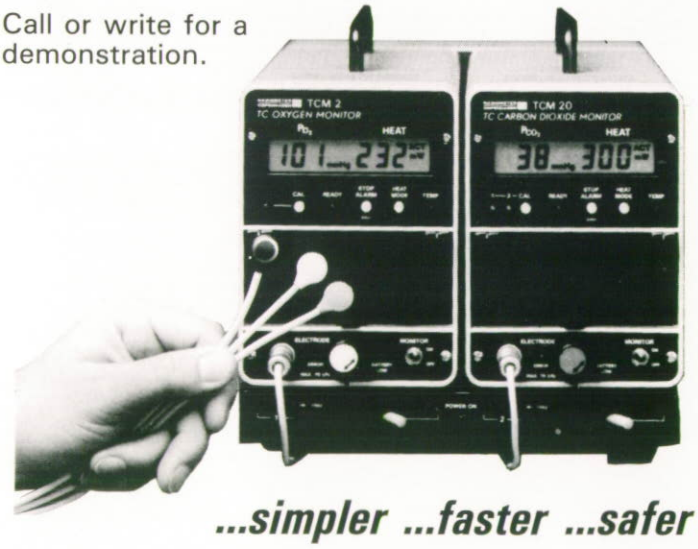

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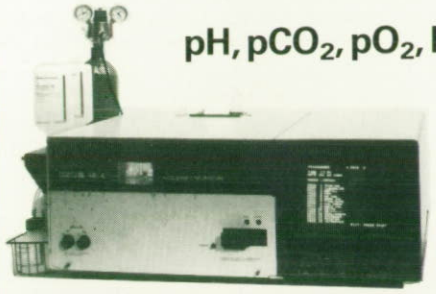

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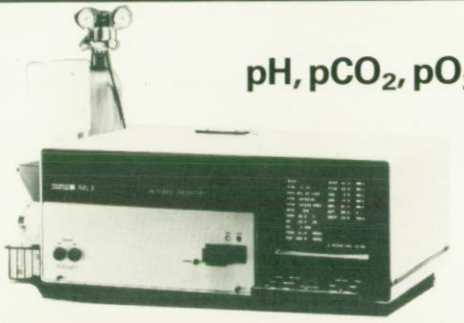

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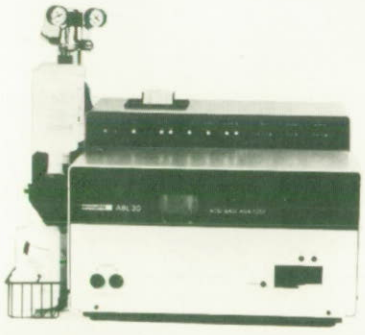

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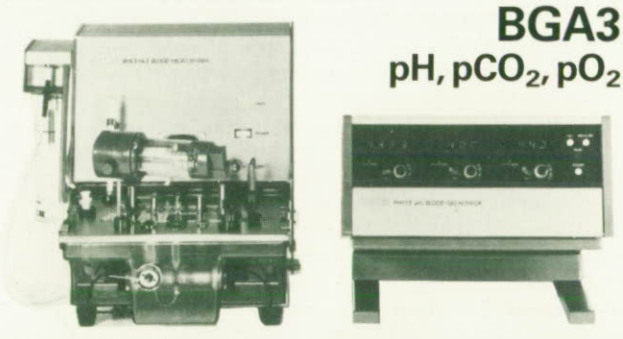

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Table 1.
Total volume outputs

	Fill ml	No. of units	No. of readings	Mean output ml	SD
Mini-Neb	2	5	5	1.57	0.08
Ultrasonic	2	3	5	1.47	0.16

Table 2.
Percentage volume output

Min.	1	2	3	4	5	6	7	8	9	10
Mini-Neb	17.2	17.8	14.9	14.7	9.7	7.1	6.4	5.0	5.5	2.6
Ultrasonic	34.2	17.1	12.4	7.5	7.7	5.8	4.5	3.8	4.5	3.5

Table 3 shows the patients' results. For the group as a whole there was a highly significant increase in both morning and evening PEF after treatment ($p<0.001$). The difference in improvement of PEF between the jet and ultrasonic nebulisers was not significant. There was no significant difference in breathlessness scores or PPA usage between the two treatment periods. Eight patients preferred the ultrasonic nebuliser therapy, while four preferred the jet nebuliser. The main reasons were the silent operation and lightness (hence portability) of the unit. No patient thought that the ultrasonic unit gave more symtomatic relief.

Discussion

Nebuliser therapy is well established in hospital practice and is becoming increasingly used in the home. Jet nebulisation using a high dose of bronchodilator has been used with clinical improvement in adults with asthma and with chronic bronchitis (6). A disadvantage to the patient is that the compressor required to drive the unit is often heavy and noisy. The small Ultrasonic nebuliser (Pulmo-Sonic) has the advantage of being light and silent. The main comment noted with the ultrasonic unit was that it induced a cough when first used, though all the patients became accustomed to this with time. The effect can be explained by the fact that the ultrasonic unit has a much greater volume output within the first min. (Table 2). The present study suggests that the clinical response to ultrasonically nebulised bronchodilator is similar to that of the jet nebuliser. Prior to the study, patients were receiving nebulised bronchodilators using a jet system with a "T" piece and mouthpiece. In this system there is considerable drug wastage during expiration whereas the ultrasonic nebuliser is a "closed" system with less wastage. Eleven patients were able to reduce the dose of salbutamol from 5 mg to 2.5 mg whilst using the ultrasonic nebuliser without a deterioration in their clinical condition. It has to be accepted however that if 2.5 mg had been given by jet nebulisation, the response might have been the same and further controlled studies are necessary to determine the comparable drug dosage when using these two methods.

