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Inspire

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FIRST WORD

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40 years. 1976, I remember as being a particularly hot (in the traditional sense) summer but you can read all about it HERE. Eight Chairpersons (?) in 40 years puts many a football club to shame in terms of retention for what is, after all, a much more stressful job, moulding a team out of physiologists who each bring different skills to the table. This issue includes testimonies from most of the eight who have helped to develop the ARTP into the important institution it is today. Their remit was to write about their time as Chair, how things changed and how they see things developing in the future. I am grateful to each of them for taking the time out from their day jobs to contribute these informative articles, which also serve to highlight the differing personalities involved. Maybe there will be scope for an ARTP Chairs 'Top Trumps' game in another century?

Reading through the articles, common themes emerge— of people giving up their time (the volunteering often seems to have occurred during or after a drink, hmmm, sounds familiar), of the manufacturers being involved as part of the ARTP "family" and of the growing role of the conference as a means of cementing the ARTP "way". Each Chair has stressed how enjoyable the role was for their personal and professional development. Links were nurtured with other professional bodies, the role of education grew and continues to grow, so that there is now a clear pathway to becoming a Healthcare Scientist and eventually the administration became so involved, as numbers grew, that fortunately a company was formed to ensure it all ran smoothly!

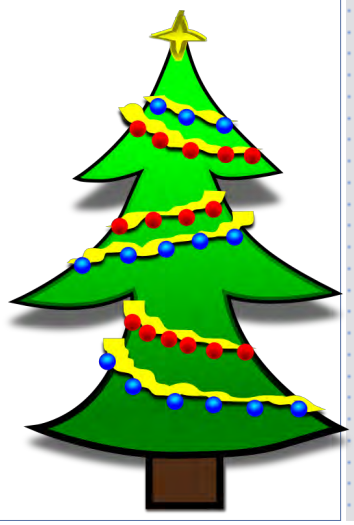
Although I was aware of ARTP as a student (I saw the odd copy of 'Breath' in the staff room) it was not promoted by the laboratory I worked in at the time. Thankfully, I think this has now changed for the better and most are aware of the ARTP. My experience of ARTP conferences starts in the late-80s, I think, a Shakespeare pun-laden speech by Brendan, at the Stratford-upon-Avon event, being a particular early memory, for some odd reason!

Lung Function equipment has changed greatly since I was a student, often for the better and although I have always been a great advocate of the use of PCs to record data I do miss the old X-Y plotters and the palaver involved to set-up a flow/volume loop test. An article highlights what a certain Mr Kendrick made of the new fangled technology back in the day.

We have , of course, the regular 'On the Blower', plus three high quality ERS Travel Grant winners and one from the archive to complete this action-packed 40th anniversary special.

I hope you enjoy the issue. We shall continue the 40 years celebration in each issue during 2016. Please contact me at inspire@artp.org.uk if you have any suggestions for articles you would like to see in future issues of 'Inspire'.

Wishing you all a Merry Christmas and a Happy New Year.



Aidan Laverty

40 years of ARTP Chairs

LEN SMITH

ARTP CHAIR from 1976 to 1978

SALLY GOUGH

ARTP CHAIR from 1978 to 1980

In the early part of 1975 several people working in respiratory laboratories thought that it would be a good idea to meet up to see if it would be possible to form a respiratory association. The first meeting was held at Kings College Hospital and the following people attended:

Len Smith, Derek Cramer, Jane Jones, Sally Gough, Gloria Gessey, Anne Watson and Kelvin Houston.

In the latter part of 1975, we formed a Steering Committee and the constitution was written and the **Association for Respiratory Physiology and Technology** was officially formed.

During the last forty years, eight people have held the position of chairman: Len Smith, Sally Gough, Derek Cramer, Sue Hill, Brendan Cooper, Damian Muncaster, Martyn Bucknall and Karl Sylvester. I chaired the ARTP between 1980-1983 and I served as Treasurer between 1979-1980. I continued to sit on the Executive Committee for over ten years and was the London Regional Organiser for more than twenty years. I also acted as the ARTP Clinical Advisor for over ten years.

I have chaired a significant number of ARTP meetings and conferences and have given many lectures at these meetings. I have written numerous articles for the association journals and I wrote my first article for Breath in 1975 and the last one in 2011 for Inspire, just before I retired.

DEREK CRAMER

ARTP CHAIR from 1980 to 1983

Derek Cramer was the Consultant Clinical Scientist and Head of the Lung Function Department at Royal Brompton Hospital from 1974 to 2011

I have published approximately thirty five papers in peer-reviewed medical and scientific journals. Many of the techniques that I have described in the papers are still being used today by ARTP members and others working in respiratory laboratories around the country.

While I chaired the ARTP, one of my aims was to create more formal links with the British

Thoracic Society as I believed this was important in order to raise our profile with a highly respected Medical Society, who would support our cause. This occurred and we now have very good links with the BTS.

I have been actively involved in Education and Training of ARTP members and also to students attending respiratory physiology courses at City of Westminster College and at NESCOT.

I wrote my first article for Breath in 1975 and the last one in 2011 for Inspire, just before I retired

I was the lead trainer at the Royal Brompton Hospital on the National ARTP/BTS spirometry courses and I hope it enabled the students to have a better understanding of the service they could offer their patients.

In 2006 I was given a lifetime achievement award by the ARTP for services to Respiratory Physiology. In 2012 I was enrolled into the Healthcare Science Roll of Honour by the Rt Hon Andrew Lansley, Secretary of State for Health and Professor Sue Hill, Chief Scientific Officer at the Department of Health. I was very privileged to receive this special lifetime award for my contribution to Healthcare Science.

I believe that the ARTP is a highly respected respiratory physiological association which has now developed good links with other eminent scientific and medical societies. The membership has continued to rise from about twelve members in 1975 to approximately seven hundred and sixty in 2015.

ARTP have continued to progress very significantly in many areas and particularly in education and training. We have been fortunate, of course, to have a dedicated and active education committee to facilitate this.

The Annual General Meetings have improved so much over the years and we now attend very elegant conference centres in which papers are presented in the most professional manner.

I believe that the ARTP is a highly respected respiratory physiological association which has now developed good links with other eminent scientific and medical societies

The future looks promising for the ARTP as we move forward into 2016. We have a professional organisation with many dedicated members who willingly give their time, effort and expertise to improve the high standards we already offer with education and training, standards of practice, research and audit, diagnostic assessments and treatment and care of patients with respiratory disease.

I believe that ARTP members are caring professional guardians in the field of physiological measurement and respiratory medicine in the UK and long may it continue.

Derek Cramer

40 years of ARTP Chairs

I have watched the ARTP develop throughout my career, especially since the Society was only founded shortly after I joined the NHS in the mid 1970s. It was very different then in so many ways !

If you sit in a modern lung function laboratory, surrounded by the latest equipment and highly trained colleagues, it's easy to forget how far the profession and the practice of respiratory function has moved over that time. In the mid-1970s we were still using chemical methods of measuring expired gases using for example original Haldane equipment ! We used huge Douglas Bags to collect gas for analysis as part of exercise testing and I remember having to calibrate all of our analysers using concentrations of pure Carbon Monoxide and Helium and making careful internal adjustments to the instruments themselves.

Respiratory physiology then felt very experimental. We were working at the limits of basic science, pushing boundaries and developing our skills by experiment, working with the patients that we saw. Nowadays this might be dismissed as ad hoc and unstructured, but this was establishing the potential and scope for our work in this important disease area.

It was a time of storming and forming as the NHS was just starting to recognise the importance of medical technology and its application to healthcare and improving the lives of our patients.

I first became involved with ARTP when I went to Birmingham on 2 Jan 1980 to take up a post as a Research Assistant, working between the then General Hospital and the University of Birmingham and joined the Executive Committee later in the year having attended an annual meeting of the Society at Walsgrave Hospital in Coventry. In those days an ARTP meeting was a group of people meeting often in small departmental seminar rooms– far removed from the large national meetings of today. The latter hopefully being seen as one of my legacies from the 25th anniversary celebrations!

PROFESSOR SUE HILL OBE

ARTP CHAIR from 1983 to 1989 and 1991 to 1997

Professor Sue Hill OBE was Chair of the ARTP Executive Committee from 1983 to 1989 and 1991 to 1997, having been a member of the executive since 1980. Prior to taking up the Chair of Executive she established and chaired the Education Committee . She continued on as Chair of the ARTP/ BTS Liaison Committee until becoming the Department of Health Chief Scientific Officer in 2002 (now Chief Scientific Officer for England working across the health and care system based in NHS England).

I soon developed a passion for education and training, realising that the profession needed a clear structure and process to support the development of individuals to match the growing skills and knowledge base of our science. Clear, high quality, reproducible education and training programmes have to be one of the defining foundations of any profession and is crucial to building respect and recognition

> In the mid-1970s we were still using chemical methods of measuring expired gases

amongst clinical colleagues and the wider population.

I became Chair of the ARTP Education Committee in 1982 and Chair of the Executive the following year, working to formalise education and training and professional standards. This included leading the development of revised guidelines and standard operating procedures for different techniques and also the development of a completely new range of professional examinations and courses to mark attainment and drive continuing development of skills.

The other great mark of a profession is how it forms links with other groups and bodies to establish and develop its position within the broader landscape of its sector. One of the great achievements of the ARTP during my time as Chair was to take all the internal development work we had done, particularly around education, training and professional standards and to take this out to support the development of other bodies and organisations within the Healthcare Science family (and more latterly to the broader professional team in Respiratory Medicine). This started my career-long involvement—initially as a professional representative - with the Department of Health and all of the different NHS and national health education and training bodies over the past 30-plus years.

I helped to found the ARTP/ BTS Liaison Committee, back in 1986, going on to Chair the group for six years. I took the ARTP's achievements to the Education Committee of the BTS, spurring the development of innovative multiprofessional approaches to short course and annual meeting programmes. Likewise, I was able to take the ARTP's experience through membership of the BTS's Standards of Care Committee and review the guidelines and recommendations made for the diagnosis and care of a range of conditions and diseases.

> I feel that my time leading ARTP and the alliances that I have forged for the profession have helped take me on through my career

In my era, the ARTP was also able to lead significant developments across the whole of healthcare science, playing a central role in the Federated Associations for Medical Technology, the Association of Clinical Scientists, and, importantly, in the setting up of the Registration Council for Clinical Physiologists, setting out and assuring high standards of practice across the range of physiological specialities. With other colleagues in Spain and the Netherlands I also made the case for, and established the first Respiratory Professionals Assembly within the European Respiratory Society. I was its

first head and am pleased to see the work of this assembly go from strength to strength now under the leadership of Brendan.

The final element of groundwork we established during my time with the ARTP was the development and strengthening of partnerships with the medical technology industry, helping bring new devices into clinical practice and assess their effectiveness, providing great opportunities for innovation and development in the years that followed.

