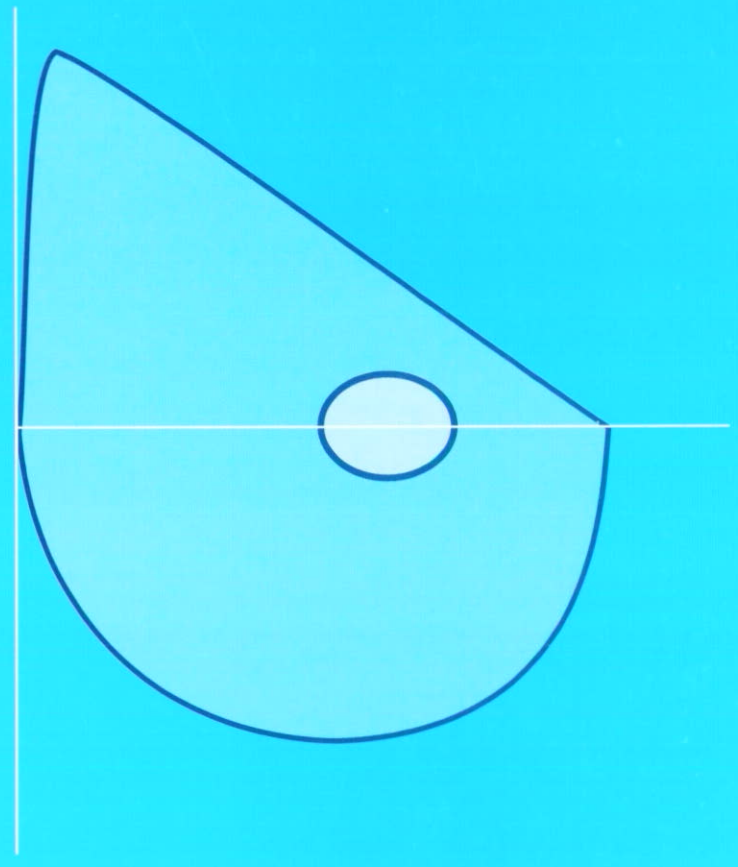
Vol. 5 No. 1 January 2003

Inspire



www.artp.org.uk

The Official Journal of the Association for Respiratory Technology & Physiology

FIRST WORD

Happy New Year to all ARTP members.

Welcome to this "bumper" Winter edition of *Inspire* which this year we have tried to link in with the ARTP Annual Conference. The abstracts which will be presented at the conference are to be found on page 11 and copies of *Inspire* will also be available at the conference.

Last year saw developments on professional issues and voluntary registration continuing with great pace and the forthcoming year looks to continue this trend. ARTP membership numbers continue to increase at a healthy rate and, on various issues, the ARTP Executive Committee is listening to its members, taking on board their comments and making changes where possible to accommodate these needs. If you are coming to the conference you will get to hear first hand many of the developments and plans for 2003 but the meeting report and minutes of the Heads of Department meeting will be available in the next edition of *Inspire*.

There have been many more enquiries and applications for bursaries this year with some members being unlucky and turned down due to over subscription. To help meet this demand two additional bursaries for the BTS Summer Meeting 2003 have been funded with the bursaries for the ARTP Annual Conference 2004 and ERS Congress continuing.

Many thanks to all authors for their articles for this edition.

The next edition of *Inspire* will be out in the Spring so please send any contributions to me by 21st March 2003: **Gill Butcher, Cardiorespiratory Unit, Queen's Hospital Burton, Belvedere Road, Burton on Trent DE13 ORB Tel: 01283 566333 Ext 5334 E mail** *inspire@artp.org.uk*

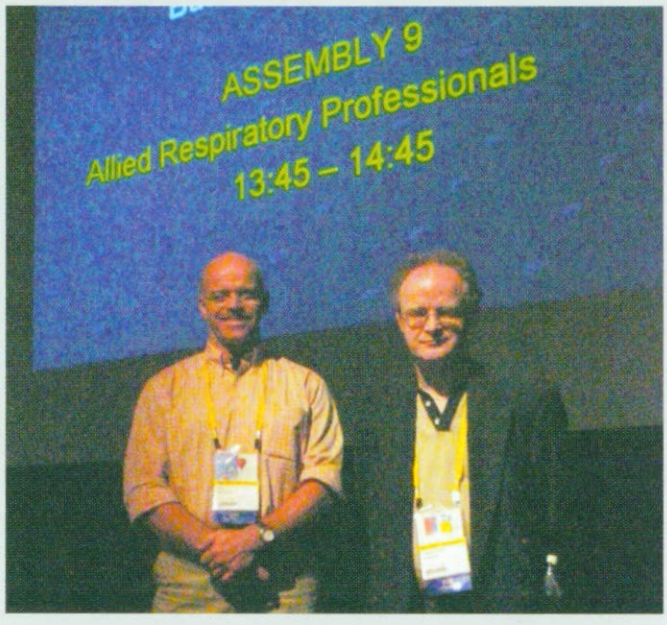
We look forward to meeting many of you soon at Stratford.

CONTENTS

EXECUTIVE NEWS

Dr. Adrian Kendrick has been elected as Chair of Group 9.1 Respiratory Measurement and Technology which forms part of the Allied Health Care Professions Assembly 9 of the European Respiratory Society. His role will involve running the group, attending meetings to discuss issues on measurement and technology and coordinating abstracts submitted to the ERS on these subjects. Congratulations to Adrian on this appointment. ARTP members can be assured that they will be well represented.

ARTP members are also encouraged to join the ERS which has favourable rates for clinical physiologists. The web site is www.ersnet.org



Adrian Kendrick (right) with Han Beurskens (Secretary)

As many ARTP members will already be aware **Dr Sue Hill** has been appointed to the post of Chief Scientific Officer at the Department of Health. A press release supplied by the DofH states *"as the principal interface between the Department and Healthcare Scientists, the Chief Scientific Officer will provided strong and effective leadership for some 40,000 Healthcare Scientists working in the NHS, influencing the thinking and development of the NHS. Dr Hill will act as advocate for Healthcare Scientists on education, training, career development and their contribution to different ways of working to deliver responsive patient-centred health care. She will be the Lead Professional Adviser to the Strategy Imple-mentation Group for 'Making the Change, A Strategy for the Professions in Healthcare Science' "*
Due to this new position Sue has had to resign from her role on the ARTP Executive Committee, but, on behalf of all ARTP members, we would like to wish her congratulations on this prestigious appointment and thank her for all the work done on behalf of Clinical Physiologists and Scientists from all disciplines.

There was an error in the last edition of *Inspire*.The email address of **Rod Lane,** Paediatric Services Officer is respaeds@artp.org.uk.

Inspire

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BURSARY INFORMATION

Bursaries are available to ARTP members, which can be used to support attendance at National ARTP, BTS or STS meetings. Other relevant respiratory meetings or approved training courses will also be considered. Bursaries are available to student, associate and full ARTP members of any grade. They can be used for partial or total funding of registration, travel and accommodation costs for the whole or part of the meeting/course. All bursaries are considered by the ARTP Executive Committee on the reason for the request and the commitment to an article for *Inspire*.
For further details or an application form please contact: **Gill Butcher (Bursary Secretary), Cardiorespiratory Unit, Queen's Hospital Burton, Belvedere Road, Burton on Trent, DE13 0RB. Tel: 01283 566333 Ext 5334 or via e-mail: bursary@artp.org.uk**

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ARTP MERCHANDISE

ARTP HANDBOOKS

SPIROMETRY HANDBOOK:	£ 25 (members)	£ 35 (non-members)
RESPIRATORY FUNCTION TESTING:	£ 40 (members)	£ 55 (non-members)

ARTP CLOTHING

POLO SHIRTS, SWEATSHIRT CARDIGANS, SWEATSHIRTS, LAMBSWOOL CARDIGANS, CAPS AND TIES ALL AVAILABLE WITH ARTP LOGO

Prices may be subject to amendment and all orders are subject to availability
For current prices and an order form please contact the ARTP Administrator

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ADVERTISING RATES

INSPIRE JOURNAL

1/4 Page £200 1/2 Page £300 Full Page £400 Colour printing Full page £600

Discounts available for multiple issues

FLYERS

Supplied by advertiser (< 200 gm)	£150
Photocopied by ARTP	£300
Professional Groups / Charities	rate negotiable

MAILSHOTS

Monthly (last Friday in the month) £650 Urgent (within 5 days) £800

Flyers and mailshots will also be distributed via the ARTP e-mail forum

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WEB SITE ADDRESS: www.artp.org.uk

E-MAIL FORUM: forum@artp.org.uk

CORRESPONDENCE: admin@artp.org.uk

HAPPY BIRTHDAY TO MORGAN MEDICAL

Well 40 years ago was the time when (suffix) "A" registered cars started to appear (none of this European "52" nonsense), John F Kennedy was enjoying the last year of his life, Alan Moore was busy writing letters to an email forum that wasn't happening yet, and Kevin Hogben was taking his mum and dad's T.V. to bits late one evening, saying, "I should have found the fault by the morning!". Yes, 1962 was the era of the "swinging sixties", the Beatles were writing little ditties to play in Liverpool clubs, Liverpool F.C. were in the (then) 2nd Division and a chap called Phillip K Morgan, was working away on an idea that a young Dr Cotes had been keen on - to produce a standardised lung function testing piece of equipment called a "respirameter".

For those of you who didn't notice, Morgan Medical, has been celebrating its 40th Anniversary throughout the year with Road shows, and an open day at their factory in Rainham, Kent. I was invited on behalf of the ARTP to represent the professional body who over the years have worked with (and sometimes against!) PKM to help establish widespread lung function services throughout the U.K.

How many times do the "oldies" at ARTP conferences go all glassy-eyed reminiscing about the "Model C", the Respirameter itself, and the delights of the Autolink (fatal error, lock out, re-boot, control-alt-delete!!!). Yes we can laugh that the equipment the size of a Giles Gilbert Scott telephone box was quirky (No offence Danny!), all lab staff carried a screw driver to "tweak the pots!" (for younger members, this had no sexual connotations!) and the engineer often dropped in before the fault developed. Ah those were the days! I mean who would want small boxes driven by powerful computers, with fancy printouts and graphics and on-board operator manuals. (Well, current day Morgan customers for a start….no, I'm only teasing!)

When visiting Morgan's, you are always struck by the sense of family and local loyalty that has taken the company from the valve and rheostat days though the printed circuit board to the microprocessor, and all against a changing world market in healthcare. I was delighted to chat to Phillip Morgan at the dinner who I reminded was the first ever ARTP life member – a fact of which he is very proud!

The Anniversary dinner was held at a local golf club and had the atmosphere of a Christmas party! Kevin Budd and Phillip Morgan delivered their after-dinner speeches….. and Kevin Budd was very glad that I didn't. The band struck up and the dancing began. The most fascinating sight was "their man in Tokyo", a small Japanese chap in a grey suit (not dissimilar to Ronnie Corbett) dancing at an incredible rate that even challenged the Hogben shuffle! I got accosted by one of the ex-Morgan engineers, Graham, who, through his alcoholic blur, tried to persuade me that all companies should continue to employ engineers who don't know what they're doing!!! I wonder why he took up that line? Anyway, it was a pleasant evening and a chance to talk to old colleagues/adversaries about this influential company. I was reminded that at one stage, a chap called George Holmes (ex head of SensorMedics), Phillip Morgan and a bloke called Erich Jaeger all worked for the same company (Mjinhardt or Gould I think!) What a small world it is!

Phillip Morgan together with other colleagues set up PK Morgan 40 years ago and can congratulate themselves on making a great impact on lung function in the U.K. and throughout the world. Their products have had a reputation for reliability and robustness, to the point that it was very hard to replace the Model C (which is still in use in some departments today). If the company had a source of criticism, it was in taking on the world of PCs and software and linking the good analogue technology to the digital arena. However, they have moved on in recent years to meet that challenge, and their array of new products stands as marker of their success. On behalf of ARTP members who are Morgan users, I hope they will continue to deliver the best software and equipment to their customers so in the end the beneficiary of their efforts will be the patients. Congratulations and well done!

Written by Dr Brendan Cooper, Honorary Chairman ARTP

WEBSITE AND FORUM REPORT

WEBSITE

If you have looked at the website lately you will see a few new pages have appeared...

Watchdog - tells you how to contact the Manufacturers Liaison Committee with problems about equipment.

Network - tells you about the Regional Group Network and gives you contact numbers for the facilitators in each area (see separate article in this issue).

Forum FAQ - Frequently Asked Questions that appear on the Forum are collected on this page for easy reference. (My thanks to Jo Montgomery for volunteering to maintain this page.)

You should keep an eye for important news on the Latest Updates section of the Home Page, especially if you don't subscribe to the Forum.

Hopefully, within the next couple of months, I will be opening the 'Members Only' section of the website which will be password protected and contain some new pages. Some of the pages that are currently open to 'Public Access' will also gradually be moved into the 'Members Only' section. When this part of the site is declared open the password will be *'alveolus'*. Please read the instructions on how to sign in carefully - my JavaScript programming is not good enough to put in error checks - make sure that you click the button rather than press <enter> after you type in the password.

FORUM

There are currently about 225 members on the Forum and with the current rash of Trusts changing their email address to the new shorter format domain names your email address may become invalid without you realising.

The symptoms are that you will still receive emails because your old email address will still be valid (for receiving) for a few months after they change it. However if you try to send a message to the Forum the YahooGroups site will see that the message has been sent from your new email address; your new email address won't be recognised as a member of the ARTP Forum and so it will be rejected.

YahooGroups uses the term 'bouncing' for email addresses that return emails sent to the group marked as 'undeliverable'. I can ask the YahooGroups server to send out a 'reactivation request' email to any 'bouncing' addresses but further than that I'm afraid I don't have the time to chase up why an email address is not responding so, if there is no response to a reactivation request, I will just have to delete a bouncing email address after a couple of weeks.

The Forum carried a record 138 messages in October so if you don't receive a message via the Forum over a few days you should start wondering whether your account is still active.

If a simple change of email address is all that is needed you can find the instructions on how to unsubscribe your old one and subscribe a new one on the new Forum FAQ web page.

Keith Butterfield - webmaster@artp.org.uk

ARTP REGIONAL NETWORK UPDATE

Keith Butterfield

The Regional Network Groups are mostly up and running; at least 6 new groups have started up and, since the last edition of *Inspire*, where we only lacked a contact in the East region, Arlene Jackson has volunteered to fill the gap so we now have full coverage of the UK.

The network leads have an email group like the open email forum to be able discuss ideas and progress and we hope to incorporate a meeting of the leads into the HoD meeting at Stratford.

Although I will remain involved in the Regional Group project (I am the facilitator for the West Midlands group anyway), Rod Lane has agreed to become the Network Co-ordinator and oversee the feedback to and from the groups. As Rod sits on the Executive Committee he will be able to bring up any points or questions raised locally and ensure that action is taken, if necessary at a national level, then cascade it back out via the network in case it has local relevance.