All patients preferred the silent nature of the Pulmo-Sonic unit; eight preferred it overall to Jet nebulisation, while four preferred the Jet nebuliser. The Ultrasonic nebuliser appears to be a useful way of giving high dose bronchodilators and has the advantage of being light and silent. It may in addition enable the patient to use a lower bronchodilator dose than the Jet system though the patient only has the choice of using it with a mouthpiece.

The disadvantages are that it is less suited to patients who prefer to use a facemask and is more expensive than most of the compressors available. We would conclude that the Pulmo-Sonic nebuliser is a useful addition to the equipment range in the field of nebuliser therapy, though its long-term reliability has not been assessed.

Acknowledgments

The authors wish to express thanks to Devilbiss Health Care (UK) for the loan of the Pulmo-Sonics for this study and for their help in answering technical questions.

The Pulmo-Sonic Unit is available from Devilbiss Health Care U.K. and the Mini-Nebuliser from Bard Ltd. The Inspiron 1500 compressor is available from Bard Ltd. and the Medix 11/111 from Medix Ltd.

Devilbiss Health Care UK Ltd., PO Box 7, Great South West Road, Feltham, Middlesex TW14 0PN.

Bard Ltd., Pennywell Industrial Estate, Sunderland SR4 9EW.

Medix Ltd., Main Street, Catthorpe, Lutterworth, Leicester LE17 6DB.

Table 3.

Patient No.	Age	Sex	PEF U/S B	PEF U/S A	PEF J B	PEF J A	Dyspnoea Score* U/S	Dyspnoea Score* J	PPA use U/S	PPA use J	Preferred
1	68	M	126	152	140	162	40	39	55	57	Jet
2	60	M	155	188	162	211	19	14	28	28	Jet
3	71	M	171	162	163	169	48	42	96	98	Jet
4	72	M	219	249	215	249	27	19	49	42	Jet
5	28	F	94	155	102	148	15	15	50	44	U/S
6	49	M	154	180	145	175	19	18	19	18	U/S
7	66	F	178	210	183	210	17	23	54	63	U/S
8	50	M	180	236	177	247	15	14	70	68	U/S
9	47	F	240	367	242	371	16	17	33	29	U/S
10	40	M	258	290	237	287	13	18	55	56	U/S
11	43	M	283	325	261	310	15	16	61	56	U/S
12	51	M	184	261	205	258	15	19	36	38	U/S
Mean	53.7		187	231	186	233	22	22	51	50	
SD	13.1		54.9	69.9	47.3	67.2	11.2	9.3	20.5	21.6	
% Change			23.5		25.3		0		-0.02		
			HS		HS		NS		NS		

U/S = Ultrasonic J = Jet B = Before therapy A = After therapy
HS = Highly significant ($P<0.001$) NS = Not significant ($P>0.3$)
* Max. dyspnoea score: 84.

References

1. Steventon R D, Wilson R S E (1980). Facemask or mouthpiece for delivery of nebulised bronchodilator aerosols? Br J Dis Chest **75** 88-90.
2. Steventon R D, Wilson R S E (1979). Nebuliser units. Br J Clin Equip No 4 153-156.
3. Personal communications: Allen & Hanburys and Fisons PLC Pharmaceutical Division.
4. Chivers R C et al (1978). Methods of monitoring Ultrasonic scanning equipment. Topic Group Report 23, Hospital Physicists Association.
5. Personal communication: Fisons PLC Pharmaceutical Division.
6. Wilson R S E, Connellan S J (1980). Domiciliary nebulised salbutamol solution in severe chronic airways obstruction. Thorax **35** 873-876.

patients' point of view is the noise produced by the apparatus, though the benefits usually far outweigh this.

(b) *The ultrasonic method:* A significant advantage of this system is that the unit is silent when in use. If a sinusoidal voltage is applied across a piezo-electric crystal, it is converted to a mechanical form of energy because the crystal changes shape with the same frequency, the source frequency being matched to the resonant frequency of the crystal. At high frequency (greater than 1 MHz), the energy generated is sufficient to break up the solution into a fine mist. The resonant frequency of the crystal and source frequency determine the particle size produced, and the amplitude determines the aerosol output (Fig. 2). Ultrasonic nebulisers have until recently only been available as large expensive units but the Pulmo-Sonic unit is capable of nebulising small amounts of solution (from 1 to 10 ml) and costs much the same as a good quality air compressor.