I'm particularly proud of my work within the ARTP at what was a very formative time for the profession and for the healthcare science profession more broadly. I was lucky to work with a great group of people at the time to lay the strong and comprehensive foundations across some crucial areas that has allowed the society to develop to the force it is today – not only within respiratory physiology but also more broadly in respiratory medicine and healthcare science. Many of the people I have worked closely with during my time at ARTP have become longstanding friends (as have many who have also worked with me in my new roles). We are all bound together by a common set of values that signify us as individuals and that we each brought to ARTP. I particularly want to single out Sally Gough, Janie Jones, Gillian Manning, Sue Bradbury, Angela Evans and Brendan Cooper. I would like to pay tribute to the staff who worked for us as we have taken on national roles and particularly my previous staff in Birmingham. It has been a pleasure to see Jodie Hunt and Jo Shakespeare, who I trained, taking on significant ARTP roles.

It's really satisfying to see that others have felt that they can learn from the way we have done things. On a personal note, I feel that my time leading ARTP and the alliances that I have forged for the profession have helped take me on through my career and it has been really pleasing to see how taking on this important and valued role has helped to do the same for those who have followed after me.

I am confident that the ARTP will go from strength to strength and am delighted to be part of these 40 year celebrations.

Professor Sue Hill OBE

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40 years of ARTP Chairs

DR. BRENDAN COOPER

ARTP CHAIR from 1998 to 2006

Brendan Cooper was Head of Service/Clinical Scientist at the Nottingham City Hospital Lung Function Department, from 1992 to 2002 before taking up post as Consultant Clinical Scientist at Queen Elizabeth Hospital Birmingham in 2003.

I followed on as Chair of ARTP from Sue Hill at the "25th Anniversary" in 1998 (even though it was only 22 years, but Sue was rubbish at sums then!).

That conference was a huge sea change for ARTP as we went from sharing summer meetings with BTS and small hospital-based winter events to our own "large venue" hotel-based annual events. It was an exciting time to be leading such an enthusiastic, refreshed Executive Committee and having a membership that were ready for a bigger, better and more influential professional leadership. I served 3 terms of office over 9 years and during that time saw almost a complete change of Exec members. These were heady days for ARTP.

Training and Education

We launched the spirometry training certificate with lots of resistance from nursing and primary care colleagues who claimed we were over-complicating spirometry – they eventually ate (blew?) their own words! Furthermore, this certificate has formed the bedrock of the European Spirometry Driving Licence that is setting a global standard in respiratory patient diagnostics. We established the Website and Forum which I think was the reason why the ARTP has grown and become more relevant to our members both then and now. The next enormous task was establishing the 4 year B.Sc. training route in cooperation with RCCP. The Education Committee chaired by Angela Evans MBE and then Julie Lloyd, did a brilliant job producing what was an amazing training programme for Clinical Physiologists. Sadly, Modernising Scientific Careers (MSC) PTP, STP & HSST has meant that the 4-year course wasn't compatible with the MSC model. Nevertheless, much of the content of that B.Sc. curriculum was used to develop the PTP and STP curricula being used today, so all was not lost.

Some of the most successful work in Education happened because we published the Spirometry, ARTP Part 1 and Part 2 Handbooks, which no other UK professional bodies in physiology were able to do. It was upon this backbone of knowledge that we built our training numbers up and set our high standards in education and training.

Administration

Another giant leap for ARTP was the appointment of Jackie Hutchinson and EBS as our administration support. I like to think that ARTP and EBS have grown up together and become greater than the sum of our parts. Prior to this, the Executive Committee members would attend meetings, do all the administration and hold down the "day job" as well. Suddenly we were able to respond to consultations, develop projects and have more efficient and effective functions as a professional body. We had enormous influence with other organisations (BTS, RCCP, DH, etc.) because we were active, responsive and versatile. Other professional bodies have eventually woken up to our approach and now EBS host many sister physiological colleagues' administration.

Manufacturers

Another great achievement in my tenure as ARTP Chair was the development of the Manufacturer's Liaison Committee which has built incredibly strong bonds between ARTP and our manufacturing colleagues. I have always believed that the manufacturers are as important a part of the ARTP as the members themselves because the symbiosis between us not only helps ARTP set standards, but has also been good business for many manufacturers. It has always been a challenging, fine line to tread between defending members, exposing poor practice and keeping strong links together. Nigel Clayton and Alan Moore have done a brilliant job, albeit with the odd upset applecart, threatened law-suit and apologetic withdrawal of claims. Because of our efforts, patients are safer, equipment is more reliable and there is still a lung function industry in the UK!

Manufacturers continually tell me that they attend no other conference where they feel a part of the family like at ARTP

Achievements

People have asked me what my greatest professional achievements have been and I have to respond that the development of "the ARTP Way" has been the highlight for me. This was very much a deliberate strategy to create the Conference as the centre of our activities – a focus for awarding academic success, recognising great science, celebrating our profession and having a good time networking together and building friendships across the country. I started the customary after-dinner speech to thank our sponsors which developed into a bit of fun, reflection and unifying of members, manufacturers and Allied Healthcare colleagues. I've always judged that humour is a great way to share understanding and perceptions and to make us think about what is really important using irony, exaggeration and a bit of light hearted ridicule. If I have upset anyone over the years – get over it, life's too short to be that serious! Indeed, at conference and on our Forum, we have shared grief, sadness and despair with individual, national and international tragedies for our members and colleagues. It is that concern, support and caring for each other that is the hallmark of "the ARTP Way". Manufacturers continually tell me that they attend no other conference where they feel a part of the family like at ARTP – and long may that continue!

Thanks

It's very hard to thank specific people because there have been so many great colleagues, friends, supporters and compatriots (many mentioned above) on this ARTP journey. Some individuals stand out for me from my days as Chair: Sue Hill OBE, Jane Caldwell, Angela Evans MBE, Sue Revill, Pat Mitchell MBE, Trefor Watts, Adrian Kendrick, Alan Moore, Keith Butterfield, Andy Robson, Aidan Laverty, Jo Shakespeare and of course my nearest and dearest Julie Lloyd. If you haven't been included in this list, don't feel left out, I am so lucky to have worked with all of you who have given time, effort and commitment to what I regard as one of the most important aspects of any career.

Regrets

There are a few posts on the Forum, I wish I hadn't sent, but then again there are a few drafts I didn't send which I wish I had! I had hoped that statutory regulation for all qualified clinical physiologists would have been achieved ten years ago. We've been through a dreadful mess since then, but I believe, RCCP, the Academy and MSC, once bedded in, developed and modified slightly will counter the negative history. I think it is a shame that the close liaison we used to have with BTS faded and the partnership we see in our multi-disciplinary clinical teams is not echoed at national professional body level. Hopefully this will improve soon.

I also wish more posts on ARTP committees were competitively elected, because my fear is that members think it is "too hard" to commit to ARTP. You'll notice that every person who has held ARTP office has developed their own career and prospects because of the skills they learned around the committee table, developing research and delivering projects. If you're reading this and are reluctant to get involved – please make the effort – you will never regret it!

> No matter whatever the future holds, I am sure, ARTP will still be fighting for quality, standards and more staff so that we can continue to protect patients even more than we have in the last forty years

The Future

And what of the next 40 years? The young leaders I meet at conference really encourage hope and expectation for a further 40 great years of ARTP. There are some very smart cookies on ARTP Committees who share our values on quality, standards, leadership, encouragement of colleagues and vision. There are some bright new members who will shape the future of research in Respiratory Physiology – these are the product of the STP programme. The HSST programme securing a pathway to Consultant Clinical Scientist has to be a pinnacle of 40 years of development.

Healthcare is changing rapidly; Aneuran Bevan's brilliant idea for a post-war National Health Service has realised it is the victim of its own success and is being transformed. People used to die in their early 60s, whereas they live for a further 20-plus years with increasing health demands; hence we need to re-think the model. The concept of "Free at the point of care" must remain for most services (well not that free - have you seen your NI/ tax bill?). Hospitals may not be able to continue "carrying" large cohorts of chronically ill patients, so stable, healthy patients will need to be managed in Primary Care perhaps in part by some "non NHS" organisations. Profits must never be allowed to come before quality care. No matter whatever the future holds, I am sure, ARTP will still be fighting for quality, standards and more staff so that we can continue to protect patients even more than we have in the last forty years.

Thank you ARTP for giving me the privilege and opportunity to be able to serve you as Chair and also President. It has been an honour!

Dr Brendan G Cooper

40 years of ARTP Chairs

DAMIAN MUNCASTER

ARTP CHAIR from 2006 to 2008

Damian was Lung Function Manager at the Homerton Hospital from 2002-2010 and is currently Respiratory Physiology Manager at the Wellington Hospital

At the beginning of my brief sojourn as ARTP Chair, taking over from Dr Brendan Cooper, I felt very much like David Moyes about to take over from Sir Alex Ferguson. After years of ARTP success under Brendan (he even conquered Europe as he took the ARTP to the ERS), the era was about to end and new blood was needed. Brendan had decided to herd goats in Lithuania for a while so a new leader, figurehead and statesman was required and for some reason that ended up as me. Some say that I was chosen for my enthusiasm, charm and potential to grow into the role, some say no one else wanted to do it, or was mad enough to accept it. I like to think it was the former but deep down I think we all know it was the latter.

In fact it was actually worse than Ferguson to Moyes, because the previous chair to Brendan was the then Chief Scientific Officer, a certain Sue Hill. So it was the equivalent of Sir Matt Busby to Sir Alex Ferguson and then onto Mr. Moyes. I had some big shoes to follow.

So my ARTP Chairmanship began and it was a massive learning curve. I knew the guys on the committee did a lot but I had no idea just how much. From afar I had thought that Brendan just sat in on a couple of meetings, sent Jackie Hutchison a couple of emails, a forum message at Xmas, maybe the odd letter to number 10 Downing Street about RCCP and then rocked up to conference, popped his white scarf on over his dinner jacket, made everyone laugh in his after dinner speech and sat back and basked in the glory of yet another fantastic conference. That year in Glasgow, Brendan and I had even found time to go and find some fancy dress and hire kilts for the dinner. I thought how hard could the chairmanship be? We're shopping for kilts! *(As an aside we had a photo taken in our kilts that night, my wife's then 88 year-old nan thought I looked very handsome, so the next time we go round for tea she has framed the picture and it's on the mantelpiece. She obviously has no idea who Brendan is but to this day there is a picture of him in a kilt with his knobbly knees in a 96 year-olds 3 bed terrace house in Upminster!!).*

Back to the Chairmanship - Errrrrr, nope it was slightly different. It was full-on from the first minute. The role

> For me, the most important aspect of the ARTP is its holistic and community role

required just about every management skill going: Project management, negotiation, ability to influence, communication, public speaking and lots, lots more. Even now, on personal spec's of prospective jobs, I can use my short experience as ARTP Chair to cover them all—except the time I applied for 'The Chippendales'...never did get the job.

I think my fondest memory was the first conference in Hinckley, that felt a real achievement. The biggest thing I'd organised before was a departmental sports quiz and even then I lost count and no one ended up winning. From Keith's band playing in the bar on the Thursday night through to our keynote speech from Greg Whyte, who has since been on all sorts of TV programmes, it just felt brilliant.

The ARTP Committee was all about the people though. I have forgotten about the endless emails, the dreadfully dull meetings with the various scientific groups regarding MSC, the trek over to Sutton Coldfield, the complaints, the preparation for meetings and talks, the endless presentations. However I do remember a great bunch of people, from the gnarled old veterans of Brendan, Keith, Adrian, Alan, Nigel and Trefor to the glamour of Julie, Jo and Christine. My drinking partner Martyn and my brilliant train buddy Rod. I'm not sure I ever really found my feet as ARTP Chair but I got so much from the experience. I learnt invaluable work and management skills and, most importantly, I made some awesome friends. If you are ever tempted to get involved, it is hard work but please, please do it, if for no other reason than you get an extra token for the gala dinner.