The individual group leads' contact details are now on the website for anyone who wants to get involved – and I urge you to do so as the feedback I am getting is that people are finding these meetings of great benefit.

Next meetings I know about are...

West Midlands - (West Midlands Respiratory Managers Group) 10th Dec 02 at Birmingham Childrens Hospital.

South-West - 12th Feb 03 in Exeter.

South – Inaugural meeting 7th Jan 03

Yorkshire - (Yorkshire Respiratory Group) 6th Dec 02.

North West - After ARTP 2003, probably in Preston.

Home Counties - June 03 in Wycombe.

Just because I haven't listed your group doesn't mean there isn't a meeting being arranged so contact your local group facilitator for more information.

REGISTRATION COUNCIL FOR CLINICAL PHYSIOLOGISTS - UPDATE

RCCP Administrator
202 Maney Hill Road
Sutton Coldfield
West Midlands B72 1JX
Tel: 0121 241 9699
rccpadmin@rccp.co.uk

There have been major advances and changes within the RCCP in recent weeks.

- A copy of the RCCP Directory with all registrants to July 2002 has been sent to all HR departments asking them to promote the register and encourage their staff to join.
- A copy has also been sent to all hospital departments with registered members. The Directory is updated regularly and the complete and up-to-date register is available from www.rccp.co.uk
- Additional copies of the Directory are available to members of the Register free of charge. Please forward a large S.A.E. with stamps to the value of 87p to the address above.
- A meeting has been requested with the Health Professions Council (HPC) to pave the way to state registration.
- We have established all the requirements for petitioning for State Registration and plan to do so in early 2003 when petitions are being accepted by the Health Professions Council (formerly the Council for Professions Supplementary to Medicine).
- A petition made without the support of those it represents will not be successful. If you want to be 'State Registered' you must demonstrate this by completion and submission of an application form to the Registration Council for Clinical Physiology (find one at: www.rccp.co.uk)
- We strongly advise that applications to RCCP are submitted by 31st December 2002 in order to avoid the substantial increase in registration fees.

ARTP BURSARIES

Funding is available to ARTP members to assist their attendance at the conferences below. The commitment to an article for *Inspire* before or after the event is a requirement for application.

Articles may be a piece of scientific research, case study, department protocol, course project, equipment/test evaluation, meeting/course evaluation or similar

Approval for bursaries is via the ARTP Executive Committee.

For further details or an application form please contact: Gill Butcher, Cardiorespiratory Unit, Queen's Hospital Burton, Belvedere Road, Burton on Trent DE13 0RB Tel: 01283 566333 Ext 5334 E mail: *bursary@artp.org*

BRITISH THORACIC SOCIETY SUMMER MEETING
CARDIFF TOWN HALL – 26th to 27th JUNE 2003

Four bursaries of £100 are available

THE ANNUAL CONGRESS OF THE EUROPEAN RESPIRATORY SOCIETY
VIENNA – 27th SEPTEMBER to 1st OCTOBER 2003

Two bursaries of up to £500 are available to assist ARTP members who have had an abstract submission for the ERS Congress accepted

ARTP ANNUAL CONFERENCE 2004
Venue and date to be finalised

Four bursaries of up to £200 are available – apply early to avoid disappointment

ARTP ANNUAL CONFERENCE UPDATE

With the ARTP 2003 conference just a couple of weeks away I thought I'd whet your appetite with a taste of what will be happening during the event. We have a few surprises in store for the gala dinner which I won't spoil, and have been extremely fortunate to secure the services of Dr Colm Mahony, Consultant GU Physician as the after-dinner speaker whose talk entitled "Are sex, love, passion & desire, compatible with marriage?" bound to raise more than a few smiles!

The programme content is second to none with talks from Dr. Martyn Partridge (Chairman BTS Executive Committee), Professor John Stradling and Professor Jim Horne to name but a few. Peter Macklem MD, retired from McGill University in Canada, will be attending to talk about optoelectronic plethysmography, believed by some to be the most important methodological advance in the mechanics of breathing since the introduction of the whole body plethysmography. Subjects ranging from sleep to lung disease will be addressed with 4 lunchtime workshops to attend in case you get bored!

As usual we have overflowed the hotel and taken over a large slice of Stratford and have had exhibitors breaking down the doors to secure a space. The feedback we received from you all last year has been taken on board and we hope you enjoy the feast of learning and fun we have in store for you.

If you have not secured your place at the conference please contact me immediately, you will certainly regret it if you don't!

Have a safe journey and I look forward to welcoming you to Stratford-upon Avon.

JACKIE HUTCHINSON, ARTP ADMINISTRATOR, 202 MANEY HILL ROAD, SUTTON COLDFIELD, WEST MIDLANDS, B72 1JX

TELEPHONE: 0121 241 1611 E MAIL admin@artp.org.uk

BOOK REVIEW

RESPIRATORY MEDICINE SPECIALIST HANDBOOK

Dilworth D.J. & Baldwin D.R. (Eds)

Harwood Academic Publishers, 2001 (£39.50) 701pp ISBN 90-5823-077-5

This small book attempts to cover the ground between the big, multivolume specialist textbook and a general medical textbook and is aimed primarily at specialist registrars. It is divided into 31 chapters and covers all the major areas of respiratory medicine, each chapter being written by an acknowledged expert in that field.

I am delighted to report that the book opens with a chapter written by Dr Mike Morgan from Glenfield Hospital entitled "The conduct and interpretation of pulmonary function tests" which includes information on physiology and pathology as well as descriptions of the main tests found in most Labs. Other chapters focus on topics as diverse as COPD, chronic cough, lung infection and intensive care and the book closes with a chapter on preparation for research.

This chapter is aimed purely at the medic, and I think it should be required reading for all medical staff about to undertake any serious research activity.

Whilst many may find this book contains a little too much information for a quick scan of the major points I think it would prove to be a useful addition to any lung function Lab's bookshelf.

Andy Robson

Edinburgh Respiratory Function Service

Many thanks to Andy for this book review which he undertook whilst recovering from a slipped disc! He has not however volunteered for the post of "Book Reviewer" on a regular basis. Any other contributions would be most welcome if any ARTP members can find enough time in a normal working day!! ...Ed

OBITUARY

Suzanne Davis – "Miss Respiratory Function" Leeds General Infirmary

11th November 1944 – 16th November 2002

A unique role model at the Leeds General Infirmary, Suzanne made her mark within her field by being a methodical precise worker. Her preparation of patients and the diligence she showed when testing left nothing to chance. This attention to detail was a hallmark throughout her career.

Suzanne was the backbone of the Respiratory Function Unit. From early in the morning to last thing at night she could be found beavering away. Always busy, always lots to do, but never too busy for a kind word of encouragement for a colleague.

Her working life began in the late sixties at the LGI, a place she stayed throughout her long career.

In the early days she trained in cardiology working under Graham Tate, establishing life long friends along the way. She then moved on to Respiratory Physiology, an irony due to her being a life long asthmatic. This enabled her to genuinely empathise with the suffering of her patients but this debilitating illness eventually led to her untimely death.

Suzanne dedicated her life to Respiratory Physiology and to the LGI, a place she continued to love despite the many changes she saw during her long association with the hospital. She was well known throughout our profession, never afraid of voicing her opinion, questioning a point in her clear precise manner even though she insisted she was shy.

She will be sadly missed. There will never be another Suzanne. A truly unique person.

Georgina Martin, Head of the Respiratory Services, Leeds Teaching Hospital Trust, Leeds.

"ON THE BLOWER"

By Brendan Cooper, Nigel Clayton and Alan Moore

As many ARTP Forum users may realise, I have recently been asking for responses of members on a variety of companies with whom I was having difficulties. To their credit all three companies (Viasys, Breas and Vitalograph) have eventually responded to my calls and begun to improve the services we receive. In two cases, the problems arose largely because of a lack of communication between service engineers and manufacturers. In one case, you will be as delighted as I am to see Viasys finally buy out EME and their equipment engineers. With my John Harvey-Jones hat on, businesses should keep full control of their sales and service teams, because as far as the customer is concerned sales and service are the tangible face of the company!

A Viasys representative assured me that SensorMedics and Jaeger are still independent companies but a part of the Viasys group. Steven Connolly (Viasys UK Boss) has assured me that customers should receive the same service they got under either Jaeger or Sensor Medics, but it is taking time to get the new group running appropriately. ARTP are watching with interest and expect some big improvements on recent performance. Software upgrades for full service agreement customers should be free and performed quickly.

Breas are sorting out an odd problem with software on two of our Breas 403 ventilators. These seem to be isolated incidents, and the usual good name of Breas remains intact. Again, poor communication between Breas UK (the manufacturer) and Deva Medical (the service engineers) led to the customer becoming very frustrated. I am assured this should not happen again. The issue of Rusch NIV circuits is still with the Medical Devices Agency and is of interest to Breas and B&D Biomedical users.

Vitalograph's "crown" appears to have slipped recently according to a number of member reports. Unreliablility of the Wedge Bellows Spirometer seems to be the issue - "they don't build 'em like they used to" is the cry. We've also heard of problems with the odd Pneumotachograph system.

The repeated problem is that members complaints do not appear to have been taken seriously on occasions - the usual "well, you're the only one who has reported" is what we're hearing.

Representations have been made to Vitalograph on your behalf and the following response has been received:-

"Thank you for sending me copies of the complaints, I have raised this issue as a matter of urgency and I can assure you investigations are being made, appointments arranged with the customers concerned and service records are being thoroughly checked in an effort to trace where and how the reported faults arose.

Once again thanks for the feedback. Regards

Lester Beeson. – (Service dept) Vitalograph"

Morgan Medical

I despair at Morgan. They have a new system from Collins, which was proudly on show at ERS in Stockholm. According to a number of respected opinion formers, this system merits serious consideration albeit that it is shaped like an Elephant lower limb amputation. Despite requesting that Morgan, in the shape of Kevin Budd, send me details of the system so that I cannot be accused of mis-quoting or inaccuracy, what am I sent - nothing. The deadline for going to press was made clear to them. This is not the first time I've asked for information on new products and no information has been forthcoming - the same happened for the previous issue. Sorry guys, I'm not going to write it for you - you have only yourselves to blame.

Dodgy Carboxyhaemoglobin Measurement

This item may only be of interest to a limited number of you but we need your help in proving a point to a particular blood gas analyser manufacturer who shall remain anonymous for the present. So far, we have received two reports of patients who are non-smokers wherein co-oximetry on a particular model analyser is regularly yielding carboxyhaemoglobin values in the region of 3.5 - 4.5%.

The original reference range as described by Siggard-Anderson in 1959 is zero to 0.8%. However, in clinical practice levels up to 1.5% would be OK. The problem comes when, for example, patients in an ITU who have been ventilated for 3-4 weeks and who have been lifelong non-smokers have COHb levels of 3.5 - 4.5%. High background environmental CO levels in this establishment have also been ruled out.

The company involved, whilst the Service Department and the local representative are trying to be helpful, are proving difficult at a higher level. They have produced an irrelevant paper from the mid 1990's in the USA and claimed that it shows the "normal" range for COHb is in the region of 3.5 - 4.5%. Having run this paper past an eminent Toxicologist, he was less than impressed and agrees that the most likely problem is a measurement error.

So, the help we need is from those of you who have analysers which incorporate COHb measurement or who have stand-alone co-oximeters. We would be interested to hear what COHb levels you are finding in non-smokers. We need to know make and model number of analyser together with your location. The location information will be kept confidential within ARTP. Please report your findings to watchdog@artp.org.uk or call Alan Moore on 0121 507 4098.

The company has been notified that it has until January to come clean and solve the problem - otherwise it runs the risk of being named and shamed at some stage during the Stratford Meeting.

Fortin Barometers - Cranlea & Co

Just when we thought that nobody apart from a few antique dealers could help us with servicing and repair, along come Cranlea & Co with their new catalogue full of Fortin barometers and a whole range of other types of barometer. Tim Allen, Sales & Technical Support Manager will be happy to assist you - many of you will remember him from Jaeger. Company boss, Simon Skett, advises me that, within reason, they will be able to offer a collect and return service - though the outer reaches of the United Kingdom may prove a logistical problem too many. Email them on info@cranlea.co.uk or call 0121 472 0361.

Reply from Pulmolink

The August 2002 Inspire carried a statement in the "on the blower" section, raising the concerns of Kevin Budd as to customers purchasing a windows based package to replace MDAS.

To address these concerns, the ComPAS, true windows-based operating system (to drive instruments currently running the MDAS code) has full CE and FDA approval for its applications.

The second point of technical concern is simply answered by the fact that any sale of ComPAS software comes complete with a twelve month guarantee. Therefore, during this period, any fault or query can be answered in the first place by Pulmolink under the terms of the guarantee.

In the event of a problem being of a technical nature relating to hardware, there is a choice; one of which is to employ the services of Pulmolink's fully trained Service Department. (What is the other? Ed)

Please contact us for details of service charges and contract service. We are big enough to cope, yet small enough to care. We will not hide from our responsibilities, unlike the reference to IBM in the previous issue.

We are not 'State-of-the-Art' as we firmly believe that what we are involved in is science!

New Product Launches

Clement Clarke International

SpiroStar is the latest release from Medikro OY, which is distributed in the UK by Clement Clarke. It is claimed to be the world's smallest Windows compatible spirometer. The flow head features a disposable pneumotachograph which weighs just 22 grams and plugs straight into the back of any computer via the RS-232 serial port. The software looks impressive and allows a comprehensive choice of report formats, which may be modified to suit the user. The open data base connectivity and XML interface makes it simple to download results onto other databases such as hospital information systems. The system is competitively priced at £1,295. Disposable pneumotachs cost 99 pence each which is comparable in price to that of a disposable filter.

Trudell Medical International (TMI) sets up European presence

A new arrival on the scene in the UK respiratory device industry is TMI. A Canadian based company which manufactures MDI spacer chambers. Probably best known for their AeroChamber product which is currently marketed by 3M Healthcare. They will soon be distributing their own devices including the TruZone peak flow meter, AeroVent II collapsible spacer device and a breath-actuated nebuliser which generates medication only on inspiration, thus reducing wastage. Hopefully we will soon have a contact address and telephone number.

Breas

Intrapulmonary Percussive Ventilation in the form of the IMP2 is the latest positive pressure device designed for acute or long term IPV treatment. It allows the administration of a form of chest physiotherapy during ventilation by oscillating the airflow at frequencies from 75 - 400 cycles per minute. Ideal for mobilising those sticky secretions!

Henleys Medical

Bacterial / viral filters are now available from Henleys Medical. These look very similar in design to many other filters on the market. Quoting from the sales literature "Our electrostatic filters utilise a unique patented triboelectrical charge exchange between a specially developed blend of polymers to induce a highly stable electrical charge on every individual fibre in the media to more easily trap small particles. This allows filtration efficiencies up to 99.9999%." There is however no reference to independent testing of the filter provided in the leaflet. Prices are competitive at less than £1.00 each for bulk purchases.