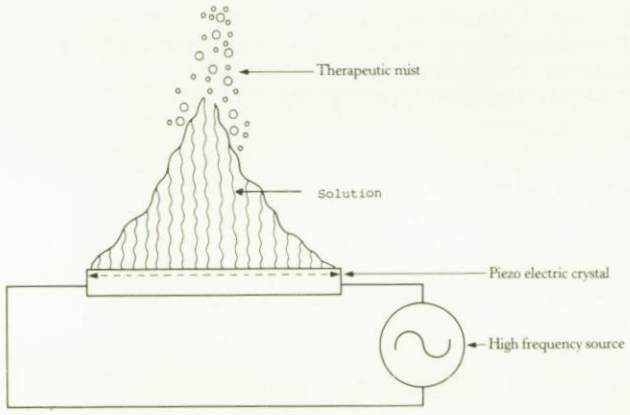

Fig. 2. *Ultrasonic nebuliser.*

The mechanical vibration produces a heating effect, so the instrument is protected by a thermal cut-out, operating at 64°C, mounted behind the crystal. Because of hysteresis, the unit will have to cool by about 12°C before switching itself on again, after an interval of 2 to 3 min. Provided the instrument is not left switched on when empty this situation should not arise in clinical practice.

Because of this heating effect the solution itself will be heated to between 47 and 55°C, the temperature depending on the volume of medication, its viscosity and the tidal volume of the patient. The temperature of the mist emitted at the outlet during normal tidal breathing is about 37°C though with neither salbutamol nor disodium cromoglycate is instability of the drug likely to occur within this temperature range (3). With the Pulmo-Sonic nebuliser the frequency used is 1.35 MHz. There is little danger of ultrasonic radiation being emitted, despite being at higher energy levels usually encountered in hospital scanning equipment (4). Patients should be advised not to insert their fingers into the medication chamber as an ultrasonic tissue burn may occur; the unit is designed so that this is only possible if a deliberate attempt is made.

Methods

Twelve patients, nine males and three females, aged 40 to 72, were studied (Table 3). All had chronic airflow obstruction, five with asthma and seven with chronic bronchitis and emphysema. All patients were well established on domiciliary nebuliser therapy, their normal system being a Mini-Neb nebuliser unit driven by either an Inspiron 1500 or a Medix Minor II compressor. Both compressors produce similar pressure and flow characteristics and will nebulise more than 70% of a 2 ml solution within 10 minutes (2).

The particle sizes of the mist produced by both systems are very similar with about 95% of the particles produced by weight being less that 10 microns (5). To determine volume outputs five Mini-nebs were each filled with 2 ml of sterile water and nebulised for 10 mins; the units were weighed every min to determine the rate of nebulisation. Total volume output was determined by measuring residual volume at the end of the ten min. The units were tapped to encourage nebulisation.

Volume outputs of three Pulmo-Sonic units (five readings) were determined by filling with 2 ml water with the same person breathing through the unit for ten min. The output was determined by measuring the residual volume. We measured percentage output per min by inserting a silica gel filter in the inspiration port and weighing it each min. The increase in weight was taken to be due to the volume output.

All twelve patients used the jet nebuliser or the ultrasonic unit for two weeks before crossing over in random fashion for a further two-week period on the alternative treatment. When using the ultrasonic unit a lead-in period of three days was used so that the patient could become accustomed to the technique.

All the patients were using salbutamol respirator solution, diluted to a total volume of 2 ml with sterile water, regularly up to four times a day. The Pulmo-Sonic unit operates as a closed loop system by having flap valves in the expiratory and inspiratory ports. Because of this the mist is only delivered on inspiration and there should be less drug wastage than in the open system of the jet nebuliser. The wastage was estimated at about 50%, so the patient was instructed to use half the usual dose of bronchodilator in the Pulmo-Sonic unit to determine if a similar therapeutic response was attained. The unit dosage for the jet nebuliser was 5 mg.

With both units patients were asked to use the nebuliser for 10 min. A Mini-Wright peak flow gauge was used to record peak expiratory flow (PEF) in the morning and the evening. Readings were made in triplicate before and half an hour after therapy, with the best of three attempts being recorded on each occasion. Symptom scores for breathlessness were also noted. These were scored from 0 (no symptoms) to 3 (severe symptoms). Emergency usage of their pressure pack aerosol (PPA) was noted. At the end of the study patients were asked which unit they preferred and why. The means and standard deviations for PEF and the symptom scores were calculated and the differences were compared by the Student's paired t-test.

Results

After the lead-in period with the ultrasonic unit, only one patient (No. 9) was unable to tolerate the half dosage. The total volume output and percent output per min for each type of nebuliser are shown in Tables 1 and 2. The mean total output for the jet type was 1.57 ml (SD 0.08) and for the ultrasonic unit was 1.47 ml (SD 0.16). Table 2 shows that the ultrasonic unit gave a much greater output within the first min and demonstrates the reduced delivered aerosol due to the valve system.