So that was a brief taste of my experience as ARTP Chairnut on the 30-year anniversary of 'Back to the Future' and the Editor has also asked for a few words on where the ARTP will be in the future. So first up I can say without fear that Adrian Kendrick will turn up to the 2046 conference on a hover board wearing a red bodywarmer. P.S. that wasn't Adrian on the moon with a telescope and tear in his eye I saw on TV this weekend was it? But, yes, in 2046 for sure the ARTP Exec Committee will all be travelling to conferences on hover boards and I'd like to wager on who will be the first exec committee member to be caught for being disorderly on a hoverboard. Hoverboards won't be able to save the NHS though, but in a remarkable episode of 'The Apprentice' the NHS will be saved by team Invictus in Episode 3 series 213, making a whopping £246 profit by the end of the task. N.B Alan Sugar will be aged 104 and be approx. 3ft 4inches tall. He will need steps to get into his boardroom chair. I also think ARTP conferences will take place in Las Vegas, a genetically modified Tom Jones will sing at the Gala dinner and all hospitals will sanction the study leave requests… yeah I know, crazy idea…as if your line manager is going to do that even if he does have his own hoverboard.

On a touch more serious note I would hate to predict what changes are afoot in the NHS and how it will impact on Respiratory Physiologists. I do think it's pretty clear that we will be expected to do more for less and that working conditions will be difficult and morale will suffer. So I believe the ARTP of the future will continue to have a role to play in ensuring that our profession is consulted, is listened to and is involved in the decision-making processes.

I cannot predict via which medium we shall communicate via in the future but what I am sure of is that the ARTP will embrace it to keep us all connected and informed.

For me, the most important aspect of the ARTP is its holistic and community role. Supporting the lone respiratory workers out there, providing empathy and solutions for the problems that we face day-in and day-out and the overall 'family feeling' it brings to our profession. In my opinion this is the most valued aspect of the ARTP. Through the forum, the conferences and the courses it has been crucial to the success of the professional body. I cannot predict via which medium we shall communicate with in the future but I am sure that the ARTP will embrace it to keep us all connected and informed.

All the Best

Damian Muncaster

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40 years of ARTP Chairs

MARTYN BUCKNALL

ARTP CHAIR from 2009 to 2013

Martyn Bucknall is a Senior Lecturer at St Georges University of London

My role as your Chairman started in 2009, taking on the role for four years. Prior to this, I got involved in a few ARTP projects, including leading the working group writing recommendations on Department Size and Space and later joined the ARTP Executive Committee in the Treasurer role (after being lured into a pub in Glasgow by Rod Lane!). I was apprehensive at joining this committee, but was warmly welcomed and supported, and I soon came to fully realise the dedication and immense hard work that a relatively small number of people did on behalf of their professional body and profession! In 2009, I took over the role of chairman, when Damian Muncaster stepped down.

Looking back, I enjoyed my time in the Chairman role representing you – it is certainly a challenging role, and I was honoured to take it . Again, I would like to acknowledge the hard work and support of the ARTP committees, the membership and the admin team at EBS Ltd during my term of office. A special thank you also to the staff I worked with at the Princess Royal University Hospital and Guy's and St Thomas' Hospital, who supported me in my role (often in my absence from my paid job!). The Chairman role took over my life for four years, so the biggest thank you goes to my family for their support and understanding.

During my time as Chair, I was involved in many key pieces of work, including the development and roll-out of Modernising Scientific Careers programmes (PTP, STP and later HSST), IQIPS Accreditation, the formation of the Academy of Healthcare Science (AHCS), where I sat on the shadow board and so much more! All of these work streams will play a vital and important role in our profession over the coming years in developing our future workforce, continually raising standards and quality and allowing scientists to speak with a more powerful and united voice. Please do support these.

My proudest achievement during my term of office were inspiring and getting "new blood" involved into ARTP work. Often the ARTP Executive was perceived as a "cliquey" group, but I hope I managed to break down some of these perceptions, and it is now great to see the "new blood" working within the ARTP Board and committees, bringing in new ideas and

successfully leading our profession onwards and upwards.

So what do I see as the challenges for ARTP going forward? I think there is (sadly) still a lack of recognition for the great and highly skilled work that we all do and the impacts we make on a daily basis to the lives of our patients and their families. Sometimes we are not good at standing up and telling people what we do – and often school/college leavers (i.e. our future workforce!), patients and even the organisations we work for don't understand, appreciate or acknowledge our roles. We need to communicate more effectively within the (ever) changing NHS landscape, with the commissioners and clinical commissioning groups (CCG's), so they know and understand who we are, what we do and the quality of our (IQIPS accredited) services. Importantly we must ensure we are sitting at the table to discuss, plan and deliver quality physiological diagnostic services locally for our patients. There is an increasing need for the ARTP and members to share and discuss areas of good practice, service delivery and new innovative ways of working. We know this is going on, but we need to promote and share.

There is an increasing need for the ARTP and members to share and discuss areas of good practice, service delivery and new innovative ways of working

My most embarrassing moment was falling off the back of the stage……at 10.00am…….during my opening of the 2013 conference at Hinckley……or was it dressing up as a pilot at the Heathrow conference….then there was that karaoke…….or was it marching in procession to the top table following a haggis!.....but one thing that became quickly evident at the Gala Dinners was the camaraderie, networking and partying of the membership – and nobody does this better than ARTP. I recall one of my table guests asking if it always like this and that was at 9pm! "We haven't started yet. Cheers!"

It is great to still be actively involved in ARTP projects and to sit on sub-committees (editorial, standards, and workforce) – I am very grateful to you for giving me the opportunity to be your chairman and to represent you. It allowed me to develop both as a person and as a physiologist, and to develop some great friendships.

It was an honour to continue the great work of the previous distinguished and highly respected ARTP chairs (who you have just read about) and their committees and to play my part in the 40 years of ARTP. ARTP remain the guardians of high quality diagnostics and leaders in education and training of our dedicated workforce and I can only see ARTP continually raising the standards.

If you are not already involved in ARTP work, I would encourage you take that step. Thank you.

Martyn Bucknall

40 years of ARTP Chairs

DR. KARL SYLVESTER

ARTP CHAIR from 2013 to present

Dr. Sylvester is Head of Joint Respiratory Physiology Services (CUH & Papworth)

"Be vice-chair", he said. "You'll love it", he said. "It's easy", he said. OK, so Martyn didn't actually say the last one, but he sure as hell made it look easy! I always knew they were going to be very difficult shoes to fill when the time came. I also had a clear sense of the legacy left by previous chairs and have been consistently worried whether I could meet the standard they had set.

So that was how it all started. Well that's not necessarily true. First I volunteered to be the ARTP's clinical coding co-ordinator. So I was already used to a baptism of fire before taking on the Vice-Chair role. And all this at around the time my twin girls were born. I have no idea what I was thinking, but do you know what? It is one of the best decisions I have ever made.

Being Honorary Chair of such an amazing organisation has taught me so much. It has been a very steep learning curve, not assisted by the fact I had to Chair an organisation going through the inauguration of its new constitution with the introduction of a Council with a President and Non-Executive Directors. However, the new constitution ensures the ARTP moves forward with a revitalised level of professionalism and a clear governance structure in place.

The hard work undertaken by the Board is backed up by the strategic delivery of the Council. Our NEDs bring in an outside perspective on the function of our organisation and expertise from many different specialist areas, including private industry.

Being Chair has truly honed my leadership, management and organisational skills and has assisted me so much in my clinical role. It's introduced me to people I would never have come into contact with otherwise and I'm pleased to say I have developed life long friendships. I just hope they think we're friends too!

> We have a clear joint aim of massively improving respiratory physiology education among the junior doctor workforce

ARTP Chair, as the representative for the respiratory and sleep healthcare science workforce, gets invited to many important meetings and is informed of upcoming workstreams so that, as an organisation, we are able to respond with our point of

view. I have been to many, many meetings over my tenure, some extremely valuable, others maybe not so, but at each of these meetings connections are made that feed into future areas of development. ARTP were invited as stakeholders into the Respiratory Alliance, which unfortunately lost its way, but we now have Respiratory Futures as a means to highlight important work within the field of Respiratory Medicine. We are re-invigorating our relationship with the British Thoracic Society, which may have waned slightly over previous years, but initiated by Martyn, the bond between the two organisations continues to develop. We have a clear joint aim of massively improving respiratory physiology education among the junior doctor workforce, which we know has been sincerely lacking. Respiratory physiology needs to have a much higher prominence among the medical workforce and thankfully that is a joint aim of our two societies.

Improving delivery and quality of spirometry services within Primary Care has also been an important issue for the BTS and ARTP. With the Primary Care Respiratory Society and Education for Health, among others, we have delivered the quality assured diagnostic spirometry booklet endorsed by the Department of Health. We are now working hard together to ensure the next phase of this work is completed, that is, that any Healthcare Professional delivering a spirometry service is mandated to complete ARTP -accredited training and to appear on a spirometry register of competence.

We have also worked closely with others to deliver the Modernising Scientific Careers pathway, especially the development of the curricula for the Higher Scientific Specialist Training (HSST). This will see the development of Consultant Respiratory Healthcare Scientists with much greater autonomy in the delivery of respiratory services, running their own clinics, referring to other diagnostic specialties, basic prescribing and running their own Healthcare Scientist clinics. The prominence of respiratory and sleep physiologists and Clinical Scientists is rightly much greater than at any point previously and the ARTP has played a pivotal role in this development.

We need to ensure that the ARTP continues to thrive and play an influential role within respiratory medicine and healthcare science as a whole

The role of Chair would not be so enjoyable if it weren't for the amazing and hard working people on all the ARTP committees and our absolutely awesome colleagues at Executive Business Support. The effort and time on the part of our committees, all voluntary, remember, is what makes our organisation the best in the business. We need to ensure that the ARTP continues to thrive and play an influential role within respiratory medicine and healthcare science as a whole. This will only be possible with appropriate succession planning. We have some great new members of committees learning the ropes and bringing a fresh perspective on the future of our organisation and ideas of areas for development. These

individuals will need to become the new leadership structure within ARTP and with this comes the requirement for more new volunteers. I would like to say from my perspective I have found working as part of ARTP extremely rewarding. You are made aware before others of upcoming issues and events which influence our practice, which allows for a greater level of preparedness. New skills in communication and negotiation are developed but above all else, new working and professional relationships are made as well as friendships that will stand the test of time.

Thank you to those previous Chairs who have delivered ARTP to the respected and professional organisation it is today. Thank you to everybody that has made my time as Chair so enjoyable. I would do it all again in a heart beat.

Dr. Karl Sylvester

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ARTP TRAVEL GRANT WINNER

Quadriceps weakness in COPD; identification of a functionally relevant threshold

Jane Canavan, NIHR Muscle Laboratory, Harefield Hospital

INTRODUCTION

The extra-pulmonary systemic manifestations of chronic obstructive pulmonary disease (COPD) are well established and include weight loss, cachexia, decline in muscle mass and peripheral muscle weakness. Muscle dysfunction combined with ventilatory limitation is associated with dyspnoea, disengagement from activities of daily living and exercise intolerance.