Specialised Laboratory Equipment

If you are into measuring lung compliance or transdiaphragmatic pressures then no doubt you will be using oesophageal balloons. SLE are now marketing sterile balloon catheters manufactured by Ackrad. These are latex free and come complete with a stylet to aid the insertion of the balloon. The catheter is radio-opaque and marked with depth markings so you know exactly where you are inside the patient. They cost £110 for a set of five.

Fisher & Paykel

F&P have launched a couple of interesting CPAP interfaces in the form of a nasal mask and an oral interface for mouth breathers called "Oracle" - where do these marketing people get these names from?

DeVilbiss

Serenity Shallow size and Gel CPAP masks

DeVilbiss - Sunrise Medical Ltd (Wollaston, West Midlands) have now added a shallow size silicon cushion to their Serenity nCPAP mask range and have also released a version of the

Serenity mask with a gel filled cushion and forehead pads. The Gel and shallow size mask are available as a fully configured product complete with headgear (9235G and 9235SS) or the cushions and forehead pads are available as accessory parts and will fit onto any standard serenity mask for maximum choice of configurations while keeping your mask inventory low.

DeVilbiss Sure Fit Kit

A handy carrying case containing 3 sets of each style of Serenity mask plus all the available optional accessories. The case is divided into storage compartments that are clearly labelled with descriptions and part numbers making it easy to re-order.

Upgraded DS-3 Software

Minolta have now upgraded the DS-3 Pulse Oximeter software for the Pulsox 3i and 3iA wristwatch oximeters. The software is now supplied on CD-Rom and has now been up-graded to work with Microsoft Windows 2000 as well as other standard Microsoft formats. Other new features include improved reporting and data entry as well as increased user adjustment of the algorithm.

9300UK Heated Humidifier

The DeVilbiss Heated Humidifier has a choice of 10 levels of humidification. The 9300 comes complete with an integrated cable that will accept most CPAP devices. This means the combined heated humidifier and CPAP can be plugged neatly into one wall socket.

For all further information on any of the above products please contact Nicola McGregor at DeVilbiss.

PMS (Instruments) Ltd

Offer a wide range of digital, aneroid and ambulatory blood pressure monitors together with a range of hand held spirometers (Micromedical), stethoscopes and tympanic thermometers. They also supply a device called Respons which allows respiratory rate and pulse oximetry to be recorded by a monitor worn on a belt around the waist. Call 01628 773233 for a brochure.

Astra Tech

We've all heard of AstraZeneca, but have you heard of ASTRA TECH? They form a part of the AstraZeneca group and manufacture some excellent latex free inflatable breathing masks.

They also supply a device known as PEP / RMT. PEP stands for Positive Expiratory Pressure and is used to relieve secretionary problems by use of a mask and a set of eight different resistors. RMT stands for Respiratory Muscle Training and uses the same device to improve respiratory muscle strength. There are no references supplied in the sales literature, so it is impossible to say how good this device is.

The Transfer Market & Company Changes

Ferraris

Farewell to Clare Boot who has left for pastures new. Her dynamism and enthusiasm will be missed.

DeVilbiss

Congratulations to Nicola McGregor who has been appointed as UK Sales Manager. Also congratulations to our old mate Tim Newby on his appointment as European Director of Marketing for Respiratory Products. Tim, as joint editor of the DeVilbiss monthly internal newsletter, also takes a special award from the "On the Blower" team for the naffest title of his organisation "Aspire". Tim openly admits that plagiarism has always been his strong point.

Beaver

Whilst not a transfer, congratulations to Sarah Purchase and Annie Condon who have been promoted to Sales Manager North and South respectively, joining Claire Buchan who has been Sales Manager Scotland for some time.

Look out for something really new from Beaver in the New Year!

Profile

Belated congratulations to Rachel Clark who has joined the Profile team.

Pulmolink

Can you recall a familiar face from Jaeger who went to work for Air Safety then left the respiratory field earlier this year? I'm sure you can. Yes, Anthony Philips is now back in the respiratory field playing for Pulmolink.

Complaints watchdog

The "Web Master", Keith Butterfield, has very kindly set up a watch dog for complaints which may be made via the Forum. Please do not air your complaints on the open forum as this could have legal implications for the association. Please report your findings to ***watchdog@artp.org.uk*** where it will be picked up by Alan Moore, Nigel Clayton and Brendan Cooper. Any complaint will be dealt with by the watchdog committee and the outcome made known through *Inspire*.

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1. **Does CPAP Improve The Health-Related Quality Of Life In The Bed Partners Of Patients With Obstructive Sleep Apnoea (OSA)?** AR Proctor, CG Billings, J Phillips, JC Waterhouse.

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3. **Domiciliary Nebuliser Treatment: How Should We Assess The Response To Treatment?** J Stenhouse, R Carter, A Oliver, SW Banham

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POSTERS

P1: COMPARING DIFFUSION METHODS A TECHNICAL APPRAISAL

Kevin Hogben – Technical Director – Pulmolink.

As instrumentation moves forward, different methods are employed under the common heading – in this case Diffusion. Can the methods be related to each other and should they? This article attempts to place all the measurements in a like method of analysis and then to present the case for "can they be related?" The more difficult question still to be resolved is that of whilst I demonstrate the methods can be related within the acceptable margin of error, should they be related to a predicted value derived from a single method remains unclear. This can only be resolved by a cross section study of subjects from different pathologies measured under scientific controls by the various methods. The conclusion that calculations can be cross-related is demonstrated.

P2: "VOLUME", NOT AS WE KNOW IT JIM...

Kevin Hogben – Technical Director – Pulmolink.

We have all heard the phase, "life – not as we know it Jim" from the hit series "Star Trek". Volume, it is a fundamental measurement; however how many of us know exactly how it is measured by our systems and how it is corrected with in the accompanying software? In this presentation, I attempt to address the fundamental measurement and look at how it is corrected and why for different transducers including Volume displacement spirometers, pneumotachograph, and mass flow sensors found in instrumentation used today. What is the basic measurement and how is it corrected for the BTPS relationship? We can if we understand the fundamentals relate any measured volume in relationship to volume irrespective of the transducer employed; the litre is a standard measure.

P3: WHAT'S IN A NAME?

KE Oates and A Jackson. Respiratory Physiology Department. Papworth Hospital, Cambridge.

There is a nationwide problem with recruitment of MTOs within respiratory physiology. Unless this is addressed, laboratories could become critically understaffed. In August 2002, the respiratory physiology department at Papworth Hospital ran a recruitment campaign to employ a grade 1 MTO. The advertisement was published in the local press. It generated nine enquiries and seven applicants, all of whom were interviewed. Of these candidates, only one was deemed suitable and this person declined the post. Further to this it was decided that a review of the recruitment campaign was necessary. The title of the post was changed from "Grade 1 MTO" to "Trainee Clinical Physiologist". The advertisement was published in the local press and also two Internet sites. The revised campaign generated 100 enquiries, and 49 applicants. Of these applicants, 49% stated that they had seen the post in the local press and 31% stated that they had seen it on the Internet. Of the remainder, 10% stated miscellaneous sightings and 10% did not specify where they had seen the post. The majority of the applicants (69%) were graduates. These findings raise important questions: where should we advertise, what age groups should we target and what's in a name?

P4: GENERAL PRACTICE OPEN ACCESS SPIROMETRY: WHAT WAS REFERRED IN 2001?

D Smith, MR Hetzel, JR Catterall, G Laszlo, AH Kendrick. Department of Respiratory Medicine, Bristol Royal Infirmary, Bristol, England

We provide an Open Access spirometry service to primary care between 09:30-11:30 Mon – Fri. A history, spirometry pre- and post ß$_2$-agonist via spacer and pulse oximetry are obtained by a technologist. A report is sent to the GP. 706 patients attended in 2001, with 55 follow-ups after a steroid trial. Age was 54.7yr (10–91), 366 females and BMI was 27.4 (14.9– 52.6; 198 ≥ 30 kg.m^{-2}). 274 smoked, 438 had cough, 368 wheeze and 397 had sputum production. MRC dyspnoea grade (n = 696) was Grade 1; 110, Grade 2; 230, Grade 3; 223, Grade 4; 116 and Grade 5; 17. Patients medication was – None; 196, antibiotics; 49, ß$_2$-agonist; 261, anti-muscarinic; 24, oral/inhaled steroids; 17, ß-blocker; 32, blood pressure tablets; 57, other therapies; 203. FEV_1%predicted was 84.7 (15–143), FVC%predicted 89.1 (14.7–144) and FEV_1%FVC 74.9 (23.9–100). 61 studies had submaximal/variable efforts. 115 patients had normal spirometry, 68 reversible airflow obstruction, 438 irreversible airflow obstruction and 24 a restrictive defect. 9/55 steroid trials had a positive response. 34/676 patients had an O_2 saturation ≤ 92%. Recommendations: 25 patients with airflow obstruction to change from ß-blockers, 145 for an inhaled steroid trial, 40 for a ß2-agonist prescription, 184 for further investigations – LTOT (n = 34), ?occupational lung disease (n = 36), ?EIA (n = 27), excessive dyspnoea (n = 63), and restrictive defect (n = 24). **Conclusion:** This service 1) identifies groups of patients requiring further investigation or a change in therapy and 2) gives recommendations to assist the primary care physician to manage their patients.

P5: PRIMARY CARE OPEN ACCESS SPIROMETRY: A COMPARISON OF THE BTS AND GOLD COPD GUIDELINES

Kendrick AH, Laszlo G. Department of Respiratory Medicine, Bristol Royal Infirmary, Bristol, England

The use of the BTS and GOLD guidelines in a Primary Care setting has not been assessed. Aim: To compare the guidelines and include subjective dyspnoea rating using the MRC dyspnoea grades. Methods: 438 patients with irreversible airflow obstruction were grouped according to the BTS guidelines using FEV_1%predicted and GOLD using FEV_1, FEV_1%FVC and symptoms. For each group, the distribution of MRC dyspnoea grades was obtained. Results: 16% - 25% of patients had MRC Grade 4 or 5 despite being classified as None - Mild under BTS and Stage 0 or 1 under GOLD. GOLD identified 61% of patients as at risk with normal spirometry, symptoms and exposure to risk factors. A similar number of patients were grouped as no COPD by BTS. Conclusion: 1) The BTS guidelines are simple to classify patients; 2) GOLD guidelines are more complex , but provide a more subtle classification; 3) The inclusion of the "at risk" group in GOLD provides a useful warning regarding patients in this group; 4) A significant number patients have excessive perceived dyspnoea, and including this in the assessment will highlight the need for further investigations.

		Dyspnoea Grade				
BTS Guidelines		**1**	**2**	**3**	**4**	**5**
None	267	65	119	99	50	8
Mild	97	15	29	37	12	3
Moderate	54	6	20	15	13	0
Severe	20	4	5	7	2	1
GOLD Guidelines						
Stage 0	265	39	98	81	40	4
Stage 1	43	9	10	14	8	3
Stage 2A	94	15	33	29	13	2
Stage 2B	25	2	6	7	9	0
Stage 3	11	3	2	5	0	1

P6: RATIO OF ONE SECOND FORCED EXPIRATORY VOLUME TO TOTAL LUNG CAPACITY (FEV1/TLC) IN NORMALS, AND PATIENTS WITH AIRWAYS OBSTRUCTION (AWO) AND RESTRICTIVE VENTILATORY DEFECTS (RVD)

Kendrick AH. Department of Respiratory Medicine, Bristol Royal Infirmary, Bristol, England

The FEV_1 decreases in AWO and TLC may be normal or increased, whilst an RVD, FEV_1 and TLC are both decreased. **Aim:** To determine if the FEV_1/TLC ratio is a useful index in determining the presence of an obstructive or restrictive defect. **Methods:** 658 results with dynamic spirometry, helium dilution TLC and CO transfer factor were reviewed and grouped as 1) normal, 2) AWO, 3) RVD or 4) combined defect. Group 2 was divided into reversible and irreversible AWO, and Group 3 into intrathoracic and extrathoracic defects. Data are given as mean ±1 SEM and volumes in l_{BPTS}. **Results:** Age range was 7 - 90yr. For the group, the FEV_1/TLC and FEV_1/VC, were significantly related: $FEV_1/TLC = 0.96FEV_1/VC - 0.2 \pm 0.08$, $r^2 = 0.85$. In group 1, FEV_1/TLC and age (yr) were significantly related; $FEV_1/TLC = 0.8 - 0.005age \pm 0.07$, $r^2 = 0.47$. The FEV_1/TLC ratio was significantly lower ($p<0.01$) in groups 2, 3 and 4 compared to group 1. There was no significant difference between groups 2 and 4, nor between the subgroups in Group 2 or Group 3. **Conclusion:** The FEV_1/TLC ratio provides a guide to the presence of airways obstruction or a restrictive ventilatory defect.

Group	n	FEV_1	VC	FEV_1/TLC
Entire Group	658	2.6 ± 0.10	3.3 ± 0.02	0.49 ± 0.006
1	152	3.7 ± 0.08	4.2 ± 0.09	0.67 ± 0.01
2	315	1.7 ± 0.07	3.6 ± 0.06	0.31 ± 0.01
2 - *reversible*	*120*	1.5 ± 0.05	3.8 ± 0.04	0.34 ± 0.01
2 - *irreversible*	*195*	1.8 ± 0.06	3.9 ± 0.06	0.30 ± 0.01
3	155	2.1 ± 0.08	2.7 ± 0.04	0.51 ± 0.01
3 - *intrathoracic*	*101*	2.3 ± 0.05	2.8 ± 0.03	0.48 ± 0.01
3 - *extrathoracic*	*54*	2.0 ± 0.06	2.5 ± 0.05	0.52 ± 0.01
4	36	1.5 ± 0.11	2.5 ± 0.18	0.29 ± 0.02

P7: TO COMPARE AN AUDIT OF LUNG FUNCTION EQUIPMENT IN THE TRENT REGION 2002 WITH THE PREVIOUS AUDIT FROM 2000

D E Muirhead, H Briggs, R Wells, F Bradish, M Jackson, L Watson, B G Cooper, D D Vara, L Knowles, J Caldwell, C Roberts, T Broom, J Howard. On behalf of the East Midlands Respiratory Group c/o Respiratory Function, Derbyshire Royal Infirmary, London Road, Derby DE1 2QY.