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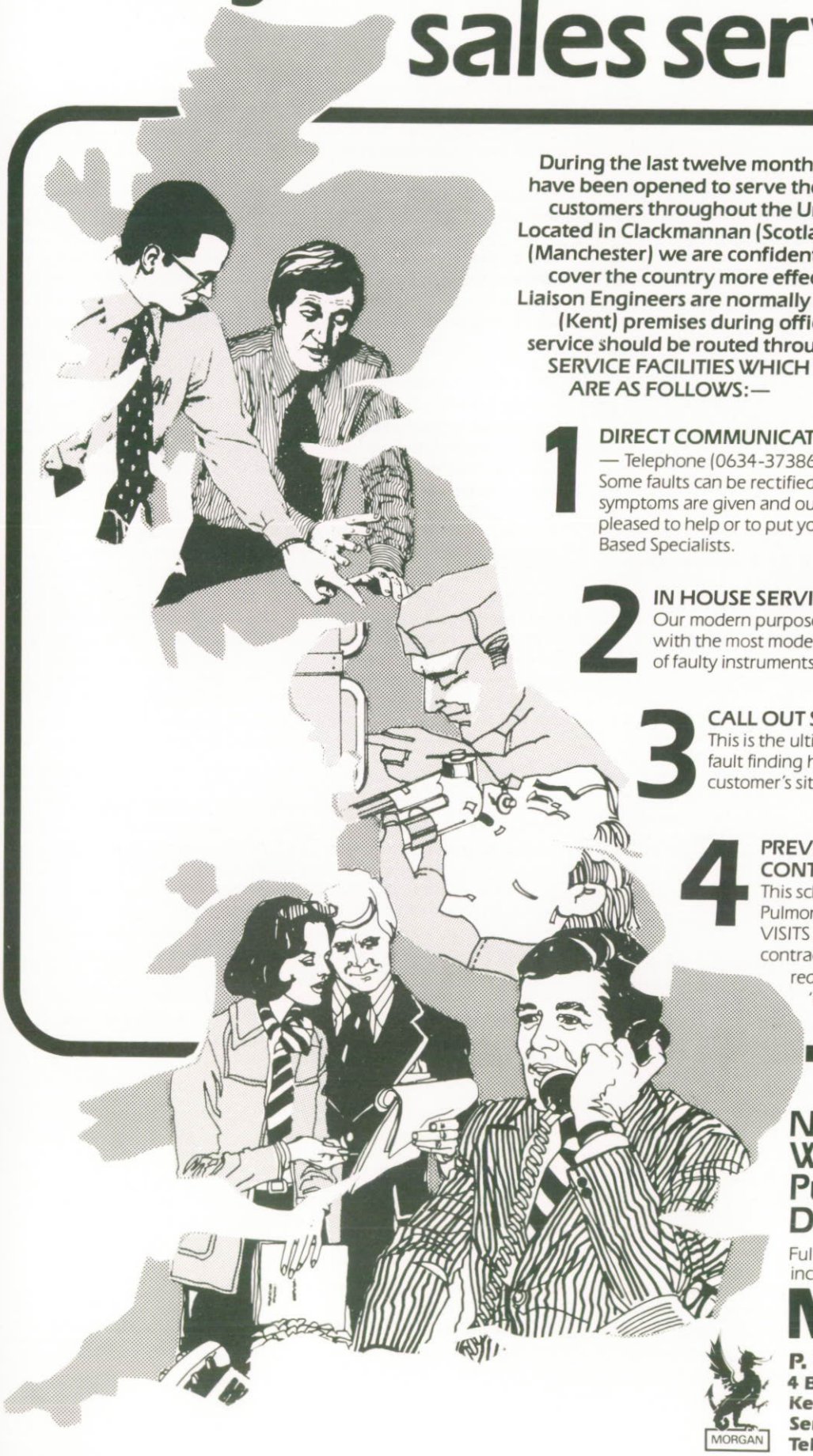

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Chest, Heart and Stroke Association called "Exercise can help your Breathlessness" which some members may feel is worthwhile having available in their laboratories for the patients. We also discussed the cost of oxygen cylinders as compared with oxygen concentrators and it was pointed out that the latter may soon be more readily available due to the recent change in Government policy.

Dr Gribbin then talked to us about lung cancer, describing its aetiology, the prognosis of the various types of cancer and how patients are assessed for treatment whether it be surgery, radiation or chemotherapy. Cancer is always a depressing subject and so we broke for beer and sandwiches at this point.

After lunch Dr Partridge started the afternoon's session on asthma with the definition, aetiology and clinical pattern of the disease. 5-10% of children develop asthma and there are still 1500 deaths a year from this disease, one hundred of those being among children. Asthma is treatable and probably on the increase even though it is no longer so often diagnosed as chronic bronchitis. Dr Partridge also discussed the treatment of asthma and the domiciliary use of peak flow meters.

Dr Blainey then gave us a talk on occupational asthma and pointed out that a patient's symptoms often do not appear until four to six hours after contact with the irritant so that a home peak flow meter is essential. He showed us some peak flow charts of patients who had occupationally induced asthma and discussed some unusual cases. He then talked about bronchial challenge testing and the treatment of these patients. Dr Rudolf then discussed drugs to avoid in asthma and the use and misuse of nebulisers. As time was running short, Dr Partridge gave us a brief outline of hypoxaemia during sleep, its investigation, causes and treatment and talked finally about the sleep apnoea syndrome. The meeting ended at four o'clock with a vote of thanks to the four doctors involved by Derek Cramer from the Brompton Hospital on behalf of the ARTP.

The entire meeting was very efficiently run with comprehensive presentations supported by diagrams, slides and interesting subject matter which provoked questions and discussions all through the day. Dr Partridge and Dr Rudolf especially had obviously spent a great deal of time and thought in producing a worthwhile and informative day and they deserve our thanks and future support. It is proposed that a similar day will be organised next year on restrictive lung disease.

JET AND ULTRASONIC NEBULISER SYSTEMS
a comparative study

R D Steventon, Ailsa Dunn[1], B Green[2], and R S E Wilson
Royal Shrewsbury Hospital, Shropshire
[1] City General Hospital, Stoke-on-Trent
[2] Derby Royal Infirmary, Derby

Summary
The therapeutic effects of bronchodilator aerosols produced by a jet nebuliser and an ultrasonic device were studied in twelve patients. All the patients were well established on domiciliary nebuliser therapy and used a mouthpiece as the method of delivery and all had used the jet method prior to entering the study. Four patients preferred the jet nebuliser while eight preferred the ultrasonic unit. There was no significant difference between the two methods in peak expiratory flow measurements, symptom scores or emergency pressure packed aerosol usage. The amount of drug used in the ultrasonic nebuliser was less than in the jet nebuliser in all but one patient.