As a major locomotor muscle, weakness of the quadriceps muscle can lead to a loss of independence, physical inactivity and reduced exercise capacity[1], sarcopenia[2] and increased mortality[3]. Quadriceps strength can be assessed in several ways, for example the one repetition maximum (1RM) knee extension, isokinetic dynamometry (concentric and eccentric measurement) and by using a variety of handheld dynamometers, or a specially adapted chair with a strain gauge as previously described[4].

The ATS/ERS statement on limb muscle dysfunction in COPD suggested that isometric quadriceps maximal voluntary contraction (QMVC) could potentially be integrated into the routine clinical assessment of patients with COPD to evaluate quadriceps strength[5] and the impact of interventions such as pulmonary rehabilitation or anabolic agents. Seymour and colleagues[6] described normal values for QMVC in patients with COPD, but the meaning of particular QMVC values and the implications for functional independence of patients with COPD has not been reported. In older adults, functionally relevant cut-points have been identified for sit-to-stand, stair climbing and walking ability[7] and to predict mobility decline[8]; however, due to methodological differences, direct comparison between methods and populations is challenging. Furthermore Corrigan and colleagues showed that a curvilinear relationship exists between knee extension force and the ability to sit-to-stand[9].

Aims

- To determine and validate sex-specific QMVC cut-points for COPD patients, anchored to sit-to-stand ability, to provide context for therapists, clinicians and patients.
- To validate these in a non-COPD chronic respiratory cohort.

Methods

This was a prospective study[10] with the following inclusion criteria: patients were required to have a diagnosis of COPD according to Global Initiative for Chronic Obstructive Lung Disease criteria[11], be over 35 years of age and clinically stable, with no exacerbation of COPD requiring a change of medication in the previous 4 weeks. The validation cohort consisted of patients with non-COPD chronic respiratory conditions. Exclusion criteria for all patients included a primary joint or neurological limitation to standing or walking.

All patients completed an assessment of isometric QMVC of the dominant leg, measured using a specially adapted chair and strain gauge, with their hips and knees at 90° flexion[4]. The maximal force that could be maintained for 1 second was recorded from the best of three reproducible attempts (**Figure 1**). As the ability to stand from a chair is paramount to functional independence we anchored QMVC measurements to the ability to stand from a chair without using the upper limbs. Receiver operating curves were constructed separately for men and women that best identified patients who were unable to stand from sitting; we gave equal weighting to sensitivity and specificity. Additional methodological details are published elsewhere[10].

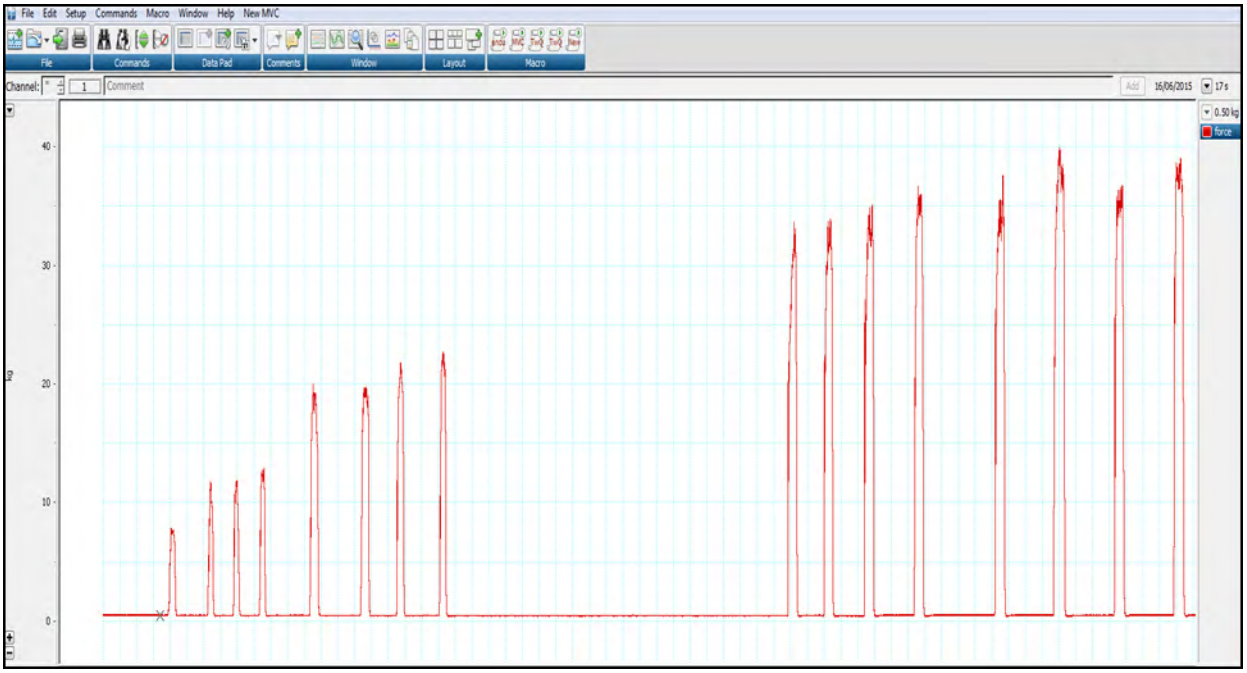


Figure 1: Trace of isometric quadriceps maximal voluntary contractions. kg: kilograms

Results

Participant characteristics are reported in **Table 1**. The validation cohort (n=208) consisted of patients with a respiratory diagnosis of asthma (n=62), bronchiectasis (n=61), interstitial lung disease (n=76) and extrathoracic restriction (n=9).

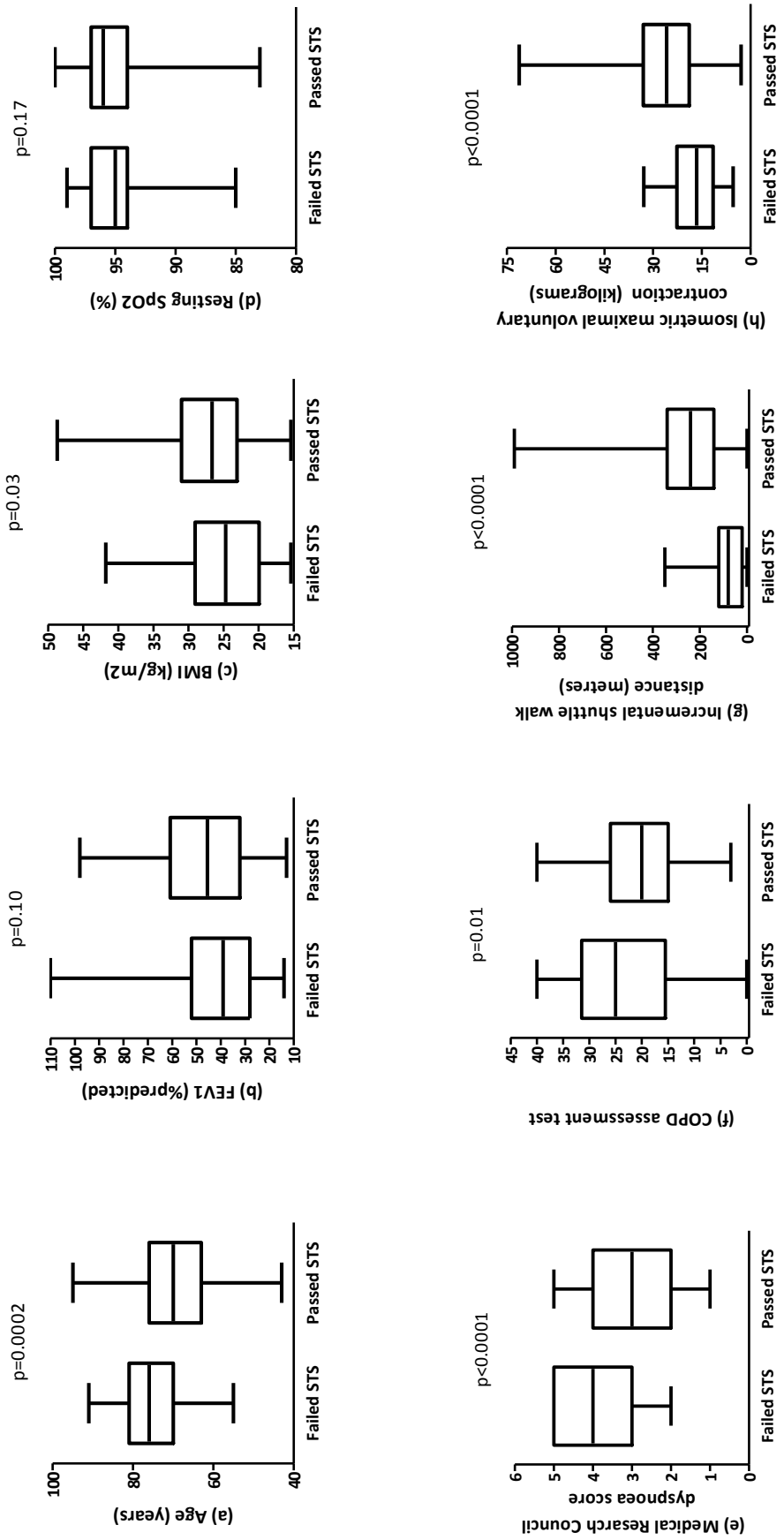
	COPD (n=437)	Non-COPD (n=208)	p value
Outcome measure	**Mean (SD)**	**Mean (SD)**	
Male : Female	277:160	98:110	<0.001
Age (years)	70 (10)	68 (12)	0.03
MRC	3.2 (1.1)	3.0 (1.0)	0.001
FEV_1 (% predicted)*	47 (19)	68 (24)	<0.001
FVC (% predicted)	71 (19)	70 (23)	0.48
FEV_1/FVC	0.48 (0.12)	0.73 (0.13)	<0.001
BMI (kg/m^2)	27.1 (5.9)	28.5 (5.8)	0.004
COTE	1.4 (2.0)	NC	-
ISW (metres)	236 (154)	285 (202)	<0.001
CAT	21.0 (8.0)	19.0 (7.7)	0.01
QMVC (kg)	25.7 (10.3)	23.1 (9.5)	0.002
Failed sit-to-stand (M:F)	26 (9%):23 (14%)	9 (4%):12 (6%)	0.60

Table 1: Participant characteristics

* - unfortunately SRs were not used

BMI = Body Mass Index; FEV1= Forced Expiratory Volume in One Second; MRC = Medical Research Council Dyspnea score; COTE = COPD specific Comorbidity Test; ISW = Incremental Shuttle Walk; CAT = COPD Assessment Test; QMVC = Quadriceps Maximum Voluntary Contraction; NC: not collected.

Figure 2 reports the clinical characteristics for the COPD group (n=437) according to their ability to complete a sit-to-stand. Those unable to perform a sit to stand were older, had a higher Medical Research Council Dyspnoea (MRC) score[12], COPD Assessment Test (CAT) score[13], higher COPD specific comorbidity test score (1.9 (2.2) vs. 1.3 (2.0) p=0.05)[14] and reduced maximal exercise capacity and quadriceps strength.