The aim of this study was to determine whether predicted values calculated on lung function equipment were consistent in lung function laboratories in the Trent Region and to make a comparison with the Audit carried out in this region in 2000. **Method:** 13 of the 17 laboratories circulated responded to the written survey (76% response rate). The written survey was exactly the same as the previous in that departments were asked for calculation of predicted adult values for (a) a caucasian male, (b) a black male, (c) a caucasian female, (d) an Asian female as well as predicted paediatric values for (e) a girl and (f) a boy. Values for FEV_1, FVC, TLC, FRC, RV, TLCO, V_A and KCO were used and compared with the ECCS predicted equations adopted in the BTS/ARTP Guidelines 1993 (Resp Med (1994) 88, 165-194) calculated on an Excel spreadsheet. Agreement was considered as being within 200ml volume or 5% of the PC calculated value. **Results:** The equipment used was manufactured by four companies, Morgan Medical (n=6), Jaeger (n=4), SensorMedics (n=2), MedGraphics (n=1) and a departmental-based system - Cardiobase (n=1). The table below shows percentage of answers in agreement with the PC calculated value:

	n=13	n=6	n=4	n=2	n=1	n=1	
	Overall	Morgan	Jaeger	Sensor Medics	Med Graphics	Cardiobase	
Caucas/n	87%	88%	83%	88%	88%	100%	Predicted a
Black	42%	46%	49%	50%	13%	100%	Predicted b
Caucas/n	79%	73%	80%	88%	88%	100%	Predicted c
Asian	41%	42%	49%	38%	13%	100%	Predicted d
Mean	62%	62%	65%	66%	50%	100%	
Girl	3%	6%	0%	0%	0%	-	Predicted e
Boy	13%	13%	10%	0%	13%	-	Predicted f

The results for table 1 show that overall agreement for adult predicted was 62%. This compares to 60% in the last study. There was improvement in the correlation between centres for caucasian adults. Once again, there was poor agreement on calculation of alveolar volume and there were still large differences between centres for ethnic corrections. All centres are now calculating paediatric values compared to two in the last audit. However, there was poor agreement on calculation of paediatric predicted for all centres. One centre had their own departmental system, which showed a 100% agreement for adult lung volume predicted. **Conclusion:** Despite the introduction of ARTP/BTS guidelines and performing a further audit, there are still differences between centres. To further improve standardisation throughout regions more audits should be performed and the outcome of these communicated to manufacturers, ARTP and the centres involved so relevant changes can be made.

P8: COMPARISON OF GAS TRANSFER MEASUREMENTS BETWEEN COMMERCIALLY AVAILABLE EQUIPMENT

NM John, SL Hill. Lung Investigation Unit, Queen Elizabeth Hospital, Birmingham, UK

A recent audit highlighted the occurrence of variability in transfer factor measurements between different manufacturers[1]. The aim of this study was to compare measurements of transfer factor (T_{LCO}), transfer coefficient (Kco) and effective alveolar volume ($EffV_A$) obtained using the Pulmolab TT501 (Morgan Medical Ltd, Kent, UK) and the Jaeger Masterscreen (JM; Viasys Healthcare, Coventry, UK) in patients with a range of lung function abnormalities. **Methods:** 20 patients (13 male) were randomly selected from those attending the Lung Investigation Unit for routine tests. All patients performed spirometry (Vitalograph model S, Bucks) and measurements of gas transfer using both the TT501 and JM, in random order. All tests were performed according to ARTP/BTS guidelines. Statistical analysis was performed using paired t-tests and Pearson's correlation. **Results:** Transfer factor measurements using the TT501 were significantly higher than for the JM (mean difference in T_{LCO} 0.62±0.61, $p<0.001$; Kco 0.11±0.13, $p=0.001$; $EffV_A$ 0.18±0.35, $p=0.03$). To establish whether differences were dependent on the type of lung disease, patients were divided into those with FEV_1 >80% (n=11) and <80% (n=9) predicted and the measurements compared (Table 1; where $^{**}p<0.003$; $^{*}p=0.08$).

TABLE 1	FEV_1<80% predicted		FEV1>80% predicted	
Parameter	TT501	Jaeger	TT501	Jaeger
T_{LCO}	5.29±2.58	5.06±2.42	7.58±1.98	6.64±2.15**
Kco	1.21±0.44	1.14±0.39	1.52±0.26	1.38±0.22**
$EffV_A$	4.63±1.75	4.49±1.60	5.06±1.44	4.83±1.43*

Significant differences in the measurements obtained were demonstrated only in patients with FEV_1>80% predicted. Furthermore there was a positive correlation between the difference in T_{LCO} and FEV_1 percent predicted ($r^2=0.442$; $p=0.05$). **Conclusion:** Differences may occur in the measurement of transfer factor between different manufacturers' equipment. Furthermore, these differences vary across the range of patients routinely attending for lung function tests.

1. Moore et al . Eur Respir J 2002; 20 (suppl 38): 381s

P9: WHAT IS THIS TUBE I SEE BEFORE ME?

R E Anthony, B G Cooper. Lung Function Department, Nottingham City Hospital, Nottingham NG5 1PB.

The aim of this study was to investigate leak alarms on non-invasive ventilators using a commercially available breathing circuit. We have noticed an increase in alarms on non-invasive ventilators (Nippy and Breas 403) ventilators and suspected they may have been related to the commercial disposable NIPPV tubing supplied by Rusch (Ltd) **Methods:** We took standard Rusch breathing circuits and modified them for use on Breas 403 and NIPPY ventilators by removing the rubberised connection on the trigger port tubing at the ventilator end. By adding a t-piece to the main ventilator tube we could measure the pressure delivered to the "patient" which was a 3 litre anaesthetic bag. We then recorded the pressure delivered by the ventilator and compared this with the pressure setting on either the Breas 403 (Breas UK. Ltd, Farnham, UK) or NIPPY (B&D BioMedical, Stratford upon Avon, UK) ventilators. We looked at the Rusch tubing (RUSCH) and Breas tubing (SILICONE)

	NIPPY				BREAS 403			
Pressure	RUSCH		SILICONE		RUSCH		SILICONE (cm/H_2O)	
	Meas	Diff	Meas	Diff	Meas	Diff	Meas	Diff
5	7.5	2.5	5.0	0.0	5.0	0.0	5.0	0.0
10	15.5	5.5	10.0	0.0	10.0	0.0	10.0	0.0
15	22.0	7.0	15.5	0.5	14.0	1.0	15.0	0.5
20	27.0	7.0	20.5	0.5	18.0	2.0	20.0	0.5
25	32.0	7.0	26.0	1.0	25.5	5.5	24.0	1.0
30	-	-	-	-	24.0	6.0	28.0	1.0

Conclusion: The Rusch tubing on either ventilator produces a lower measured pressure on each machine. The NIPPY has an error, which increases up to 20.0 cm/H_2O whereas the Breas ventilator has the error increase after 20.0 cm/H_2O. The Rusch tubing is unsuitable for use with NIV since it is likely to be the cause of leak errors.

P10: THE MULTIDIMENSIONAL FATIGUE INVENTORY (MFI-20) IN OBSTRUCTIVE SLEEP APNOEA (OSA): EFFECTS OF NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

N Wiltshire, F Buchanan, A Harper, JR Catterall, AH Kendrick. Sleep Unit, Dept Respiratory Medicine, Bristol Royal Infirmary, Bristol, England

We have shown that the MFI-20 provides useful additional information to the Epworth Score (ESS) and SF-36 in patients with OSA, and separates sleepiness and fatigue (Kendrick et al. Thorax 2001; 56 (Suppl III): 46).
Aim: To assess the response of the MFI-20 in a CPAP naïve patients and to compare this with data from the ESS and the dimensions of the SF-36. **Methods:** Patients were given the ESS, SF-36 and MFI-20 questionnaires before and at the end of a 4 week trial of CPAP as part of our clinical management of patients with OSA. Data are given as median (range). **Results:** 50 patients (6F), age 54.5 yr (27 - 80) and Body Mass Index 31.8 $kg.m^{-2}$ (22.8 – 52.6) were studied. The results are summarized below.

	Baseline	Post CPAP	p-value
Epworth Score	14 (0 – 20)	8 (0 – 20)	< 0.005
MFI-20, General Fatigue	17 (8 – 20)	12 (4 – 20)	< 0.005
MFI-20, Physical Fatigue	16 (4 – 20)	13 (4 – 20)	< 0.01
MFI-20, Reduced Activity	10 (4 – 17)	8 (4 – 20)	< 0.05
MFI-20, Mental Fatigue	13 (4 – 20)	7 (4 – 20)	< 0.005
SF-36, Physical Limitations	25 (0 –100)	75 (0 – 100)	< 0.005
SF-36, Vitality	30 (0 – 85)	55 (0 – 100)	< 0.001
SF-36, Mental Health	68 (4 – 100)	84 (28 – 100)	< 0.005

At the end of the trial and using a cut-off of 10 for each MFI-20 dimension and for ESS, 16/50 had a MFI-20 GH>10, 17/50 had an MFI-20 PH>10 and 20/50 had an MFI-20 RA>10 indicating significant fatigue problems remain in the absence of daytime hypersomnolence. The relation between changes in ESS and MFI-20 were:

ΔMFI-20, GF	= 1.59	+ 0.5ΔESS	$r^2 = 0.30$	p <0.001
ΔMFI-20, PF	= 0.80	+ 0.31ΔESS	$r^2 = 0.13$	p <0.01
ΔMFI-20, RA	= 0.40	+ 0.27ΔESS	$r^2 = 0.12$	p <0.05

Conclusion: The MFI-20 is a simple self-completion questionnaire that provides useful additional information to that obtained from the ESS and the SF-36 and separates out sleepiness and fatigue pre and post CPAP.

P11: DETERMINATION OF INHALATION TIME REQUIRED TO INDUCE HYPOXIA IN FLIGHT ASSESSMENT

Susan E Martin, J B Buick, M Riley, Regional Respiratory Unit, Belfast City Hospital, Lisburn Road, Belfast.
I Logan, University of Ulster at Jordanstown, Shore Road, Newtownabbey.

Objective: To compare two methods of hypoxic challenge in patients with Chronic Obstructive Pulmonary Disease by determining the time for 90% desaturation to occur.
Methods: Nine subjects were studied. In the first method the subject was required to breath through a 40% Venti-mask at a designated flow rate of 10 l $min.^{-1}$ with nitrogen as the "driven" gas thus producing nominal FiO_2 of 15.0%. The second method is effectively a modification of that used to measure membrane diffusion and pulmonary capillary blood volume. Here a gas mixture of 15% oxygen in nitrogen is delivered to the subject via a Rubens valve attached to an anaesthetic bag. Throughout the test pulse oximetry was used to measure and record arterial oxygen saturation (SpO_2). The time for each subject to reach an SpO_2 of 90% was determined.
Results: The results show that subjects desaturate quicker using the Rubens valve method (Mean 141 ± 103 sec.) compared to the Venti-mask method (Mean 394 ±204 sec.). P = 0.0035, paired T-test.
Conclusion: Desaturation occurred more quickly using the Rubens valve method. This may be because this method allows more accurate control of FiO_2 and is not influenced by external gas mixing.

P12: A QUARTER CENTURY OF REVERSIBILITY TESTING IN SHEFFIELD

JC Waterhouse, D Fishwick, RA Lawson. On Behalf of the Sheffield COPD Interest Group RFU, Royal Hallamshire Hospital, STH, Sheffield

Reversibility testing is widely advocated in the diagnosis of chronic obstructive pulmonary disease. However, data needs to be interpreted with caution, illustrated by the fact that the three guidelines use different criteria for reversibility. We have examined our Respiratory Function Unit database. 6710 reversibility tests were performed, using either B_2 or anticholinergics. Overall, FEV_1 failed to improve in 30.6 % of tests. In 41.7% there was an improvement of less than 15% of baseline. In 27.7% of cases, the improvement in FEV_1 exceeded 15%. In 23.6% of cases, FEV_1 improved in excess of 15% and by at least 200 ml. Thus, in 14.8% of cases where FEV_1 improved in excess of 15%, the absolute improvement was below 200 ml. Median post bronchodilator improvement in absolute FEV_1 was similar in all ranges of pre-bronchodilator FEV_1, though there was a large range. The median percentage reversibility increased as the pre-bronchodilator FEV_1 decreased, despite the fact that asthma would be a more frequent diagnosis in those with a high initial FEV_1 who were relatively young, with COPD more frequent in those with a low initial FEV_1.

P13: PULMONARY FUNCTION IN THREE YEAR OLD CHILDREN: EFFECT OF EXPOSURE AND SENSITIZATION TO INDOOR ALLERGENS

L. Lowe, CS Murray, A Custovic, M Craven, P Kissen, A Woodcock. North West Lung Centre, Manchester UK

Sensitization to indoor allergens is a major risk factor for asthma in children and a dose response relationship exists between mite allergen exposure and sensitization, however the role of exposure in the development of asthma is still unclear. The aim of this study was to evaluate the effect of indoor allergen exposure and sensitization on lung function in 3-year-old children. Children were followed prospectively from birth and reviewed at age 3. Lung function was assessed by measurement of specific airway resistance (sR_{aw}) by plethysmography (Jaeger, Germany). Dust samples were taken from the living room floor and the child's mattress with levels of mite (Der p 1), cat (Fel d 1) and dog (Can f 1) allergens determined by mAb-based ELISA. Significant exposure was defined as Der p 1 >2mg/g of mattress dust, Can f 1 >10mg/g and Fel d 1 >8mg/g of living room floor dust. A total of 425 children attended the follow-up clinic and measurements of sR_{aw} were recorded in 276 children (65%). There was no effect of high exposure to mite, cat or dog allergen on lung function. Skin prick tests to mite, cat, dog, pollen, milk and egg were carried out on 262/276 children, of which 42 (16%) were sensitized to at least one allergen. We found no relationship between sensitisation to cat or dog allergen and reduced lung function. However, children sensitised to dust mite (n=28) had significantly impaired lung function compared to those not sensitised (n=231) (sR_{aw} GM 1.16 $kPa \cdot s^{-1}$, 95% CI 1.06, 1.27 vs 1.05 95% CI 1.03,1.08, mite sensitised vs non sensitised, respectively, mean difference 9.2%, 95% CI 1.5%, 19.6%, p=0.020). Furthermore, amongst 28 children sensitised to dust mite, those exposed to high levels of Der p 1 tended to have a higher sR_{aw} (n=24; GM 1.20, 95% CI 1.09,1.33) compared to children who were sensitised but not exposed (n=4; GM 0.94, 95%CI 0.71,1.24, p=0.057). These results suggest that exposure to indoor allergens is not associated with reduced lung function in early life. Sensitisation to mite allergen, but not cat or dog, is associated with impaired lung function. Mite-sensitised children exposed to high levels tend to have further impairment of lung function.

P14: OXIMETRY DURING 6 MINUTE WALK: A COMPARISON OF EAR AND FINGER PROBES

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The ARTP guidelines state that oxygen saturation (SaO_2) can be made using either a finger or ear probe. However, discrepancies between these methods have been reported. The study was to validate our laboratory's finger probe (Minolta Pulsox 3i) against an ear probe (Ohmeda 3700) on exercise. 10 healthy subjects (5 male) (29 years SD 9.1) performed a 6-minute walk test. Heart rate (HR) and SaO_2 were measured simultaneously at 30 second intervals using both ear and finger probes.