Introduction
The usual methods of generating a therapeutic aerosol are: (a) *The jet nebuliser (Fig. 1)*: This utilises the Venturi effect produced by a Bernoulli nozzle. When gas is forced through a fine nozzle, an area of negative pressure is formed at the point where the gas-jet emerges. A tube is placed in this area with the other end in the pool of liquid which is drawn up, bombarded by the high speed jet, blown out as a cloud of particles and inhaled by the patient. Any large particles tend to cling to the baffle, coalesce and fall back into the pool. Either a face-mask or a mouthpiece can be used to deliver the aerosol to the patient (1). There is no inherent mechanical problem in producing a mist by this technique other than finding a suitable driving source (usually an electric compressor) and matching it with a nebuliser unit to produce a mist of the required volume output (2). There are many such units available. One disadvantage from the

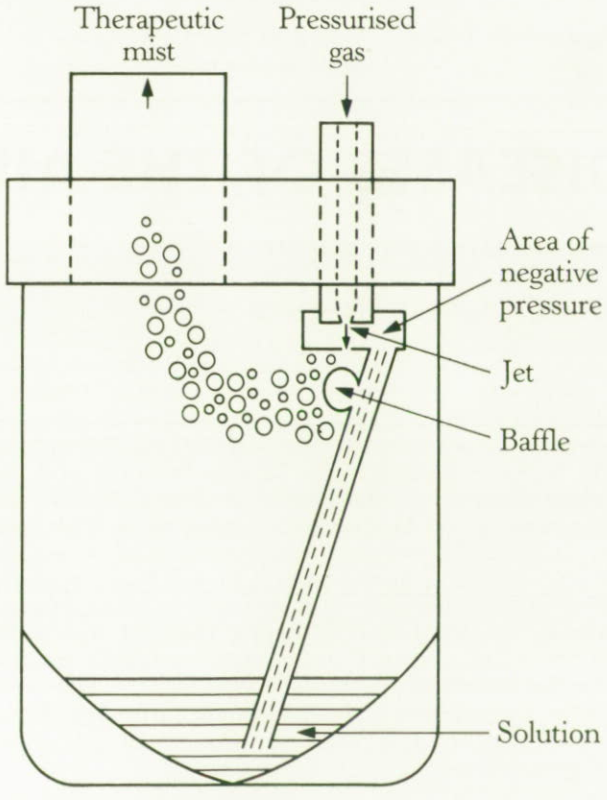

Fig. 1. *Jet nebuliser.*

duration is adequate. A simple protocol for oral steroid trials which can be done on an outpatient basis is shown in table 2.

After the trial if there is no response, steroids can be stopped abruptly as pituitary and adrenal function return to normal by 72 hours (11). If there is a response which is deemed to be clinically valuable by both patient and physician, steroids in some form should be continued, probably on a trial and error basis, and the dose should be reduced to the minimum level possible to maintain benefit. Relief of breathlessness must be balanced against the risks of long term side effects. These may be further reduced by introducing aerosol steroids or adopting an alternate day regime for oral steroids. It is clear that the last word has not yet been said on steroid trials; for example, it is not known if the long term use of oral steroids in CAL gives long term benefits which outweigh hazardous side-effects and whether such benefits will alter prognosis. These studies remain to be done.

Table 2

Protocol for steroid trials

Inclusion criteria:	Severe disability in CAL that is non-responsive to other treatments Patient has stopped smoking Absence of steroid contraindications Patient's disease in a stable state.
Trial design:	*Run-in period;* Several clinic visits to make initial measurements to use as a baseline. *Steroid period;* Prednisolone 40 mg daily for 14 days. Measurements are then repeated and compared.
Measurements at clinic visits:	Breathlessness score 6 minute walk distance FEV_1 and FVC.
Measurements at home:	Serial peak flows during the run-in period and the trial.

References

1. Ling M H M, Perry P J, Tsuang M T (1981). Side effects of corticosteroid therapy. Arch Gen Psychiatry *38* 471-7.
2. Mitchell D M, Gildeh P, Rehahn M, Dimond A H, Collins J V (1984). Psychological changes and improvement in chronic airflow limitation after corticosteroid treatment. Thorax *39* 924-927.
3. Sahn S A (1978). Corticosteroids in chronic bronchitis and pulmonary emphysema. Chest *73* 389-96.
4. Mendella L A, Manfreda J, Warren C P W, Anthonisen N R (1982). Steroid response in stable chronic obstructive pulmonary disease. Ann Intern Med *96* 17-21.
5. Stokes T C, Shaylor J M, O'Reilly J F, Harrison B D W (1982). Assessment of steroid responsiveness in patients with chronic airflow obstruction. Lancet ii 345-8.
6. Lam W K, So SY, Yn D Y L (1983). Response to oral corticosteroids in chronic airflow obstruction. Br J Dis Chest *77* 189-98.
7. Mitchell D M, Gildeh P, Rehahn M, Dimond A H, Collins JV (1984). Effects of prednisolone in chronic airflow limitation. Lancet ii 193-6.
8. Albert R K, Martin T R, Lewis SW (1980). Controlled clinical trial of methyl prednisolone in patients with chronic bronchitis and acute respiratory insufficiency. Ann Intern Med *92* 753-58.
9. Evans J A, Morrison I M, Saunders K B (1974). A controlled trial of prednisolone in low dosage, in patients with chronic airways obstruction. Thorax *29* 401-6.
10. Webb J, Clark T J H, Chilvers C (1981). Time course of response to prednisolone in chronic airflow obstruction. Thorax *36* 18-21.
11. Webb J, Clark T J H (1981). Recovery of plasma corticotrophin and cortisol levels after a three week course of prednisolone. Thorax *36* 22-4.