Figures 2 (a-h): Clinical characteristics of patients with chronic obstructive pulmonary disease according to their ability to stand from a sitting position

In the COPD group the highest value for area under the curve was found for QMVC normalized to height squared, with 8.30 kg/m2 and 5.99 kg/m2 identified as the cut-points for men and women that best identified failure to stand unaided from a chair (**Table 2; Figure 3**).

	Inability to stand				
Females	**Cut-point**	**AUC**	**P value**	**Sensitivity %**	**Specificity %**
QMVC	14.8	0.80	<0.001	72	74
QMVC/BMI	0.62	0.74	<0.001	70	70
QMVC/weight	0.24	0.74	<0.001	74	70
QMVC/height	9.45	0.80	<0.001	71	70
QMVC/height^2	5.99	0.80	<0.001	73	74
Males					
QMVC	25.3	0.76	<0.001	69	69
QMVC/BMI	0.96	0.76	<0.001	72	73
QMVC/weight	0.33	0.81	<0.001	73	73
QMVC/height	14.76	0.78	<0.001	69	69
QMVC/height^2	8.30	0.81	<0.001	73	73

Table 2: ROC analysis results for quadriceps maximum voluntary contraction strength in predicting failure to stand in patients with chronic obstructive pulmonary disease

The area under the curve identified a value of

(a) 0.81 [95% CI 0.74 – 0.88] for males and (b) 0.80 [95% CI 0.72 – 0.88] for females.

(a) Male (QMVC/height²) **(b) Female (QMVC/height²)**

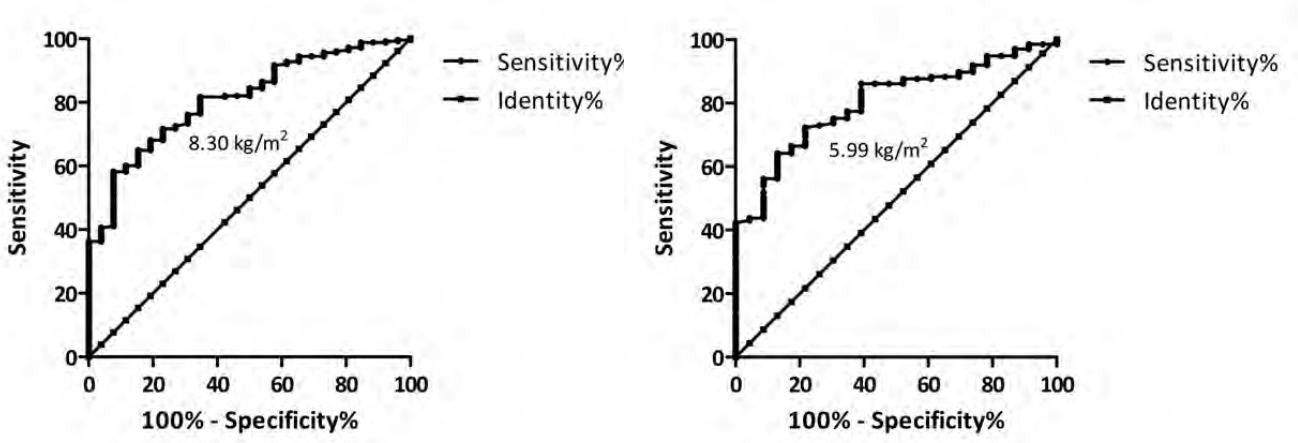


Figure 3: ROC curves generated to identify sex-specific cut-points for the inability to complete a sit to stand based on maximal voluntary isometric quadriceps strength.

The QMVC cut points from the COPD cohort were then applied to the validation cohort and these had a sensitivity and specificity of 73% and 78% for men, and 76% and 75% for women, in predicting failure to stand. Area under the curve was 0.88 for male and 0.76 for female non-COPD chronic respiratory patients.

Discussion

Functional independence is associated with the ability to perform a sit-to-stand: it is necessary for many daily activities such as getting up from a chair, out of the bathtub, off the toilet and out of bed. Greater disability and mortality is found in community-dwelling older persons who are unable to successfully perform a sit-to-stand[15]. Determination of this clinically relevant threshold may allow clinicians to better evaluate QMVC measurement and the impact of interventions for peripheral muscle weakness.

There are a number of limitations to this study which we would like to acknowledge. This was a single-centre study and the results might not be generalizable to other populations, although these are two large cohorts of respiratory outpatients. As the ability to stand from a sitting position is paramount to functional independence, we anchored QMVC measurements to sit-to-stand ability. The choice of other anchors may return different cut-points. Furthermore, other factors play a role in the ability to sit to stand, such as core stability, join range of motion, balance and integration of sensory and mechanoreceptors, although 80% of sit –to-stand ability was explained by quadriceps strength.

In summary, we have determined that cut points of 5.99 kg/m^2 for women and 8.30 kg/m^2 for men for isometric QMVC normalised to height squared are functionally relevant in COPD. We have validated these in a separate cohort of patients with non-COPD chronic respiratory disease. The thresholds provide additional clinical context to QMVC measurements in COPD and may encourage adoption of QMVC into routine clinical practice.

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ARTP TRAVEL GRANT WINNER

Lung Clearance Index and the importance of standardisation within clinical trials

Katie J. Bayfield[1-3], **Clare Saunders**[1-3], **Eric WFW. Alton**[1, 2] **and Jane C. Davies**[1-3].
1. Imperial College London, UK, 2. Royal Brompton & Harefield NHS Foundation Trust, UK, 3. LCI Core Facility, European CF Society Clinical trials Network.

INTRODUCTION

Multiple breath washout (MBW) is a lung function test that allows measurement of functional residual capacity (FRC) and lung clearance index (LCI), the latter a marker of global ventilation heterogeneity. The test was first described more than 60 years ago and involves a patient breathing tidally whilst inhaling a tracer gas then, once equilibrium is reached, switching the gas to either room air or 100% oxygen and waiting for that tracer gas to reach 1/40th of the starting concentration. The tracer gases in these cases can either be Helium (He) or Sulphur Hexafluoride (SF_6), when using room air to washout the tracer, or Nitrogen (N_2) when using 100% oxygen to washout resident N_2.

LCI is calculated from the ratio of the cumulative expiratory volume (CEV) divided by the FRC (so that LCI is corrected for lung size). The higher the value, the more lung volume turnovers are required to clear the tracer gas due to greater ventilation heterogeneity and therefore the more marked the disease severity.

Aims

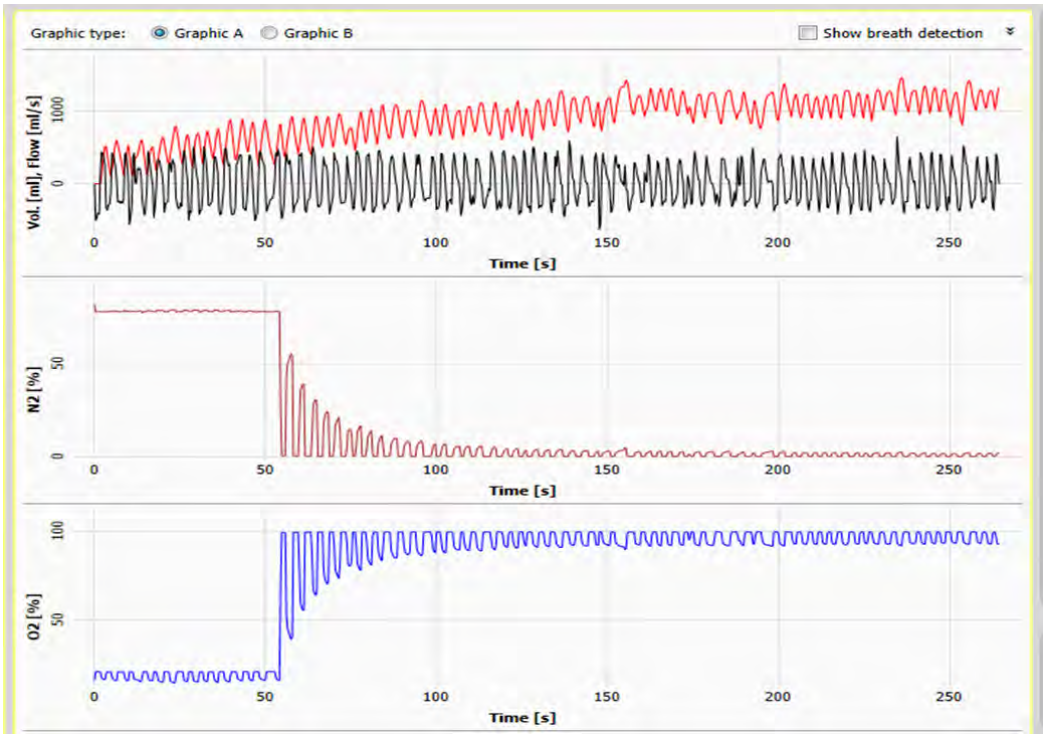
- To briefly discuss lung clearance index in terms of practical requirements and differences in testing.
- To review standardisation of lung clearance index and its use as a physiological outcome measure.

There are many gas analysers that are capable of recording an MBW trace; the gold standard

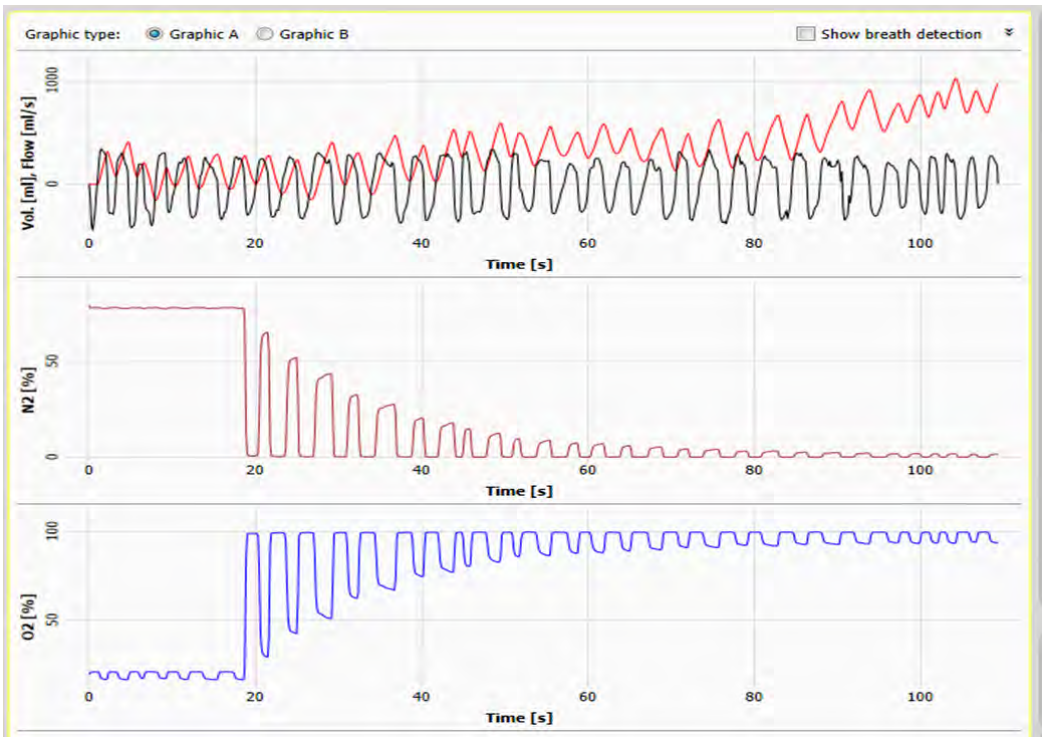
Figure 1 – Participant breathing 100% oxygen for a Nitrogen MBW using the Exhalyzer D (Ecomedics, AG, Switzerland).

being mass spectrometry, although this is a large and expensive piece of equipment perhaps more suited to basic research. Therefore, commercial devices have been developed for practical testing in a clinical setting, for example the Innocor™ device (Innovision, Denmark) that utilizes photo-acoustic technology to measure gases for the SF_6 washout and the Exhalyzer D (Ecomedics, AG, Switzerland) that uses an ultrasonic flowmeter and laser diode/infrared technology for the N_2 washout (Figure 1).