Minimum	**Ear**	**Finger**	**p=**
HR mean (**SD**)	101 (**15**)	98 (**16**)	n/s
SaO_2 median (**range**)	93 (**89-98**)	97 (**88-99**)	0.01
Maximum			
HR mean (**SD**)	142 (**26**)	131 (**27**)	n/s
SaO_2 median (**range**)	97 (**89-99**)	99 (**96-100**)	0.01

Both minimum and maximum SaO_2 were higher when measured by the finger probe, though there was no significant difference in the HR. This study shows that in this population, oximetry measured using a finger probe is consistently higher than using an ear probe. However, the finger probe often reports SaO_2 as 100%, a physiological impossibility. Whilst some authors have reported that the finger probe gives higher readings, this could be due to the finger probe over reading. For safety reasons it is better to underestimate SaO_2 than overestimate it. Hence, ear oximetry would be the safer option.

P15: GREATER GLASGOW HEALTH BOARD COPD FOCUS: DOES A DIRECT ACCESS PULMONARY REHABILITATION SERVICE MAKE A DIFFERENCE?

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An initiative by Greater Glasgow Health Board to provide enhanced diagnostic and therapeutic services for patients with COPD was started in 2002. As part of this initiative direct referral pulmonary rehabilitation and outreach spirometry services were provided to LHCC's within the health board area. We have evaluated the efficacy of the local pulmonary rehabilitation programme upon the functional status and physiological parameters in a group of 12 patients with COPD recruited from the Pulmonary Rehabilitation Assessment Clinic. Mean FEV_1 prior to entry into the programme was 1.2 (+/- 0.5) Litres; 45% (+/- 16) predicted. The programme was an eight week (twice weekly) exercise-training programme with field exercise tests (Incremental and endurance shuttle walk tests) evaluated prior to and at the end of the programme. Quality of life was assessed using the chronic respiratory questionnaire (CRQ) and skeletal muscle function was assessed by handgrip and KinCom dynamometry. There were significant improvements in quality of life based on the CRQ with "total score" ($p<0.03$) and "mastery" ($p<0.01$) improving post rehabilitation. There were increases in both upper and lower body strength and endurance following rehabilitation. Quadriceps endurance total work increased from 372 Nm to 556 Nm ($p<0.05$). In addition there was a "clinically significant" improvement in the endurance shuttle walk test of >50 metres more than the learning effect from a practice walk (Practice walk 205 +/- 30 metres, Pre Rehabilitation 220 +/- 25 metres; Post Rehabilitation 275 +/- 21 metres; $p<0.05$). This data demonstrates subjective and objective improvement following the pulmonary rehabilitation programme which is in keeping with the established evidence on the role of exercise training in COPD This is of interest as our patient population comes from an area of high social deprivation and the exercise training provided was the minimum recommended.

P16: DOMICILIARY NEBULISER TREATMENT : DO WE FOLLOW GUIDELINES?

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We have reviewed our practice in issuing nebulisers for domiciliary use against the published BTS nebuliser guidelines (Thorax Volume 52 (2S) Supplement 2). Compliance to the nebuliser guidelines was assessed during a patient interview and review of the nebuliser documentation at a routine service visit by an independent reviewer (Pharmacy Student).

The Respiratory Homecare Service based at the Department of Respiratory Medicine currently has 850 nebulisers which have been issued for domiciliary use. During 2002, a cohort of 135 patients with a domiciliary nebuliser were interviewed during a routine service visit. Of these, 99 had COPD (64 severe with an FEV_1 of <40% predicted). All the patients had had a respiratory review by a chest physician prior to the request for assessment as recommended by the guidelines. All patients reported that they had been shown how to use their nebuliser at first issue and a first treatment had been performed under supervision. Written instructions on the use of the nebuliser, cleaning instructions and maintenance had been issued. All patients had been given a contact number in the case of enquiries or equipment failure. All patients reported that they had been issued with adequate consumables to change the nebuliser chamber every three months as required by the guidelines prior to the first service visit at one year. Compliance with treatment was generally very good and the reported side effects were minor and relatively infrequent. However, only 54% of patients had had a trial of therapy using a spacer device before being referred for nebuliser therapy. Once the nebuliser had been issued the main problem had been in obtaining the medication script from the referring physician. 29% of the patients reported having to re-contact the hospital in order to obtain the recommended medication advice. In addition, there was some difficulty identifying the recommended medication from patient notes or the Respiratory Homecare documentation. Only 71% of the patients reported having their last nebuliser service within one year as the guidelines recommended (Filter change, flow measurement, electrical safety check). This audit has identified some weaknesses within our domiciliary nebuliser service, which we are in the process of rectifying with the introduction of a new nebuliser protocol and improved documentation.

P17: FEASIBILITY OF FORCED SPIROMETRY IN CHILDREN AGED 2-8 YEARS

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Aim: to assess the feasibility of achieving technically satisfactory measures of forced spirometry in young children using modifications of current ERS (ERJ 1993. Suppl 16 5 - 40) and ATS (AJRCCM 1995. 152 1107 - 1136) guidelines. **Methods:** 203 children (93 <6 yr and 110 7-8yr) performed spirometry using visual incentives. Manoeuvres were repeated until ≥ 2 technically acceptable, reproducible results were obtained (maximum 15 attempts). Manoeuvres were considered technically acceptable if there was no hesitant start (V_{BE} <0.1 L, or $V_{BE\%FVC}$ <10%), a rapid rise to peak flow, and a full smooth single expiration with a plateau on the V/t plot. For each acceptable loop, $\sum FVC+FEV_{0.5}$ (2-6 yr) or $\sum FVC+FEV_{1.0}$ (>7-8yr) was calculated. Results were considered reproducible if the best 2 attempts (largest $\sum FVC+FEV_t$) differed by <10%. No results were reported if FET < FEV_t. Results: Technically acceptable results were obtained in 196/203 (97%) children with 82% generating ≥ 3 reproducible loops, 14% achieving two. Reproducible manoeuvres were achieved in 95% of 2-6 yr olds and 98% of 7-8 yr olds. FEV_1 was calculable in 85% of children where FET >1s, in the remaining cases $FEV_{0.75}$ or $FEV_{00.5}$ were calculated.

Conclusions: Satisfactory forced expiratory manoeuvres can be achieved in most young children when appropriate techniques are used, however, current ATS/ERS guidelines are inappropriate for testing this age group. Incentive spirometry is useful in gaining co-operation and achieving reproducible measurements. Specific guidelines need to be established to ensure quality control and accuracy for forced spirometry in young children.

P18: INVESTIGATION INTO THE DIFFERENT METHODS OF MEASURING INSPIRATORY CAPACITY (IC)

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IC is a simple spirometric measure that been shown to accurately reflect operational lung volume [1]. IC can be measured directly from a spirometry trace, or by derivation from other lung volumes measured in conjunction with both helium dilution (He) and plethysmography (Pleth) e.g. TLC-FRC and VC-ERV. Direct measurement of IC is considered the "gold standard" although, in previous studies, it has generally been derived by VC-ERV. The aims of the current study were to compare 5 methods for measuring IC and to determine the most repeatable method of measuring IC. 68 patients with a variety of lung pathologies were studied, normal lung function (n=12), restrictive lung disease (n=13), mild (n=13), moderate (n=16) and severe airflow obstruction, (n=15). Results of the direct method were similar to indirect methods ($p>0.05$), however differences between two of the indirect methods (He[TLC-FRC] vs. Pleth[VC-ERV] and He[VC-ERV] vs. Pleth[VC-ERV]) were statistically significant ($p<0.05$) and these differences were independent of IC volume. The direct measurement of IC was found to be the most repeatable ($p<0.01$). It was concluded that the measurement of IC by direct method was not significantly different to other indirect methods and the direct measurement was found to be more repeatable than the most frequently used indirect method.

1. O'Donnell DE, et al. Am J Respir Crit Care Med 1998; 158: 1557-65.

P19: THE EFFECT ON THE SINGLE BREATH CARBON MONOXIDE TRANSFER FACTOR TEST AFTER SMOKING ONE CIGARETTE

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Background - When interpreting the single breath carbon monoxide transfer factor (TLco) result, it is important to distinguish genuine changes in gas transfer from physiological variables.

This study aims to define whether the TLco is inadvertently reduced by smoking one cigarette and that high levels of exhaled carbon monoxide concentrations (%COHb) are present.

Methods - 70 smokers had exhaled carbon monoxide concentrations, spirometry and TLco measured before and after 20 minutes of smoking one cigarette (30 of these were used as controls). The mean duplicate values were recorded. The smoking habits were also recorded.

Results - Excluding the variability in the TLco technique, the true change was ± 0.34 ml/min/mmHg (0.95%) for TLco and ± 0.38 % (1.10%) for %COHb. No other values (FEV), FVC, IVC, VA) were significantly different. 93% of subjects smoked 4 hours before the test (67% 2 hours before). There were 16 heavy smokers, 20 medium and 34 light smokers. 5 restrictive, 21 obstructive and 44 normal patterns of lung function were observed.

Conclusions - The quoted findings suggest the single breath carbon monoxide transfer factor value is not significantly affected by smoking one cigarette. Changes in TLco are unlikely to occur in %COHb values of less than 12.

SPOKEN PRESENTATIONS

S1: DOES CPAP IMPROVE THE HEALTH-RELATED QUALITY OF LIFE IN THE BED PARTNERS OF PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA (OSA)?

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OSA affects 2-4% of middle-aged adults in Western society. Night-time symptoms include snoring, apnoeas and restlessness. Partners of sufferers report poor sleep and low health-related quality of life (HRQoL) (McArdle N *et al. Thorax* 2001; 56: 513-518). This pilot study assessed self-reported HRQoL and subjective daytime sleepiness of bed partners before and after a 2-week home trial of CPAP. HRQoL was assessed by the Short Form-36 questionnaire (SF36) and daytime sleepiness by the Epworth Sleepiness Score (ESS). 15 couples agreed to participate in a case series study, 11 subjects completed the trial and partners of all those completed the questionnaires. HRQoL for partners before the trial was impaired compared to matched local controls from the Sheffield Population Study in all domains of the SF36 (vitality (E/V) $p<0.001$; role-emotional (RE) $p<0.001$; role-physical (RP) $p<0.05$). Their HRQoL returned to that of the local population in all domains post trial. Partners did not demonstrate excessive sleepiness at the beginning of the trial (ESS=6) but were better at the end (ESS=2). CPAP thus improves life for 2 people: patient and partner. Health economists should be aware of this when evaluating the cost-effectiveness of CPAP treatment.

S2: SLEEP STAGING IN OBSTRUCTIVE SLEEP APNOEA (OSA): COMPARISON OF NEURAL NETWORK ANALYSIS (NNA) TO MANUAL SCORING USING RECHTSCHAFFEN & KALES (R&K)

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Sleep is a continuum, often with short 2 – 3s events. Traditional scoring with R&K uses multiple channels and assigns one of 7 sleep stages to a 30s epoch with further analysis for arousals. NNA uses 1s epochs and a single EEG channel, assigning a probability of a sleep stage to each epoch. **Aim:** To compare R&K scoring to NNA in patients with OSA. **Methods:** Patients underwent one night's full polysomnography. A single scorer manually scored the study using R&K and American Sleep Disorders Association arousals criteria. Data files were analysed using neural network analysis (Bio Sleep v4.0, Oxford BioSignals). Median filter was 15s, threshold was 0.25 and minimum arousal duration of 3s. Data are median (range) and in the format [R&K: NNA]. **Results:** 26 patients (2F) were compared. Apnoea index was 2.30 (0 – 67.1) and Apnoea-Hypopnoea index was 14.4 (0.7 – 93.2). Study time was 6.96 (1.9 – 8.4) hr. There were significant differences ($p<0.01$) between Number Awakenings [27 (6 – 68): 38 (9 – 102)], Deep Sleep [58.8 (0 – 231): 39.6 (0 – 107.8), mins], Arousals/hr [20.2 (5 – 86.1): 11.0 (2 – 41.0)] and Arousal Duration [5.65 (3.6 – 6.5): 6.0 (5.0 – 7.0), secs], and no significant differences between Total Sleep Time [5.10 (1.4 – 7.4): 5.13 (1.4 – 6.8); hr], Sleep Efficiency [73.9 (37.2 – 92.6): 77.7 (45.6 – 94.5); %] and Time Awake [68.5 (17 – 218): 82.2 (22.3 – 245); min]. Neural net analysis took 55 min and median manual scoring time 120 min.
Conclusion: Differences observed between R&K and Neural Net Analysis reflect the shorter epoch analysis time of 30s versus 1s. Neural network analysis provides
1) a simple computerized scoring of overnight sleep studies;
2) a more sensitive analysis of the sleep continuum and
3) reduces the overall time of analysis of sleep studies as compared to R&K.

S3: DOMICILIARY NEBULISER TREATMENT: HOW SHOULD WE ASSESS THE RESPONSE TO TREATMENT?

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The assessment for suitability for this treatment usually relies upon the response to lung function tests. There is usually little emphasis on the patient's own view of this form of treatment. The responses to treatment of patients being assessed for long term nebuliser therapy were identified using simple spirometry and a COPD Symptom and the LCADL questionnaire. Spirometry was performed prior to assessment and acutely following nebuliser administration and at review following 6 weeks of therapy. Questionnaires were reported prior to and following a six week course of therapy. The symptom and activity questionnaire consisted of 25 structured questions covering topics of symptom control, issues of well being and activities of daily living. 30 patients with COPD were assessed for nebuliser therapy. The mean FEV_1 was 0.89 Litres (0.311) with a mean FVC of 2.15 (0.74) Litres. Only 5 patients showed a significant response to acute nebuliser administration and 4 to the trial of nebuliser therapy according to the COPD guidelines. If FVC was used then this increased to 8 following acute nebuliser therapy and 6 following the 6 week trial. There was a significant decrease in the symptoms associated with COPD during the nebuliser trail period (Cumulative symptom score prior to therapy 47.4 (6.4), nebuliser trial 34.3 (9.5); $p<-0.001$). In addition there was a reduction in the degree of breathlessness caused by daily activities from a score of 49.3 (8.3) to 35.9 (7.3), $p<0.001$). 20 patients showed a reduction in symptom scores of more than 10 with 19 reporting an improvement in breathlessness ratings of more than 10. Only one patient reported an increase in symptoms and breathlessness during the nebuliser trial period. There was no relationship between decreasing COPD symptom scores and any increase in FEV_1 (correlation coefficient –0.138) or FVC (correlation coefficient 0.045). These results suggest that patients with COPD show an improvement in their symptoms with nebuliser therapy despite the absence of a significant change in FEV_1 or FVC. Symptom questionnaires should be used in addition to changes in spirometric indices when assessing the response of COPD patients to nebulised therapy.