DISEASES OF THE AIRWAYS: a symposium

Report by Jane Jones

London Chest Hospital

A whole day symposium for respiratory function technicians entitled "Diseases of the Airways" took place at the Royal Society of Medicine on the 14th November, 1984. It was organised by Dr Martyn Partridge and Dr Michael Rudolf of the Royal Society's Section of Measurement in Medicine in conjunction with the Association of Respiratory Technicians and Physiologists and was very kindly sponsored by Allen and Hanburys Ltd. The speakers included Dr M R Partridge of Whipps Cross Hospital, Dr M Rudolf of Ealing Hospital, Dr H R Gribbin of The London Chest Hospital and Dr D Blainey of St Bartholomew's Hospital. The meeting was well attended by members of the Association particularly from the provinces and two members came all the way from Northern Ireland.

Dr Partridge started the lectures with a general introduction, discussing the definition and causes of airway narrowing; he went on to talk about the devastating effect that airways disease (which is almost entirely smoking related) has on people in Great Britain, causing 25,000 deaths a year, quite apart from lung cancer which causes another 25,000 deaths a year. He pointed out that chronic bronchitis accounts for fifty million lost working days per year in this country alone and emphasised the role of the respiratory technician in discouraging patients from smoking.

Dr Rudolf followed with a very interesting and informative paper on the types of drugs used to treat airways disease and advised us on which drugs were most suitable for the various types of patient. He then talked about the history of chronic bronchitis, about the clinical presentation of the so-called 'pink puffers' and 'blue bloaters' and the advantages of exercise with and without oxygen therapy. We were shown an interesting booklet produced by the

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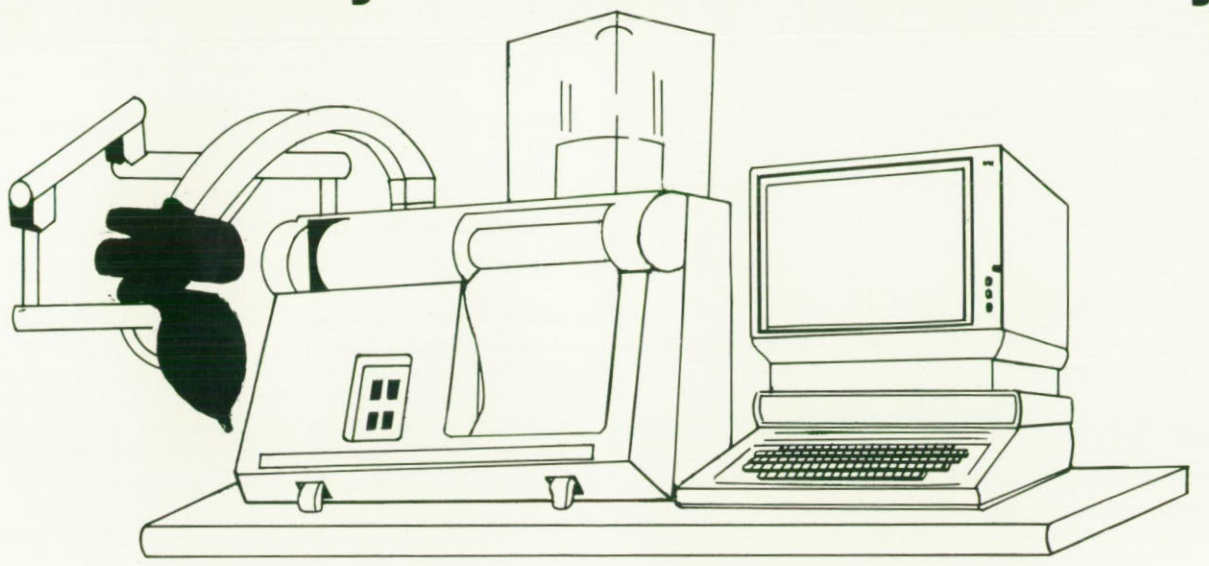