Figure 2 shows MBW traces from the Exhalyzer D N_2 washout system of two female children,



Age 8, F, CF, 88% FEV_1, LCI 11.76



Age 7, F, non-CF, LCI 6.79

Figure 2 – MBW traces from the Exhalyzer D N_2 washout system

one with cystic fibrosis (CF) and one healthy control. You can see that because of their age the breathing pattern is fairly erratic (panel 1, volume in red, flow in black) but there is no evidence of leak, cough, sigh or breath hold and actually their tidal volume is appropriate for their size and flow is fairly stable throughout the washout. The brown trace (panel 2) shows the N_2 decay once the subject is switched to breathing 100% O_2 (blue trace, panel 3) and when zoomed in you can see that both traces meet the end of test criteria (at least 3 breaths under the target end-tidal concentration – 1/40th of starting concentration). Of note is the large increase in number of breaths and resultant longer required time to complete the washout in the patient with CF when compared to the aged matched healthy control. This is because of the more variable gas mixing properties in the CF lung compared to non-CF. Thus, the CF trace reveals an elevated LCI (11.76 compared to 6.79 in non-CF) despite the spirometry result being within the normal range (88% predicted FEV_1, 98.4% FVC, 0.8 FEV_1/FVC ratio). This comparison clearly highlights the beneficial use of LCI as an outcome measure as it is able to identify abnormalities in the CF airway[1], potentially being more peripheral[2] in that spirometry is more sensitive to changes in the large airways. The comparison also highlights the importance of practical respiratory physiology knowledge of testing and the need for standardisation so that this useful test can be adopted for use in clinical trials[3] and therefore be comparable across different centres and different diseases.

LCI is in fact being increasingly used as an outcome measure for interventions in CF[4-6] and has been shown to be more sensitive than spirometry not only for discriminative power[7] but sensitivity to changes in CF lung disease following treatment[6]. Normative values have been published by various groups[1, 8] and this is a start to utilizing MBW as a lung function technique although a larger standard reference range would be required to really achieve this. Despite these advances there is still substantial variability in techniques used, as mentioned above. This includes equipment, where differences have been found in MBW outcomes when deadspace is different between tests[9]. Tracer gas used (N_2, He or SF_6) has also been shown to change MBW outcomes[10]; this is particularly important as the mechanisms behind these differences are still unknown and may lead to significantly different conclusions of trial results if understanding of what baseline measures should be and why, are not identified. Software algorithms are also important to consider as there are slightly different ways in which MBW outcomes can be generated - synchronisation of the flow and gas signals and different alveolar N_2 estimates on the expirogram, for example, all of which affect the final results[11, 12]. Summermatter et al. recently described the impact of software settings on MBW outcomes where seemingly small variations in environmental settings, O_2 and CO_2 correction and delay time of gas synchronisation could change LCI values by up to 12% both in positive and negative directions. This highlights that accuracy of the MBW results crucially depend on appropriate software settings as well as knowledge of the system to avoid measurement bias of incorrect calibration and settings[13].

All these considerations has led to a consensus statement being published[14] as well as a standardisation exercise undertaken by the European CF society Clinical Trials Network (CTN). This exercise led to the recommendation of N_2 washout with the Exhalyzer D, mainly due to the

greenhouse gas concerns of SF_6.

The CTN LCI core facility (J. Davies et al. Royal Brompton Hospital, UK, for Europe), alongside the Sick Kids Hospital (F. Ratjen et al. Toronto, Canada, for North America) and Westmead Hospital (P. Robinson et al. Sydney, Australia, for Australasia) have been working together to train and certify sites around the world on an agreed protocol (Jensen et al. 2013. Standard Operating Procedure: Multiple Breath Nitrogen Washout (Exhalyzer D)). This Standard Operating Procedure is in addition to the manufacturers manual; we believe it is more extensive and has been adopted by a wide range of research facilities throughout the field. The training, for operators involves intensive training days where all machine specifics, practical testing and troubleshooting occur. Training and certification can occur for a site either as an ECFS CTN member, due to participation in a clinical trial utilising the Exhalyzer D and the core facility approach being adopted and/or on an individual basis. The training is suitable for naïve sites but only recommended to those utilising the Exhalyzer D MBW method on a regular basis. For more details please contact lci-over-reading@imperial.ac.uk.

Following training, sites submit a required number of MBW traces to the Core and certification is provided to those operators achieving predefined quality criteria in, for example, correct software and hardware settings, consideration of appropriate breathing pattern, clear understanding of what constitutes a trace to be excluded and the correct number of tests. Certification is on an individual basis, not per site. It is not an official qualification but we hope that it is a step towards making LCI a more standardised outcome measure for current and future clinical trials utilising the technique. Within the context of a clinical trial, Core staff provide real-time quality assessments in addition to blinded analysis and over-reading of study data, again to ensure quality data that is comparable across sites.

We consider that this is a vital step towards LCI being utilized to its full potential and hopefully paving the way to its recognition by the regulatory agencies as an outcome measure. This may be particularly important for patients with early stage disease, for whom new treatments could provide the most clinical benefit, but for whom spirometry is still normal and improvements are therefore difficult to detect.

Acknowledgements Supported by the NIHR Respiratory Biomedical Research Unit at Royal Brompton and the ECFS CTN LCI Core Facility. With thanks to Central over-reading centres in SickKids, Toronto and Westmead Hospital, Sydney.

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An Audit of the utilisation of cardio-pulmonary exercise testing (CPET) to investigate shortness of breath in a respiratory clinic

Edward Parkes, Senior Clinical Physiologist
Department of Respiratory Medicine and Physiology, Heartlands Hospital, Birmingham

INTRODUCTION

It has been well documented that one of cardiopulmonary exercise testing's (CPET's) most important applications is its ability to assess the relative risk of major abdominal and thoracic surgery in the elderly patient[1, 2, 3]. Along with Older and colleagues[1,2], Ridgway[4] and Wilson[5] have demonstrated that pre-operative CPET can be utilised to assess how the heart, lungs, pulmonary and peripheral circulations will respond to post-operative increases in metabolism. A patient's ability to increase their oxygen (O_2) consumption during an incremental exercise test has been shown to strongly correlate with the ability to maintain an increased organ oxygenation and therefore functional organ status during the post-operative period. Older[1,2] has shown that the uptake of O_2 (VO_2) at the anaerobic threshold (AT) allows identification of high risk patients including those patients who have normal cardiopulmonary function at rest measured by pulmonary and cardiac function testing. In his 1993 paper, he identified that patients with a VO_2 AT threshold value of ≥ 11mL.min.kg had a post-operative mortality of 0.8% compared to those patients who had a VO_2 AT of < 11mL.min.kg, who showed an 18% chance of mortality in the post-operative period. Interestingly, in those patients with a low VO_2 and exercise-induced ischaemic changes, the post-operative mortality rose to 42%.

More recently, CPET's ability to provide valuable clinical information in relation to the investigation of unexplained shortness of breath (SOB) and also in prognosticating pulmonary hypertension in a rational manner has become better defined[6]. CPET can be utilised to non-invasively assess a patient's global reaction to physical work and provides objective measurements of ventilatory, cardiac, ventilatory-perfusion and circulatory responses to incremental maximal exercise[7]. This wealth of data provides the ability to differentiate between cardiac and ventilatory exercise limitation, which will allow implementation of the most appropriate care plan. This is particularly important in the elderly patient where cardiac and respiratory disease commonly coexist[9]. Thing and colleagues[6] performed a retrospective study assessing the utilisation of CPET in investigating patients with unexplained SOB. A total of 96 patients were included in the study, many of which had undergone numerous cardiac and pulmonary function testing prior to CPET. In 81% of patients, CPET resulted in a direct outcome, either by providing a diagnosis or by providing reassurance due to normal results. This highlights the diagnostic efficacy of CPET in patients presenting with unexplained SOB. Diagnosing the cause of SOB is particularly useful in those who are found to have pulmonary arterial hypertension (PAH), as SOB may well occur before any clinical signs of PAH[7]. Apart from possibly perfusion-ventilation scanning, CPET in the form of exercise gas exchange is the

only test with the sensitivity to identify PAH in the early stages of the disease. This is possible because the symptoms of early PAH are only present on exercise and not rest, as there is a difficulty to adequately increase pulmonary blood flow in response to exercise[7].

Previously, we have carried out a retrospective analysis of the utilisation of the CPET service at Heart of England NHS Trust between July 2013 and April 2014. A total of 176 referrals were received during this 10-month period out of which 147 (84%) were from surgical disciplines and 29 (16%) from medical disciplines. Vascular surgery submitted the majority of referrals (108, 61%) followed by urological surgery (21, 12%). Respiratory Medicine was the source of 11% of all referrals and Cardiology the source of 5% (Parkes, 2014) (Figure 1). As this audit was over a small time-period, we did not investigate unexplained SOB referrals specifically, therefore a further audit was deemed important to investigate this.