S4: TO BLOW OR NOT TO BLOW: IS THERE A NEED TO PERFORM BOTH SPIROMETRY AND FLOW VOLUME LOOPS?

A. Jackson, A. Lewis and K.E. Oates. Respiratory Physiology Department, Papworth Hospital. Cambridge.

Pulmonary Transplantation started at Papworth in 1984 with the first heart lung transplant performed. Patients', dynamic lung volumes are measured using spirometry and Flow Volume Loop (FVL). This study was to determine if a significant difference existed between data generated using these methods and to determine if patients had a preferred technique. After performing both spirometry and FVL, 92 adults (51 male) were asked which technique they preferred. Student t-tests showed no significant difference in FEV_1, FVC and PEFR measured in both methods. With regards to preference, 38% had no preference, 36% preferred FVL and 26% preferred spirometry. Of the patients who preferred the FVL, 38% said that FVL was easier to perform and 69% of these said the mouthpiece was more comfortable. In patients who preferred spirometry 65% considered the test easier to perform. Patients tended to favour FVL although the majority did not express a preference. This study may have implications for monitoring pulmonary function in this group of patients. The need to measure spirometry in addition to FVL is questionable. Using only FVL would reduce the effort required from the patient and has reduced cost implications for the department.

THE TORTOISE AND THE HARE
A NEW PERSPECTIVE

Kevin Hogben, Technical Director, Pulmolink

We all know the story, the Hare and the Tortoise start the race together, the Hare leaps in front taking the lead, his big fast steps prove a little limiting on taking tight corners, in fact his definition around the bends shows very poor resolution.

Meanwhile the Tortoise travels on slowly and methodically, he is a proud contestant, he carries everything in full view, his house must be in order, everything is displayed for all to see, for him each bend is just a succession of small straights.

The Hare's popularity comes only from his sheer speed and large presence, no one has ever seen his house and all it contains remains hidden.

At the end of the race the Hare is a clear winner, however his team now evaluate all the data from the race, did he cut corners, they add and subtract points for technicalities. The Tortoise meanwhile walks through the race end point, he knows painfully every part of his travel no further correction is necessary.

You may think the moral of the story has been lost, think on....This was not one race but a series of many, the race was repeated many times, the outcome was always the same, yet the Tortoise without fail was there ready to start each new race.

We how do we apply this story to Respiratory Function Measurements; it is the story of diffusion measurement.

Fundamentally what changed with the concept of the Resparameter as a product in the early 1960's was the ability to standardise elements of the single breath diffusion test.

The study of diffusion is not new, it dates back to August Krogh in the early 1900's, various refinements have occurred until the present day.

The previously reported variability of the measurement was removed to a great extend by some simple controls applied to each subject tested. These are;

1. Volume inspired
2. Time of breath hold
3. Volume of washout
4. Volume of sample collection

By these simple controls the operator can easily distinguish if the subjects performance is improving or not.

A loss of inspired volume could be performance related, it could be reflected in the subjects vital capacity effort, it could be calibration errors on the instrument, it is easy to spot differences.

Some of the modern methodologies have blinded the user to these simple controls and led to errors in measurement outside of the range of normal variability.

It is the purpose of this article to highlight areas that need attention and try to unhide some of the perceived confusions.

First let us look at the basic analogue measurement of diffusion single breath, the technology was limited and assumption was built in to the products we all use.

The original Jones Meade method discussed the measurement as a function of time, however the analogue technology had to revert to the test as a function of volume. The reason was that diffusion time as opposed to the actual breath hold time should be measured from one third of the inspired volume until half of the sample. Now naturally the problem was that the analogue system had no way to know what was the volume inspired until it had actually happened, therefore was unable to calculate when to start the clock for diffusion time.

At the other end of the test with operator controls the washout volume and sample volumes were dialled in to the system and therefore simple divider circuits could determine half of the sample volume and stop the clock.

The solution was based on the "average" subject being treated and it was an observation that the vital capacity was typically in the order of three litres, therefore if the clock started at a volume into inspiration equal to the volume of the washout the diffusion time would be reproducible.

Therefore the clock started at washin = washout and remained timing until half of the sample volume was cleared. This measurement was diffusion time.

The second point was that the volumes were measured from a physical chart paper calibrated directly in litres; the scale was proportional to the perceived condition of the measuring transducer. In the case of the water bath spirometer the scale was perceived to be Ambient Temperature Pressure Saturated (ATPS). When the transducer moved to "dry" spirometer's then the correction should have been either Ambient Temperature Pressure Saturated at room conditions ($APTS_{RoomH2O}$) or it could have been assumed that it was Ambient Pressure Temperature Dry at room conditions ($ATPD_{RoomH2O}$). The difference between the two has little significance. With pneumotachograph transducers it depends a little on where they are coupled to the subject, close coupled at the lips would suggest the transducer measures at Body Temperature Pressure Saturated at 32-28 degrees ($BTPS_{32\text{-}28\ degrees}$). This would also be true of the mass flow sensor.

This then raises a further point for the measurement. At this time it is necessary to look at the formula.

The first measurement is that of alveolar volume (VA) this is described by the following fundamental formula;

$$VA = \frac{(\text{Volume Inspired} - \text{Total dead spaces}) \times \text{Trace gas inspired}}{\text{Trace gas expired} \times 0.95}$$

In our minds we subtracted all the volumes under the same conditions, the volume inspired was measured from the chart paper at one of the conditions ATPS or ATPD and then we subtracted the instrument dead space more lately the filter dead space and the subjects anatomical dead space on the premise of Weight in Kg x 2.2 equals anatomical dead space in millilitres or the assumed volume of 150 ml as recommended as an alternative in the BTS/ERS/ATS recommendations.

So when the instrument reports a volume on the screen in litres BTPS as is typical of computerised equipment in order to hold the same premise as before all the dead space volumes must be raised to the same condition before subtraction from the volume inspired.

As we are saying the dead space volume is a dilutant volume that we know in respect of the measurement.

In the equation listed above it would be typical having made all the calculations of the volumes in ATPS or ATPD to then correct the VA measured by the appropriate ATPS-> BTPS factor or ATPD-> BTPS factor.

Where the volumes are already measured and corrected to BTPS no further correction is required. The VA is at BTPS directly.

The 0.95 correction to an expired trace gas is only required when the trace gas is helium and the CO_2 is scrubbed from the sample line prior to analysis, as the CO_2 represented some of the exhaled volume we must correct for it.

With trace gases other than Helium or where the gas is not scrubbed of interferences in this way then the correction factor is ignored.

The alveolar volume is the single biggest error in the simple calculation, the confusion arising from the small differences in the calculation between ATS reference publications and ERS method publications. The answer should be the same.

Whilst Cotes addressed the issue that ALL volumes should be reported corrected to BTPS, the ATS continued to measure VA and report it at STPD.

The reason for this could be seen as the fact that diffusion is reported at STPD and therefore as VA is a component part of that calculation it can be reported as STPD, this is a confusion on computerised systems as often the condition of the value is not stated. Some of the confusion arises from the calculation presented in Cotes' Lung Function versions 2,3 and 4. The reader could have become confused by the application of the b factor. A factor never discussed in the American publications.

The b factor attempted further simplification of the calculation for single breath diffusion.

The b factor addressed several issues within the calculation,

1. The fact that volume was measured in litres and we wish to express the uptake in millilitres (factor 1000)
2. The time was measured in seconds and we wish to express the uptake in minutes (factor 60)
3. The fact that the uptake is exponential ($\log_e$) and for convenience we convert to log10 (factor 2.30)
4. We measure in SI units so we convert from mmHg (torr) to kPa (factor 0.1333)
5. Application of Avogadro's law converting a gram molecule from litres STPD (factor 22.4)
6. Correction of the alveolar volume from litres BTPS to STPD (factor .826)

This all relates as follows;
$B = (2.30 \times 60 \times .826 \times 1000) / (22.4 \times 0.133 \times (760 - 47)$

This approximates to the following factors;
B = 53.6 in SI units
B = 160 in Imperial Units

Applying this to the popular UK equation the following is its application;

$$Tlco = \frac{VA\ @\ BTPS \times 53.6}{\text{Diffusion time}} \times \log_{10} \frac{(CO_{in} \times Trace_{exp})}{(CO_{exp} \times Trace_{in})}$$

How does that compare to the formulae used in the USA? Well read on,

Original Inter-Mountain Thoracic Society Publication 1984

$$Tlco = \frac{60 \times VA\ @\ STPD}{(\text{Pressure} - 47) \times \text{Time}} \times \log_e \frac{(FaCO_o)}{CO_{exp}}$$

$$FaCO_o = CO_{in} \times \frac{Trace_{exp}}{Trace_n}$$

The current ATS guidelines read;

$$Tlco = VA\ STPD \times (1/Time) \times (1/(Press - 47)) \times Log_e(CO_{in} \times (Trace_{exp}/Trace_{in})/CO_{exp} \times 60$$

First although the equations are printed differently lets see how they correlate for results.

Basic Data

Subject Weight	80 kg	**Barometric Pressure**	760
Volume Inspired BTPS	5.8	**Room Temperature**	22
Diffusion Time	10.80	**Room Humidity**	50
CO inspired	.280	**CO Expired**	0.092
Ratio insp / exp	33%		
Trace inspired	14.00	**Trace Expired**	10.46
Ratio insp/exp	75%		
Valve Dead space	110 ml	**Filter Dead space**	70 ml
Anatomical Dead space	176 ml	**Sum Dead spaces BTPS**	389ml
ATPD -> BTPS	1.12027503	**ATPS -> BTPS**	1.09142854
ATPD -> STPD	0.92542373	**ATPS -> STPD**	0.90159455

From this raw data applied correctly to each formula we find the following;

Parameter	BTS / ERS	Inter-Mountain	ATS
VA Atps	N/A	6.63613 Litres	N/A
VA Stpd	N/A	5.98309 Litres	5.97 Litres
VA Btps	7.24 Litres	7.24286 Litres	7.23 Litres
Tlco	13.32	13.30	13.28
Kco	1.84	1.84	1.84

Note: As the ITS and ATS formulae are set to provide the answer in ml/min-1/mmHg the values have been corrected by dividing by 2.99 to convert to SI mmol/min/kPA

Therefore we can conclude that the "errors" in measurement between laboratories and between formulae if correctly applied does not account a significant difference.

Lets raise the question of methods.

The traditional method is that of the Tortoise, it uses bags for both inspiratory and expiratory effort, it uses traditional gas analysis methods and is not fast.

As the inspiratory gas is decanted into a bag, the pressure drop from the cylinder allows the gas to raise temperature and approach room temperature, the condition of a gas direct from a cylinder is dry, it could be assumed to be STPD condition.

The analysis method dries the gas and removes the CO_2 element, the analyser is corrected for any cross interference from Oxygen.

The disadvantages of this method are;

1. The volume inspired must exceed the sum of the washout and sample

Investigating this point

a) The washout must exceed the sum of all the dead spaces (approximately 400ml in our example) and perhaps a little more to ensure a good alveolar sample. 500ml?
b) The sample must be sufficient to supply the analysers and allow stability, this can be analysed as follows, with a sample flow of 400 ml /min the transit time of the gas is approximately 30 seconds, the stability of the analysers is approximately 30 seconds. Therefore we must have 1 minute of gas, we must have a sample of 400 ml or greater.
c) Therefore the subject must have a vital capacity of a minimum of 900 ml, however as we accept inspiratory effort can be 90% of the vital capacity the limit for this subject and this method is a vital capacity 1 litre to 1.1 litres to ensure a measurement.
d) The sample analysis time is over 1 minute

So can we improve on this method, as the measurement is a ratio it would be possible to measure smaller volumes if the sample was bigger, so it is acceptable to dilute both the inspirate and expirate bags with a known volume of dilution that is not part of the measurement i.e. room air, thus increasing the sample volume collected, as long as the dilution allow the analysers to operate in a linear range the answer will still be true.

Can we use other methods?

Fast gas analysers and bagless collection have been available for some time, these systems offer an alternative. This is the method of the Hare;

The gas is typically applied directly to the subject be means of a demand valve and so can be considered cold and dry (STPD condition).

At the end of breath hold the volume leads the gases in the same manner as breath-by-breath exercise testing.

As the subject exhales past the sample point the gas has a transit time delay to reach the analysers, then the analysers have a response time delay to the sample.

From manufactures published data the transit time from the sample point to the analyser is typically 600 – 900 milliseconds, the response time for fast gas analysers is in the order of 100 milliseconds.

Therefore the earliest the sample can be seen is 700 – 1000 milliseconds after the commencement of the exhalation. The computer must time align the gases to the volume by subtracting the transit and response times from the gas collection arrays.

Let us think to the gas, to achieve no response delay this type of system does not use chemical absorbers, the typical method is to use Nafion (permapure) tubing in the sample line.

Nafion is a sulphuric acid lined Teflon tube and works on the principle of equalising the water vapour content to that of the surrounding environment i.e. room water vapour pressure, so the sample is not dry. The Beckman group with Alan Norton did a lot of work on the effect of water vapour in non dry sample lines and methods of correcting to bring the sample back to a true STPD condition for the analysis.

The other point to consider is how much volume passes the sample point during 600 – 900 milliseconds? The test suggests the total expiration should occur no longer than 4 seconds after commencing expiration.

If the subject exhales too quickly or too slowly after breath holding the system may take the sample at an inappropriate place during the expiration.

The fast gas system allows the user to position the sample point on a graph, does the graph have sufficient resolution to allow such adjustment. A pixel difference on the screen may be many millilitres of volume.

So when considering the point of sample the operator must take careful note of the volume of washout and then sample used.

The method has the advantage that it can permit small sample volumes.

Lets look at the disadvantages of this system in the same way as before;

1. The volume inspired must exceed the sum of the washout and sample

Investigating this point

e) The washout must exceed the sum of all the dead spaces (approximately 400ml in our example) and perhaps a little more to ensure a good alveolar sample. 500ml? Does 500 ml occur in less than 600 – 900 milliseconds?

f) The sample must be sufficient to supply the analysers and allow stability, this can be analysed as follows, with a sample flow of 400 ml /min the transit time of the gas is approximately 100 milliseconds, we can use samples as small as 50 ml or greater. However do we know from how many data points the sample is taken

g) Therefore the subject must have a vital capacity of a minimum of 550 ml, however as we accept inspiratory effort can be 90% of the vital capacity the limit for this subject and this method is a vital capacity 610 millilitres to 700 millilitres to ensure a measurement.

h) The sample analysis time is only 100 milliseconds

i) The trace gas has changed from helium to methane to have the same method of analysis as the CO and hence the same analyser response.

Therefore this method can measure subjects with smaller vital capacities, time is not really an issue, as the guidelines suggest that repeat measurements should not be performed sooner than 5 minutes.

This is to allow the subject to clear any CO from the lung to avoid a increase in back tension, as already naturally occurs with smokers.