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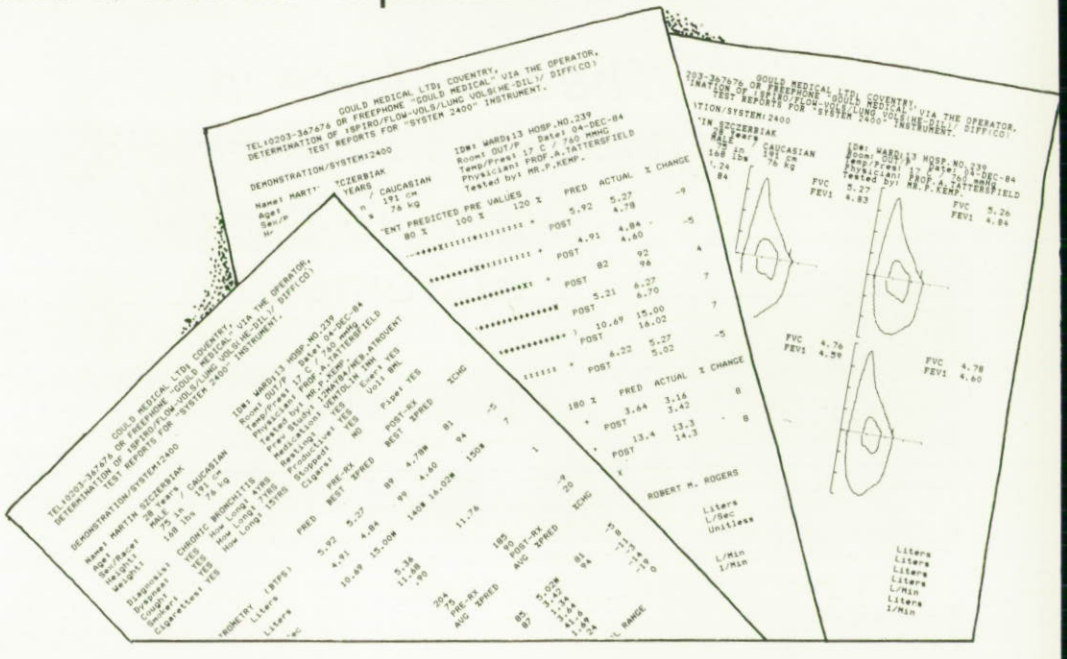

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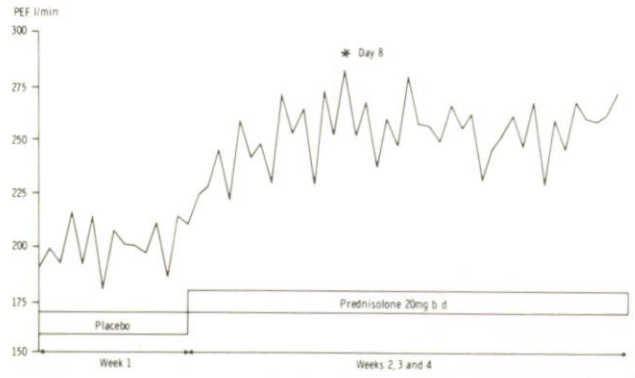

Fig 1. *Mean PEF of 13 responsive patients throughout a one-month course of corticosteroids.*
Reproduced from Webb et al (10) by courtesy of the authors and the Editor of Thorax.

It is often said that patients with CAL who respond dramatically to oral steroids are in fact suffering from asthma. This is correct in that they have significantly reversible airflow obstruction, though CAL generally presents a different clinical picture with its close relation to smoking. The amplitude of airway variability in CAL is usually less than that seen in asthma and patients with CAL rarely achieve their predicted values in spirometry, unlike some asthmatics. Perhaps it would be more correct to say that patients with CAL accompanied by significant steroid induced reversibility have an 'asthmatic component' to their disease.

In view of the small number of patients likely to benefit from oral steroids, it would be valuable to be able to predict steroid responsiveness in CAL and so to avoid subjecting all patients to unnecessary and potentially hazardous trials. The early studies suggested that atopy (blood or sputum eosinophilia) or airway variability (change in FEV_1 following inhaled salbutamol) predicted for beneficial steroid response whereas features suggesting emphysema did not (3). More recent studies (4,5) show that steroid response cannot be reliably predicted from these features so that all patients with severe CAL warrant a trial of steroids particularly as side effects are rare with short courses.

Steroid trials in clinical practice

From the preceding discussion it would seem reasonable to conduct trials of oral steroids in patients with severe CAL who have failed to respond to other measures and who have disabling breathlessness. As those likely to respond cannot be reliably predicted from the clinical features, all patients with severe CAL probably warrant a trial provided there is no contraindication to using oral steroids. Several measurements for response should be made before and after the trial for comparison including a breathlessness score, spirometry and a simple test of exercise tolerance. It may also be useful to keep a record of serial peak flow measurements both immediately before and during the trial. These measurements when considered together will enable an overall picture of steroid response to be obtained.

The correct dose of oral steroid is not known. A response is unlikely with 5 mg prednisolone daily (9), and side effects become common with doses above 40 mg daily (1). Most studies which showed a response used 30-40 mg daily (table 1), and all responses if they are going to occur have done so by the eleventh day (10), so that a trial of 14 days

Steroid Trials

Despite many studies the precise role of steroids in CAL remains uncertain. This is partly due to conflicting results. Of the earlier studies, six showed overall benefit from oral steroids whereas a further eleven did not (3). Reasons for these differences include variations in the design of trials and in dosage or duration of steroid treatment. Some of the studies had only a small number of patients whereas others lacked controls. Another reason for the variable results may be the different measurements that were made; in one study for example improvements in FEV_1 were measured whereas another relied on subjective improvements alone. However, four recent placebo controlled double-blind crossover trials (4,5,6,7) of oral steroids in stable CAL suggest that a significant proportion of patients improve on steroids (table 1).