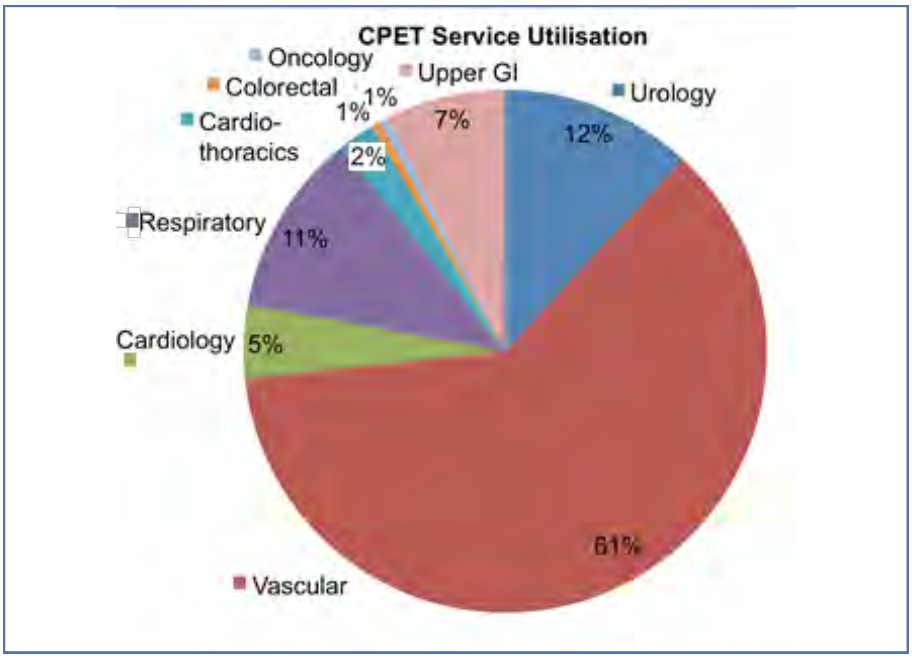

Figure 1: Utilisation of CPET

Aims and Methodology

The purpose of this retrospective cohort survey was to describe the role of CPET in Respiratory Medicine within a 1550-bedded central acute English Hospital Trust spread across 3 sites. The source of referral (and reason) for CPET were retrospectively recorded and analysed between 01 July 2013 and 30th November 2014 (17 months) for those referred by Respiratory Medicine. The outcome of the test (diagnosis) was also recorded from the patients follow-up clinic letter.

RESULTS

The total number of CPET referrals received was 377, out of which 40 (11%) were from Respiratory Medicine. 24/40 referrals (60%) were utilising the CPET service to evaluate unexplained SOB, followed by shortness of breath on exertion (SOBOE) at 22% (Figure 2). Patient demographics, pre-CPET tests and post-CPET diagnoses are shown in Table 1. 90% of patients had undergone lung function testing before undertaking a CPET and 85% had been for 1 or more cardiac investigations. In 53% (21 cases) of referrals from Respiratory Medicine, the CPET report was directly used to aid a diagnosis or to develop a clinical management plan.

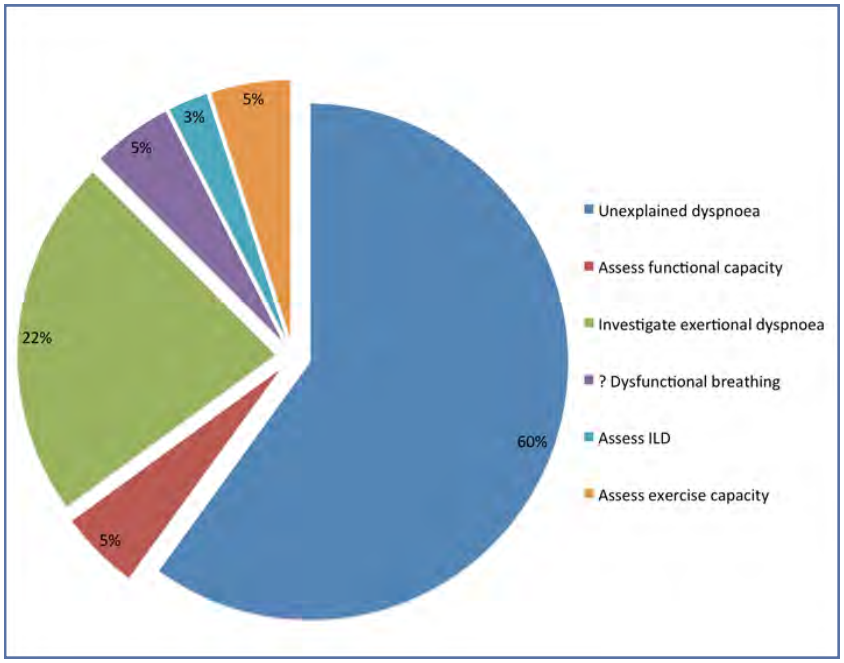

Figure 2: Utilisation of CPET in Respiratory Medicine

Demographics (n=40)	
	Mean (range)
BMI	29 (19.1-38.9)
Age	54 (27-81)
FEV_1	2.74 (0.63-4.86)
FVC	3.65 (1.63-6.23)
Sex	21 ♂, 19 ♀

Pre-CPET tests	
Investigation	% Performed
Spirometry	90
Gas Transfer	65
Lung Volumes	45
Reversibility	35
Methacholine Challenge	5
Echocardiogram	35
Electrocardiograph	30
Coronary angiogram	5
Cardiac treadmill test	15

Post-CPET diagnoses	
Diagnosis	n with specific diagnoses (%)
Normal	4 (19)
Deconditioning	6 (29)
Dysfunctional breathing	1 (5)
Hyperventilation	2 (10)
Cardiac Disease	3 (14)
Rhythm Abnormalities	3 (14)
Obesity	1 (5)
Respiratory limitation	1 (5)

Table 1: Demographics, Pre-CPET investigations and Diagnoses

DISCUSSION

This study shows that 60% of respiratory specialists are utilising CPET for the diagnosis of unexplained SOB as previous lung function and/or cardiac investigations had failed to give a confirmatory diagnosis. 53% of those referred for unexplained SOB and 53% of the total referrals from Respiratory Medicine had a definitive diagnosis from CPET, enabling the development of a clinical management plan which wasn't possible before CPET was undertaken. Our results are slightly lower than those of Thing et al.[6], where CPET was shown to provide direct outcomes in 81% of patients with unexplained SOB. This may be due to the physician discussing the results with the patient but not recording the results in the clinic letter; this audit was carried out before the patient had been followed-up in the clinic or before the clinic letter had been dictated and uploaded onto the hospital system.

This survey shows an under-utilisation of CPET by Respiratory Medicine, with essentially only 50% of all CPETs performed being used by Respiratory Specialists to assist in making a diagnosis or management plan. The reasons for the small number may include having an inconclusive report, or not being familiar with the clinical applications of the test. If CPET was used as a first-line investigation rather than the last, it could be a more effective diagnostic tool as was shown by Thing et al[6].

The indications for the performance of CPET (**Figure 2**), were taken directly from the patient's referral. Wording between consultants differed slightly such as *"CPET to assess a patient's functional capacity"* or *"CPET to assess a patient's exercise capacity"*, which are essentially the same question but were treated as distinct groups in this study, which could possibly have been treated as one category. However, irrespective of the indication for CPET, the expected outcome should be to provide a diagnosis or guidance on the development of an appropriate clinical management plan.

Although this cohort study represented a small sample size, CPET has been shown to be a valuable and comprehensive assessment tool in the differentiation between cardiac and ventilatory limitations to exercise. It has the potential to offer clinically useful information regarding diagnosis and management which can allow onward referral to the appropriate specialism i.e. cardiology as was shown by Thing et al[6].

The data from this study will now be used to identify if there are trends in demographics or symptoms of the patients who obtained a direct outcome from CPET compared to those who did not achieve a direct outcome. This may help to streamline the referral process and the overall efficacy of the CPET service.

CONCLUSIONS

The merits of CPET as a first-line investigation should continue to be promoted within our Hospital Trust, particularly within Respiratory Medicine. This should improve diagnostic pathways and therefore overall patient care. It may also reduce the cost of unnecessary investigations which is of central importance given the financial challenges that the NHS is currently facing.

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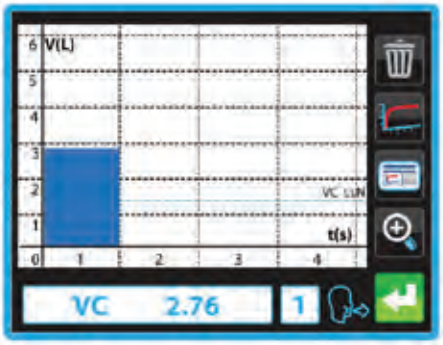

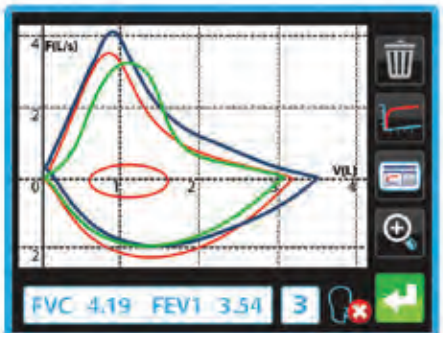

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40 years — the Manufacturers

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Any organisation that survives for 40 years must be doing things right and the Vitalograph team offer warm congratulations to ARTP as it celebrates its 40th anniversary.

Few manufacturers of medical devices are as old as ARTP but we at Vitalograph are proud to be one of them, with a heritage going back over 50 years.

Why are we so successful? The answer is in large measure similar to why ARTP is successful – we continually strive to match the needs of our customers and above all to innovate. Vitalograph spends well over 10% of its annual income on research and development and are always looking for new ideas.

A large proportion of our development effort is directed at software engineering. However, back when the seeds of the ARTP were planted, 40 years ago, things were far different. To mark the ARTPs 40th anniversary we thought that it would be interesting to compare an excellent 40 year old editorial by Adrian Kendrick in *'Breath'* (the ARTP newsletter name at that time) with the scenario today. The editorial was entitled *'Computerization of Lung function Equipment – The Answer to all our Problems?'*

Adrian's article outlined the advantages and disadvantages of computerisation in relation to lung function equipment:

Advantages:

- Savings of time and money
- Increased accuracy
- Standardised procedures
- Reduction of errors
- Simplified data storage and retrieval
- Automated checks
- Interpretation of results

Disadvantages:

- Cost
- Training
- Software flexibility
- Software correction and update

Let us take a closer look at some of Adrian's posited pros and cons and see how they hold up 40 years later.

Advantages

Time, cost and accuracy:

The time to set up a complex test methodology is certainly reduced. The computing power in the PCs used in lung function laboratories today is just phenomenal compared to the early days. The cost of this computing power is also incredibly small and the ratio of computing power to cost continues to crumble. Today, hardware is virtually an insignificant proportion of the cost, with the bulk lying in increasingly complex software and interoperability. Because of increased data protection and cyber security, systems need to be 'locked down' and regularly audited. Standards keep changing and it is hard to keep up – a Physiologist is not a software expert, the software is merely a tool to achieve the desired ends.

In the pre-computing days a good Physiologist could get accurate physiological measurements, but the calculations were often complex and thus difficult to check for errors. The Physiologist however had one vital tool – 'rule of thumb' is one name for it. Experience teaches what answer to expect, gross errors are easy to detect. Is this vital skill still with us today? I am sorry to say that I don't believe so – computers and a mass of numbers seem to dazzle people, leading them to accept silly numbers because 'the computer is always right'. This is of course far from the truth – GIGO (garbage in, garbage out) always applies.

So, has computerisation improved accuracy? – 'No', as far as calculations are concerned. Are modern 'digital' sensors more ***accurate*** that the old analogue gas and other measurement sensors? Also 'No', the difference is that a digital output can output a single number, often to a ridiculous number of decimal places, but more accurate? No? How about ***easier to use***, then?