Some of the unanswered questions may be academic, the performance of the trace gas, do helium and methane distribute in the same way throughout the lung, is it important. This can be analyser by converting the measured values from a percentage gas concentration to a percentage of the inspired mixture.

In the table above you will see the percentage of the expirate gas in relation to the inspirate gas, we would expect if it performs in the same way then the ratio of inspired to expired will be the same for both the helium and the methane between methods. In a similar way the same analysis of the Carbon monoxide will reassure us that the analysers work in a similar way between methods.

So what can we conclude from our Tortoise and Hare story?

Conclusion

Whilst fast gas analysis will provide the ability to measure diffusion in subjects with smaller vital capacities, the opportunity for error is larger on fast gas analysis than traditional methods.

We must relate back to the basic controls of volume inspired, breath hold time, washout and sample. In order to compare methods these controls must be the same. In subjects with mixing impairment it can be clearly seen that measuring a sample at a different point of the expiration from method to method or worse from test to test will increase the variability of the results.

We can also learn that what the computer can do based on information stored in data arrays may actually be better defined than an operators attempts to manipulate a result dependant on pixel resolution on a screen.

So whilst the picture maybe look sophisticated, the picture is only as good as the data behind it.

No benefit in testing time with the subject is gained between the methods.

Finally if the numbers fail to come close between the two methods, it is not the calculation that is a source of error it is the ability to collect good raw data that is to blame.

The following table is a sample of data from a normal subject on instruments of different manufactures that demonstrates the inter centre variability and the relationship of different gases.

Instrument Type	Fast Gas Analysis 1	Fast Gas Analysis 2	Helium method 1	Fast Gas Analysis 3
Dates	17/10/02	17/10/02	17/10/02	15/10/02
Vol insp btps	5.85	5.81	5.56	5.44
VA	7.55	7.76	7.05	6.93
Tlco	12.53	12.75	11.39	12.3
Kco	1.66	1.64	1.62	1.77
CO insp	.305	.305	.280	.291
CO Exp	.091	.100	.097	.095
Ratio In/Exp	33.77	32.79	34.64	32.65
Trace insp	.296	.296	13.97	.291
Trace Exp	.215	.208	10.29	.224
Ratio In/exp	72.64	70.27	73.66	73.44
Diff Time	10.69	10.77	10.8	10.54
Washout	0.9	0.9	0.9	0.9
Sample	0.9	0.9	0.9	0.9

Instrument Type	Fast Gas Analysis 4	Fast Gas Analysis 5	Helium method 2	Fast Gas Analysis 6
Dates	16/10/02	16/10/02	21/08/01	19/04/02
Vol insp btps	5.56	5.92	5.73	6.11
VA	7.11	8.10	7.36	7.86
Tlco	12.60	12.17	12.80	13.17
Kco	1.77	1.50	1.74	1.68
CO insp	.291	.301	.268	100
CO Exp	.095	.105	.097	34.72
Ratio In/Exp	32.65	34.88	36.19	34.72
Trace insp	.305	.301	14.27	100
Trace Exp	.233	.209	11.06	74.15
Ratio In/exp	73.11	69.44	77.51	74.15
Diff Time	10.50	10.52	10.17	10.50
Washout	0.9	0.9	0.9	0.9
Sample	0.9	0.9	0.9	0.9

It would be interesting to compare similar data from known subjects with small lung volumes and then to increase the study to people with known pathology to see if large differences are present.

SLEEP EDUCATION MEETING BULLETIN

On Tuesday 10th September 2002 a meeting was held with representatives from ARTP, BSS and BTS to investigate any common ground for taking education and training in sleep medicine further forward.

Those present were;

Mrs Anwen Evans, BSS
Dr Melissa Hack, BTS
Ms Simone de Lacy, BSS
Dr Adrian Kendrick, ARTP
Dr Brendan Cooper, ARTP.

The main points from this meeting were;

1. There is a common ground between the interested parties to work together on Advanced and Basic Sleep Courses for scientists, technologists, doctors, nurses and other healthcare professionals.

2. The formation of this informal group under the title of UK Sleep Education Group (UKSEG) would be helpful and is open to other groups to join (e.g. EPTA). Pooling of professional resources is the key to getting the Education Programme off the ground.

3. There are no formal terms of reference for UKSEG yet, but there is a Chairman (AK) and a Secretary (AE) and there are two representatives on the Registration Council for Clinical Physiology (RCCP) for the next meeting (AE and SdeL). The executive group will number about 7 in total.

4. The aims of UKSEG are to define, design and construct firstly a Basic Training Course for measuring physiology during sleep and providing a basic sleep service - leading to a British Sleep Education Basic Award (BSEBA). The idea is not what to measure during sleep but that whatever is measured is measured correctly (e.g. actigraphy, oximetry, airflow, etc.).

5. Secondly, to develop an Advanced Training Course for the measurement and interpretation of more advanced sleep disorders and their clinical application leading to a British Sleep Education Advanced Award (BSEAA).

6. To establish Training Centres for sleep medicine and physiology in the UK (proposed centres suggested include: Oxford, Stoke, London (St Thomas'), Bristol, Newport, Edinburgh, Leicester and Dublin.)

7. The long-term plan is to develop a B.Sc. module for sleep physiologists and a Masters degree module for post-graduates in conjunction with the associated professional bodies.

8. The training programme will have 2-3 day course, a log-book of sleep studies to maintain, assignments (2-3), a written exam and a practical with oral viva. A certificate (joint ARTP/EPTA/BSS/BTS) will be awarded to successful candidates satisfying the examination board of the course.

9. To prepare and write training manuals and materials to support the courses

ARTP EXECUTIVE COMMITTEE REPORT TO BTS EXECUTIVE COMMITTEE NOVEMBER 2002

Dr Brendan G Cooper, Honorary Chairman ARTP,
Lung Function Department, Nottingham City Hospital, Nottingham NG5 1PB

Introduction

The ARTP is growing in membership (doubled in 5 years to approx. 600), developing to meet the *Making the Change* initiative and has re-structured Education and Training programs to deliver the professional exams and standards for the future. The Association is vibrant, enthusiastic, concerned about standards of care and dedicated to team-working and putting the patient first and foremost.

Voluntary Registration

To date there are only 124 respiratory physiologists on the Registration Council for Clinical Physiology (RCCP) register. However, only 146 staff have applied out of a workforce of 1200 nationally. Only 9 have been rejected because of inadequate experience. We cannot express enough how vitally important it is for lung function staff to get on the Voluntary Register as soon as possible. Failure to do so will lead to serious consequences for departments without registered staff as the submission for State Registration goes forward possibly within the next 12 months. ARTP need the continued support of BTS members to encourage and support their lung function departments to register staff with RCCP as a matter of urgency.

National Occupational Standards (NOS)

ARTP has whole-heartedly committed to developing NOS in respiratory measurement, and are about to pilot standards in departments throughout the UK. This development has taken great effort and will lead to national standards in lung

function testing in the NHS.

ARTP/BTS National Examination in Respiratory Physiology (Parts 1& 2)

In the last year, the ARTP Education Committee has been restructured into a "college" type structure with 3 main Boards for Examinations, Education & Training and Professional Standards.

The BTS/ARTP National Assessment in Respiratory Physiology 2002

60 candidates registered for the National Assessment. 45 (75%) completed and submitted their assignments, 9 of these failed their assignments, so only 36 (60%) entered the written /practical examination phase, and 24 (40%) candidates achieved a pass or above.

ARTP Executive are happy that there is an increase in members obtaining the professional examinations but are concerned about the lack of support from some Trusts for staff wanting to receive training. ARTP are grateful for the tremendous support given by BTS consultants to their lung function staff.

The Examination Board has re-structured the National professional exams to a one-day Exam held at 3-4 Centres in the UK. The BTS/ARTP National Assessment has been modified and expanded to become Part 1, which covers much of the previous competencies and Part 2 which introduces new competencies for assessment which include; Field Exercise Testing & EIA, Full Respiratory Exercise Testing, Bronchodilator Therapy, Respiratory Muscle Function, Pulse oximetry, Bronchial Challenge, Blood Gases (Invasive and Non-invasive), Body Plethysmography, Overnight Oximetry.

Handbooks are being written and courses developed to support candidates for the 2003 examinations. Any BTS members with an interest in respiratory physiology who wish to receive updates and training in respiratory physiology and measurement would also benefit from these courses. Clinical assessors from BTS would be most welcome to participate in the practical exams.

The ARTP/BTS Certificate in Spirometry

The uptake in the certificate is gaining interest gradually with an increase in courses run across the UK. Candidates (mainly nurses), are achieving the standards set and a recent audit shows that retention of competences at a year is about 80%. Centralisation of the administration will see a big increase in the number of candidates in 2003.

Meetings

The ARTP Annual Conference 2002 was held at the Hilton Hotel in Blackpool and was a great success, which attracted 380 attendees. The scientific content was superb with many national and international speakers contributing to this "essential for your diary" event. The 2003 conference is being held at the Moat House Hotel, Stratford and has attracted 27 manufacturer's stands to date.

Three Sleep Courses (2 Basic, 1 Advanced) have been run in Bristol, all of which were heavily over-subscribed and very popular. ARTP wish to work closely with BTS in putting on joint training in sleep physiology and medicine. To that end a UK Sleep Education Group involving BTS, ARTP and BSS has been formed to put together training courses and programmes for measurement and interpretation of sleep studies. This co-operation is another example of ARTP working as a part of the respiratory team.

Regional Groups

Regional groups have been established encouraging Heads of Department to meet regularly and build up a local professional network. One function of this 'network' will be to develop a national Quality Assurance scheme for lung function departments, with a view to the National Accreditation of departments within the next few years. This is part of our response to Making the Change and Clinical Governance initiatives.

Website & Forum

The ARTP email Forum acts as a significant and efficient communication tool especially for isolated departments in the U.K . Discussion on techniques, physiology, clinical cases and broad aspects of respiratory medicine make this a very useful resource for SpRs, consultants and specialist nurses.

The ARTP website (www.artp.org.uk) is an ever-expanding resource which keeps the membership (and non-members) informed of meetings, training, jobs, guidelines and developments in clinical respiratory physiology.

The Links between the BTS and ARTP websites have been established. The ARTP Guidelines and information on purchasing Non-Invasive Ventilation are available to all BTS members.

Finally

ARTP are proud to announce that a recent member of ARTP Exec and Past Chair of ARTP, Dr Sue Hill, has been appointed as the Chief Scientific Officer to the Department of Health. She has promised to raise the profile of respiratory medicine as high as possible in the coming years.

ERS Conference September 14th - 18th 2002
Stockholm, Sweden

Bursary article by Joanna Shakespeare, Queen Elizabeth Hospital, Birmingham.

I had an abstract accepted for a poster discussion at this years European Respiratory Society Meeting in Stockholm. The title of my abstract was 'The role of impulse oscillometry in the detection of upper airway obstruction' and had been placed in the session entitled 'Airway obstruction measurement (FOT-NEP): sleep and lung sound analysis'. The session was chaired by Dr A. Kendrick (Bristol, U.K.) and E. Oostveen (Edegem, The Netherlands).

My presentation focused on the use of impulse oscillometry (IOS) in the assessment of upper airway obstruction (UAO). Thirty one percent of patients with clinically diagnosed goitre demonstrate significant upper airway obstruction(1). Classification of UAO is traditionally made using either the Empey Index (FEV_1/PEF)[2] or the ratio of FEF50%/FIF50%[1]. However the use of forced inspiratory and expiratory manoeuvres may precipitate acute stridor in these patients and thus influence measurements. Furthermore poor technique and patient effort during forced manoeuvres can mimic results seen in UAO. IOS allows measurements of respiratory resistance to be made during tidal breathing and could therefore potentially alleviate problems associated with poor technique on forced manoeuvres.

The aim of my study was to compare results obtained from maximal flow volume curves (MFVC) with those from IOS in patients with thyroid disease. I studied sixty nine consecutive patients referred to the lung investigation unit with retrosternal goitre associated with thyroid disease. These patients performed a minimum of 3 MFVC's followed by 3 measurements of IOS and all tests were performed according to national guidelines[3] and manufacturers instructions. For IOS the measurement of resistance at 20Hz (R20) was made as this has been found to equate to central airway resistance.

Table 1

	Mean ±SD	Range
FEV_1 *L*	2.48 ±0.72	0.84 – 3.99
FVC *L*	3.08 ±0.79	1.17 – 4.79
PEF *L/s*	5.75 ±1.49	2.17 – 9.47
Empey Index	7.34 ±1.51	5.00 – 12.00
FEF_{50}/FIF_{50} %	97.86 ±52.30	21.00 – 291.00
R5 *%Predicted*	158 ±54.08	76.00 – 284.00
R20 *%Predicted*	142 ±46.54	71.00 – 326.00
X5 *kPa/l/s*	-0.19 ±0.14	-0.71 – 0.01

Table 1 summary of the group lung function data.

As can be seen in Table 1, for the whole group mean results for all parameters were within normal ranges. Only 5 patients demonstrated airflow obstruction (mean FEV_1/VC % 80.5 ±0.75). Mean Empey Index did not indicate UAO, however there was an increase in resistance values with a mean R5 158% predicted and R20 142% predicted.

Table 2

Measurement	% of patients (n=69)
Empey Index (>10)	6 (n=4)
FEF_{50}/FIF_{50} (>100)	41 (n=28)
R20 (>150% Predicted)	46 (n=32)
Combination of FEF_{50}/FIF_{50} and R20	65 (n=45)

Table 2 demonstrates the detection of UAO according to measurement.

Table 2 shows that only 6% of patients with clinically significant goitre had an elevated Empey Index. Forty three percent of patients with an Empey Index less than 10 had a significantly increased R20 value. Forty one percent of patients with a normal FEF50/FIF50 ratio had an R20 value greater than 150% predicted. R20 in addition to the FEF50/FIF50 ratio identified a further 16 patients as having significant UAO.

In conclusion IOS was found to be more sensitive than parameters obtained during forced expiration in the detection of UAO. The addition of IOS measurements to MFVC's will identify more individuals than MFVC alone. IOS could potentially be used diagnostically in the assessment of UAO and provide additional information in patients with goitre.

The rest of the session included presentations on the use of forced oscillometry (FOT) in various disease states. FOT differs from IOS in the test signal that is used to measure respiratory resistance and reactance.

E. Bucchioni et al (Milan, Italy) presented the use of FOT in patients with scleroderma, idiopathic pulmonary fibrosis (IPF) and connective tissue disease. They concluded that the FOT technique is a sensitive method for following patients with severe interstitial lung disease. In contrast L.D. Kiryukhina et al (Saint-Petersburg, Russia) found that changes in measurements of FOT were not specific in patients with IPF. However they did conclude that the results found may reflect changes in elastic properties seen in these patients.

R. Bossi et al (Milan, Italy) looked at whether FOT can be used to differentiate between simple snorers, OSAS and COPD. As would be expected they found that the resistance measured at 5Hz (R5) was significantly greater in patients with COPD. Interestingly R5 was also significantly greater in those with OSAS when compared to snorers. This group concluded that FOT, in particular the measurement of R5, can be used to discriminate different types of obstructions.