The studies in the table select a 20% or greater improvement in the measurements as being significant. It can be seen that there is some variation between response rates in the different measurements and that an improvement in one measurement, such as breathlessness score, may not be invariably linked to another (FEV_1 for example). This emphasises the importance of making several measurements of subjective features such as breathlessness and of objective values such as 12 minute walking distance and FEV_1, enabling an overall judgement of the patient's response to steroids to be made.

The main conclusion that can be drawn from these four studies is that a minority of patients with CAL are likely to respond favourably to oral steroids, and that patients with CAL who are admitted with acute exacerbations have a significantly more rapid rise in FEV_1 during the first 72 hours if they receive intravenous methyl prednisolone rather than placebo (8). It is worthwhile considering if improvements in spirometry are of clinical value to the patient and if such objective measurements are valid. The aim of steroid trials in CAL is to relieve breathlessness yet symptoms are extremely difficult to quantitate. Clinicians quite correctly require objective evidence to support the continued use of oral steroids with their attendant side effects and are suspicious of a purely symptomatic improvement, which might be due to a placebo or euphoriant effect of steroids although there is no evidence so far to support this (1,2). Alternatively spirometry may not be sensitive enough to detect subtle yet useful steroid induced improvements in airway function. More complex tests might reveal such improvements; it has been suggested for example that TLC and RV might fall following steroids without a change in FEV_1 or FVC and that this might improve symptoms.

It would therefore seem to be sensible to measure symptoms with breathlessness scores or visual analogue scales in addition to measuring changes in spirometry or exercise tolerance. Problems of evaluation do not usually arise when improvements in symptoms, exercise tolerance and spirometry occur in parallel, but they may do when symptomatic changes fail to match up with objective measurements. There is no solution as yet to the dilemma posed by the patient who claims to be less breathless on steroids but has unchanged spirometry, or vice versa. The possibility of placebo effects should be considered as one study (7) reported a marked placebo effect in both subjective and objective measurements although this did not occur in the other three studies (4,5,6). Exercise tests in particular (6 or 12 minute walk distance) may be susceptible to placebo and training effects in steroid trials and should be interpreted with caution. Serial measurements of peak expiratory flow (PEF) during steroid trials can be of value in revealing trends of improvement and have the advantage that they can be done easily by the patient at home (fig.1).

Table 1
Improvements following oral steroids in patients with CAL

	Number of patients	Daily dose of prednisolone	Percentage of patients with a 20% or greater improvement in a measurement						Mean percentage changes in measurements in all patients when prednisolone values were compared to placebo values				
			SOB	12MW	PEF	FEV_1	FVC	PEF, FEV_1 or FVC	SOB	12MW	PEF	FEV_1	FVC
Mendella et al[4]	46	32*mg	—	—	—	17%	—	—	—	—	—	10%	—
Stokes et al[5]	31	30mg	—	—	—	—	—	23%	—	—	5%	10%	6%
Lam et al[6]	16	40mg	—	—	—	44%	—	—	16%	6%	23%	21%	12%
Mitchell et al[7]	43	40mg	16%	16%	21%	21%	16%	33%	12%	26%	26%	19%	15%
(*Methyl prednisolone)													

(SOB = breathlessness score; 12MW = 12 minute walk distances: PEF = Peak expiratory flow; FEV_1 = Forced expiratory volume in 1 second; FVC = Forced vital capacity); — = data not available.

ORAL CORTICOSTEROIDS IN CHRONIC AIRFLOW LIMITATION

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Introduction

The problem of chronic airflow limitation (CAL) due to chronic obstructive bronchitis and emphysema remains extremely common in the United Kingdom despite growing public awareness of the association of these diseases with smoking. The progressive nature of CAL leads to disabling breathlessness with consequent morbidity and mortality. In chronic obstructive bronchitis, the airway narrowing results largely from mucosal inflammation and thickening in the small airways (bronchi less than 3 mm in diameter) with a goblet cell hyperplasia and mucus hypersecretion. These patients usually have repeated bacterial infections which lead to airway damage and obliteration while some patients develop bronchial smooth muscle hypertrophy which further narrows the airways. In emphysema, airflow limitation results from loss of pulmonary elastic recoil which normally holds airways open during expiration. When elastic recoil is reduced due to destruction of the lung parenchyma, the airways collapse prematurely on expiration producing airflow limitation.

The role of oral corticosteroids in the management of asthma is well established but their use in CAL is less certain. They might be expected to improve airway function by suppressing mucosal inflammation and mucus hypersecretion, and enhancing bronchodilation by facilitating beta-adrenergic responsiveness of bronchial smooth muscle. Corticosteroids are unlikely to reverse severe structural damage and airway collapse associated with emphysema. As oral corticosteroids may alter mood, particularly in high doses (1), it has been suggested that the benefit seen in CAL and other chronic disabling diseases following steroid treatment could be due to an euphoriant effect which might operate by reducing the sensation of breathlessness, increasing general wellbeing and thereby improving spirometry readings. The studies that have been done suggest that this is unlikely and that generally, mood improves in parallel with relief of symptoms (1,2).

The management of CAL includes persuading patients to stop smoking, treating infective exacerbations with antibiotics and attempting maximal bronchodilation. Physical training and oxygen therapy may also be useful in selected cases, but these measures often fail to halt the progression of disease and disability. It is at this stage that a 'trial of steroids' is usually employed. The purpose of this article is to review studies in which the effects of corticosteroids in CAL have been examined to highlight problems which may be encountered in such trials.