It can be seen that the usefulness of the oscillometry technique in the clinical setting is still to be established. Hopefully with continued research and presentations at forums such as the ERS meeting this will soon be determined.

References

1. Miller, M. R. et al 1990 Upper airway obstruction due to goitre: detection, prevalence and results of surgical management, Q.J.Med 74: 177-188
2. Empey, D. W. 1972 Assessment of upper airway obstruction, BMJ 3: 503-505
3. ARTP/BTS 1994 Guidelines for the measurement of respiratory function, Resp Med 88: 165-194

CANDIDATE EVALUATION OF THE ARTP/BTS NATIONAL ASSESSMENT IN LUNG FUNCTION MEASUREMENT 2002

Written, on behalf of the ARTP Executive Committee, by Jane Caldwell, Honorary Secretary ARTP

2002 has seen a number of changes to the format of the national assessment such that members of the ARTP examination board and a number of assessors involved in this year's process met on the 19th August to critique the whole mechanism. It was decided at this meeting that it would also be useful to approach the candidates involved to obtain their feedback. It was agreed to involve those candidates that had completed all three parts of the assessment, i.e. assignments, practical & theory such that an overview of the whole process could be obtained. Candidates who only took part in this year's assignment process where not included in this evaluation.

A total of 60 candidates applied to sit this year's assessment of which 15 withdrew before the deadline for returning the assignments expired.

43 candidates had their assignments submitted (2 candidates had submitted their assignments last year and of these, 1 candidate was just re-sitting the written part of the assessment & 1 candidate was sitting the practical & written parts). Of these 43 candidates, 34 candidates (+ 1 re-sit & 1 who submitted assignments last year) were allowed to proceed to the next part of the assessment i.e. the practical & theory parts. Thus a total of 35 candidates were scheduled to take the practical examination & 36 the written part of the assessment. Please note that 7 of the 34 candidates were allowed to enter the next parts whilst a different assessor was remarking one of their assignments, which at that stage had borderline marks.

The 36 candidates who received an evaluation form were asked about several different parts of the assessment including:

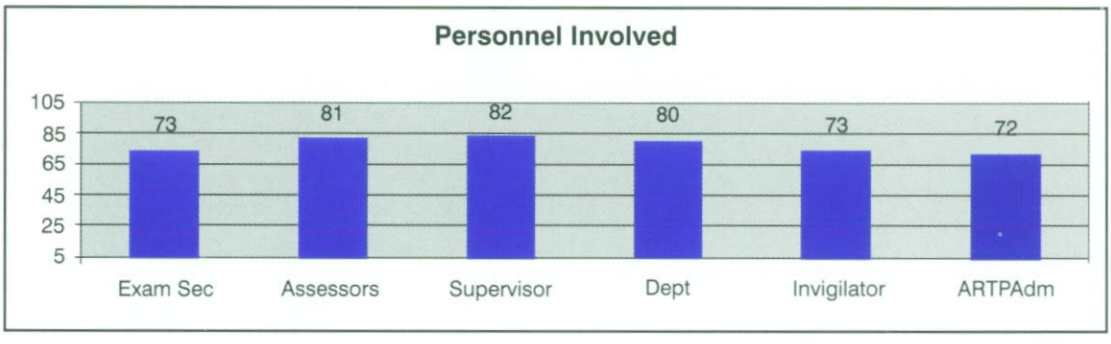
1. Personnel involved in the process
2. Practical Centre visited
3. Assignments
4. Practical Assessment
5. Written Assessment
6. Results
7. Any further comments

Each candidate was given the choice of anonymity or alternatively they could enter their details for entry into a draw for one year's free ARTP membership as an incentive to return the forms. The evaluation form was produced and submitted, before being sent to candidates, to an external expert in education and training such that a fair and valid evaluation could be obtained.

Results obtained

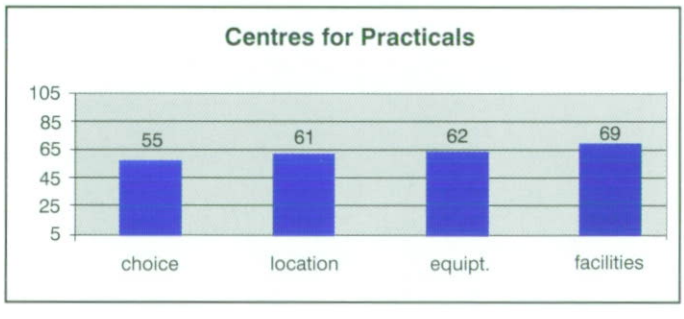
Of the 36 forms sent, 23 forms were returned, i.e. 64%. 12 candidates chose to retain their anonymity (52%). A deadline of October the 1st was given but a few were received after this date which were still included in this evaluation. Two evaluation forms were not included in the results as they only had evaluation on one part of the assessment process, but the comments were noted.

Section 1. Personnel involved in the Assessment Process



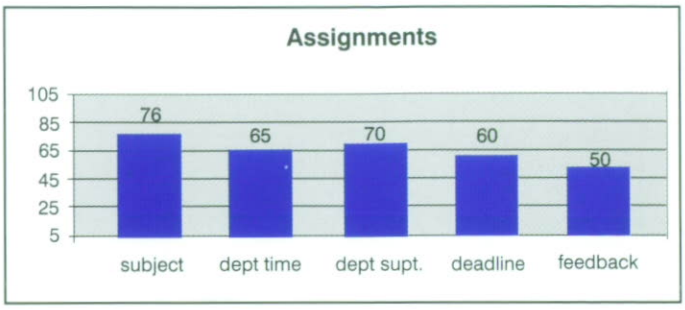
Personnel involved with the assessment process where graded according to their support & help. These included the Examination Secretary, Practical Assessors, Candidate's Supervisor; Candidate's Dept; Invigilators and ARTP Administration whom were all appraised. Marks were out of a total of 105.

Section 2. Practical Examination Centre



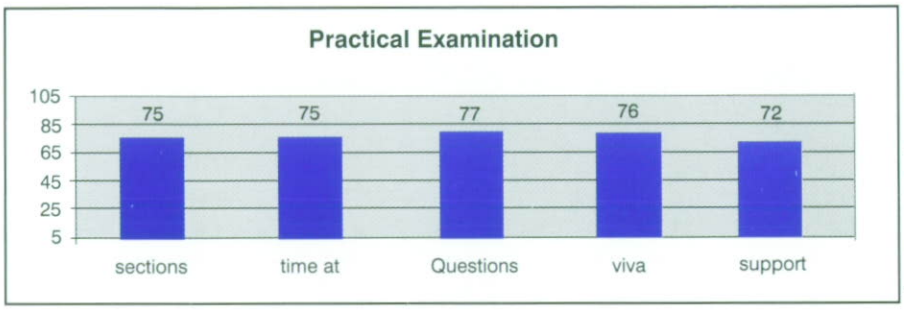
Candidates were asked about the choice of centres available, the location available, equipment used & facilities on site at the centre attended. Again all marks were out of a total of 105.

Section 3. Assignments



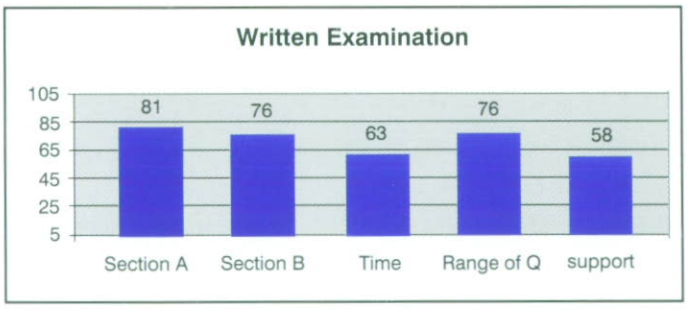
Candidates were asked about their opinions on: subject matter of assignments; time given by depts to complete assignments; support given by depts; deadlines for completion & feedback given.

Section 4. Practical Examinations



Candidates were asked their opinions about the use of separate practical subsections of assessment; time at each subsection; questions asked at each subsection; the clinical viva and the support given by the candidate's supervisor regarding mock assessments. Again marks were out of a total of 105.

Section 5. Written Examinations



Candidates were asked their opinions on section A and Section B type questions; time allowed for the exam; range of questions asked and support given by their supervisor e.g. Mock type questions. Totals again are out of 105.

Section 6. Results

Candidates were asked their opinions about the method of being informed about their results; timing of releases of results and feedback given. Again marks out of a total of 105 in each case.

The candidates were also asked to make comments about each section with any overall comments if applicable.

Discussions

Several points are included for discussion from this evaluation:

Section 1. Personnel involved: the majority of personnel involved obtained satisfactory marks in evaluation suggesting that overall the majority of candidates were happy with the help & support received. However there were some negative comments from individuals, which mainly related to lack of communication from specific personnel. Conversely there were some very positive comments overall about specific personnel members involved in the assessment process.

ARTP response: *the executive committee appreciates candidate acknowledgement of where we have been successful and will endeavour to address the individual highlighted concerns in future assessment processes.*

Section 2. Practical Examination Centres: this caused the most concern for candidates. Choice of centres available and location of centres where felt to be limited and not easily accessible. Equipment was not familiar to candidates and therefore felt to influence overall performance of candidates. Facilities available at centres received varied comments from "excellent" to "average".

ARTP response: *the limited centres available were partly due to the fact that we only had a small pool of suitable assessors available and therefore we were only able to offer four centres in total. We have recently asked for suitable volunteers from the membership to take on the role of assessors. We have had 27 volunteers so far and therefore will be able to offer more centres next year for assessment of candidates.*

Section 3 Assignments: again this highlighted some areas of concern from candidates. Whilst the majority of students were happy with the subject matter and the own departments support with the assignments, some reservations were expressed about the time allowed for completion, the time given by their department at work to complete the assignments and the feedback given from assessors for work submitted.

ARTP response: *future assignments will be reviewed and although case studies may still be used, the assignment tasks will be changed. Supervisors will be encouraged to support their candidates to a recommended national level, such that all candidates have the potential opportunity to obtain the support thought to be needed. A supervisor's course will be available for supervisors who require advice, training and support in this very important role. Feedback on assignments will be more constructive and standardised.*

Section 4: Practical Assessment: generally this section was positively appraised. One or two negative comments regarding procedures undertaken were expressed, which will be considered in next year's assessment process, but overall this section was very well received.

ARTP response: *the practical assessment format had previously involved two assessors visiting the centre of the candidate, but numbers in this year and future years dictate that this can no longer be the acceptable standard due to many obvious factors. Although the candidates now have to travel to a nominated centre this is the only option available when dealing with the large number of candidates involved. To ease the candidates unfamiliarity with the centre and equipment the ARTP is recommending that all candidates visit the centre allocated as part of the assessment process to allow themselves to familiarise themselves with the same. Equipment being used for assessment at each centre will be clearly specified and stated in the assessment information forwarded to candidates. Candidates will have to give more detailed information about their own department's equipment used, including computer software. Generic report formats; standard calculations and patient data forms will be used as part of the assessment format.*

Section 5 Written Assessment: Overall candidates were generally satisfied with the Section A & B questions, range of questions asked, but several candidates suggested that the time allowed was insufficient. Another area of concern was that supervisors generally did not subject candidates to mock type questions or vivas and that access to previous question papers would be beneficial.

ARTP response: *past papers have traditionally not been available to candidates, however it has been agreed to produce some sample questions for candidates for future reference. The examination time for the written paper has been increased from two and half hours to 3hours. The format of the assessment will remain the same. The Supervisors course will address how the supervisors can help the candidates prepare for the written assessment.*

Section 6: Overall results: generally the majority of candidates were happy with the timing & method of obtaining their results, but the majority of candidates felt that the overall feedback given was unsatisfactory.

ARTP response: *feedback to candidates is an issue, which the committee are committed to address over the next 12 months. In addition a training day, run by qualified assessors will be made available for all assessors to attend to address all aspects of assessment including feedback.*

Overall Evaluation: most parameters measured in this evaluation had a reasonable score. The majority of scores were over 70 marks representing at least 66% of the marks or greater. Parameters scoring less than 70 marks have been highlighted and acknowledged and were appropriate have been/will be changed to meet desired improvements in future assessments. These include:

1. Increased centralised administration
2. Availability of more assessment centres
3. Assessment on clearly stated and specified equipment
4. Prior exposure to this equipment before the assessment day
5. Availability of more assessors
6. Supervisors training day
7. Increased input requirement from candidate supervisors and departments
8. Assessors training day
9. Increased time allowed for theory paper
10. Constructive feedback by assessors/examiners to candidates.
11. Review of the candidate & supervisors information documents & appeals process

Final thoughts:

The committee acknowledges and appreciates that the candidates have a difficult task in undertaking this assessment process and also that there is a pronounced and varied amount of differing support given to candidates nationally, which will ultimately affect their overall performances. The ARTP are committed to readdressing the in-balance of guidance and support of candidates' by their supervisors and departments.

The committee are also committed to providing an assessment that is professional, standardised and admirable, reflecting the competency needs of the future. In this we too have a difficult task and ultimately need the support and backing of the membership to meet these aims. All committee members have other priorities and commitments along side their ARTP roles and therefore cannot do it alone. We are a committee that listens, and we will keep listening and we are willing to adapt and make changes if appropriate.

Finally we would like to acknowledge all the candidates who took part in this year's assessment process and specifically to those who contributed to this evaluation. We have listened, we have made changes and we acknowledge your concerns and we are particularly appreciative of your positive comments.

MEETINGS AND COURSES

ARTP ANNUAL CONFERENCE
MOAT HOUSE, STRATFORD UPON AVON
16th - 18th January 2003

For last minute registrations please contact ARTP Conference Administration, 202 Maney Hill Road, Sutton Coldfield, West Midlands B72 1JX
Tel: 0121 354 8326

ARTP SHORT COURSES
BASIC SLEEP COURSE BRISTOL GENERAL HOSPITAL
27th to 28th February 2003

Course will include basic sleep physiology, pathophysiology of OSA, methods for basic screening and assessing patients with suspected OSA, interpretation of screening tests for suspected OSA, CPAP and issues related to driving and OSA and other medical issues.

Registration fees: ARTP Members £170 ARTP Student Members £155
Non Members £200

ADVANCED SLEEP COURSE - BRISTOL GENERAL HOSPITAL
19th to 21st March 2003

Details on the ARTP Web Site soon

For registration and further details please contact: ARTP Administrator, 202 Maney Hill Road, Sutton Coldfield, West Midlands, B72 1JX
Tel : 0121 354 8326

BRITISH THORACIC SOCIETY
SUMMER MEETING 2003
CARDIFF TOWN HALL
26th to 27th June 2003

E.R.S CONGRESS 2003
VIENNA
27th September - 1st October