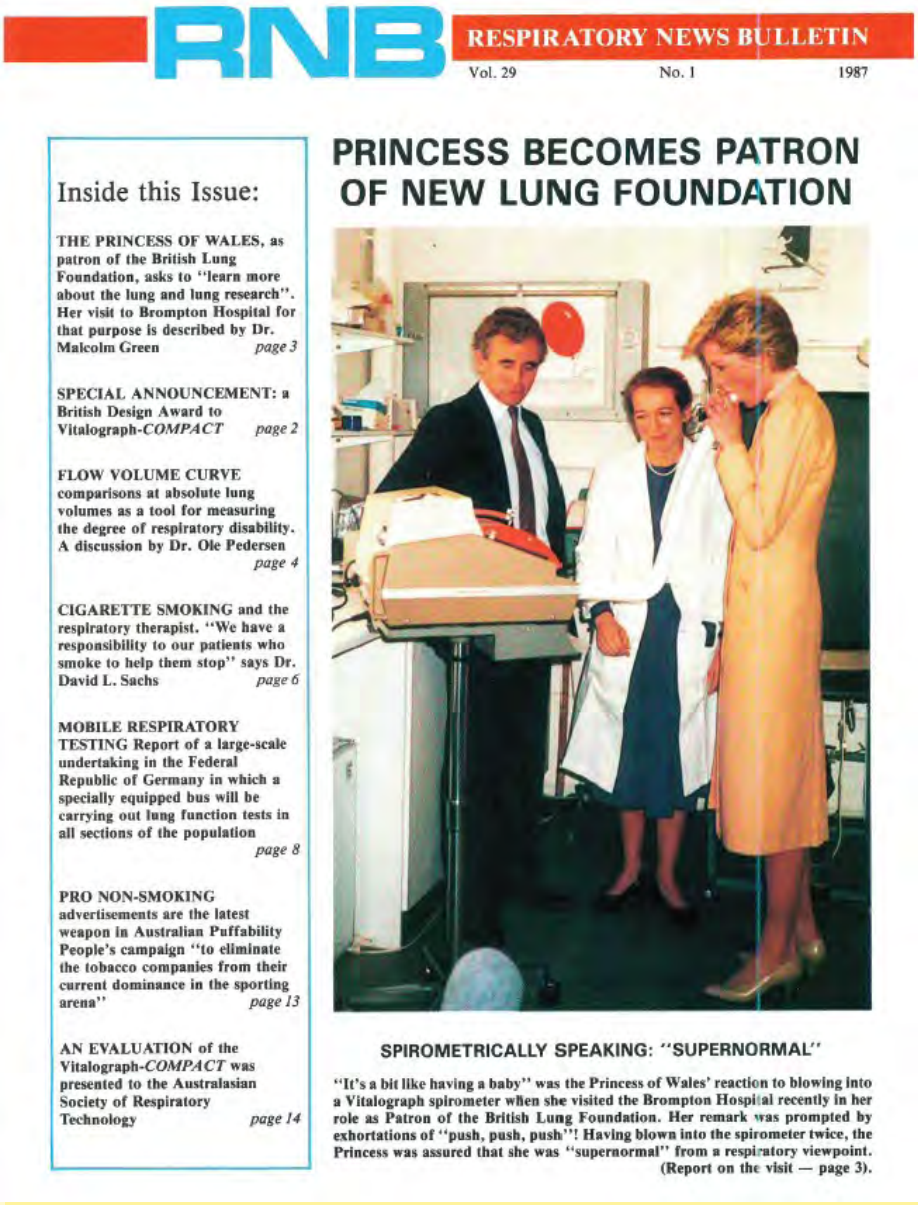
Sometimes a manufacturer will claim 'no calibration necessary' –you mean you don't want Physiologists to check it? If it is measuring equipment then it requires calibration, even if your definition of 'calibration' is traceable and certified to international standards.

Most of the other advantages of modern computerised lung function laboratory equipment, highlighted by Adrian, remain valid, with the caveat that frequent small errors may be less likely but gross errors and systematic errors are more likely. The software systems are often so complex that it is impossible to verify whether the result is correct or to examine the detail.

Disadvantages:

Cost reduction in computing is so dramatic in the last 40 years that cost is definitely no longer a disadvantage.

Training may well be easier as



RNB RESPIRATORY NEWS BULLETIN
Vol. 29 No. 1 1987

Inside this Issue:

PRINCESS BECOMES PATRON OF NEW LUNG FOUNDATION

SPIROMETRICALLY SPEAKING: "SUPERNORMAL"

"It's a bit like having a baby" was the Princess of Wales' reaction to blowing into a Vitalograph spirometer when she visited the Brompton Hospital recently in her role as Patron of the British Lung Foundation. Her remark was prompted by exhortations of "push, push, push"! Having blown into the spirometer twice, the Princess was assured that she was "supernormal" from a respiratory viewpoint. (Report on the visit — page 3).

training tools are increasingly built into software and these are improving rapidly. Add to this the excellent training now available through the ARTP and the conclusion must be that the need for training is no longer a disadvantage.

Software flexibility was a disadvantage 40 years ago. It is arguably more flexible today, certainly software is much more configurable than in the early days of computing. Also general computing knowledge is much better so that lack of flexibility is no longer a disadvantage.

Adrian cites ***software correction and update*** as a disadvantage. I think that nowadays we are so tired of Microsoft and other company software updates that many of us are ready to reject 'ad hoc' updates entirely. Indeed many hospitals lock this feature down and, frankly, this is the only way forward with medical devices. The legislation on medical devices and data security is reaching higher standards every year, which is a huge overhead for medical software developers, but the objective is clear and essential.

So in conclusion, *'Is the computerisation of lung function equipment the answer to all our problems'*? Well, although the advantages today certainly outweigh the disadvantages compared to the early days of computing; the technology, the expectations and society as a whole is rapidly changing. The progress in computing compared to 40 years ago is almost unbelievable, but we expect so much more that the advantages are not always obvious and sometimes things were easier in '*the good old days*'. I think that Adrian might re-read his old article with a good degree of satisfaction!

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ON THE BLOWER

Some good news for Manufacturers' Liaison this month in that we have just appointed a new Chair and Deputy Chair to the Manufacturers' Liaison Committee. This means that I will be standing down (again) sometime in the New Year. Tom Kelly has agreed to take on the role of Chair and Matt Rutter to that of Deputy Chair. Tom and Matt will be learning the ropes over the next few months and contributing to this column on a regular basis. I am going to allow Tom and Matt to introduce themselves to the membership and we will all get to meet them in person at the 40th anniversary conference in London on 14th and 15th January 2016. I wish them both the best in their respective roles and look forward to meeting everyone at the Hotel Russell in London.

I would like to say a huge thank you to Alan and Brendan for the support and camaraderie we have had between us over the last 16 years or so. The ARTP is a great professional body and one that many other health care science disciplines look up to. From the way we manage our profession, to the support and enthusiasm we receive from our members and the companies we deal with, the ARTP is, in my opinion, the best you could belong to.

I shall still be around for some time to come and look forward to seeing you all in London for our 40th anniversary celebrations.

Nigel

Tom Kelly

I would like to take this opportunity to introduce myself as the new Manufacturers' Liaison Chair, and thank the ARTP Executive for this appointment. I am currently Lead Respiratory Physiologist at the Countess of Chester Hospital, having moved here from Palmerston North in New Zealand earlier this year. I had previously worked as Chief Respiratory Scientist at the Mater Hospital in Dublin. While in Ireland I was honoured to hold the position of Vice-Chairperson and then Chairperson of the Irish Association of Respiratory Scientists (IARS).

As technology advances, so too does the need for quality and reliability in our diagnostic and therapeutic equipment. Equally important is the need for excellence in customer support from our suppliers and the companies they represent. The Manufacturers' Liaison Committee has worked on behalf of our

members to help resolve problems when they have arisen and will continue to do so. The Committee also offers a forum for our partners in industry to present new products and ideas to our Association, an area I would like to see develop in the future.

Many thanks to Nigel and his predecessors for their fantastic work in the past. With their help I hope to carry this work on into the future. I look forward to meeting as many members, manufacturers, and suppliers as possible at the forthcoming ARTP conference in January.

Best regards,

Tom Kelly

Matthew Rutter

I would like to thank the group for giving me this opportunity as Deputy Chair of the Manufacturer Liaison Committee. I have been working as a Respiratory Physiologist at Cambridge University Hospital for 13 years with experience predominantly in lung function but also with exercise testing and sleep.

During that time I have seen many new developments in the equipment we use in clinical practice and have come to realise how important the relationship between the manufacturers and physiologists is. As Deputy Chair I hope to encourage that relationship for the benefit of the profession and patients with the hope that the input from the membership could lead to developing the equipment to deliver the best service possible. I look forward to representing the membership and manufacturers alike, supporting the new Committee Chair, Tom, and invaluable committee members, Nigel, Alan and Brendan.

Hope to see you all at the conference.

Best wishes

Matt

Nigel Clayton
Alan Moore
Tom Kelly
Matt Rutter

ON THE BLOWER

COMPANY ROUND-UP

Not a great deal to report in this edition of 'On the Blower', however with Tom and Matt on board we should have plenty to report in the next edition, following the conference exhibition.

CHANGES AT VITALOGRAPH

It's always great to see experienced Clinical Physiologists working with our equipment suppliers. Andy Roebuck has recently moved into the service and sales team at Vitalograph where his experience as a respiratory physiologist will prove a valuable addition to this front line role. The service team has also received an extra boost with the addition of another service technician to cover field service and improve response times.

Stuart Hildage has also joined Vitalograph as Product Marketing Manager. With more than 30 years' experience in the medical device field, Stuart states that "I am very excited to be part of the Vitalograph team and look forward to building on our long heritage and excellent reputation that have served our customers well for over 50 years'.

With additional members of staff and the launch of new products, 2016 will also see the expansion of the Vitalograph Head Office facility in Buckingham.

NC

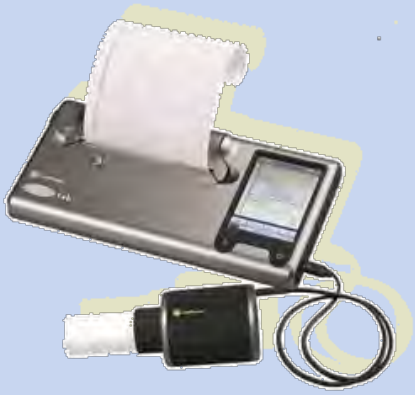
MEDISOFT

Medisoft customers will be pleased to hear that the company is working closely with its worldwide network of distributors, including Vitalograph, to turn feedback into improved products. I am sure Vitalograph and Medisoft also appreciate the feedback given by ARTP members via the manufacturers survey. With Medisoft now a subsidiary of MGC Diagnostics Corporation, the first change you will have noticed is the new corporate branding identity for the company.

NC

CAREFUSION

Stuart Bennett writes, "On behalf of all at CareFusion we would like to start by saying Happy 40th Anniversary to everyone involved with the ARTP. Congratulations on reaching such a significant milestone in celebrating your Ruby Anniversary." Keeping with the theme of 40 and to celebrate the 40th anniversary of the ARTP, CareFusion are offering ARTP members a very special deal with a 40% discount to the first 40 customers who place an order for the Vyntus Walk, Microlab, Microloop or SpiroUSB. Orders can be placed using the following email address; GMB-UK-Respiratory-Sales@carefusion.com and quoting ref: CFNIn40.



CareFusion has announced that from December 2015, all hospital related Micro Medical queries or orders should be made by contacting CareFusion directly (CareFusion UK 232 Ltd) and not Williams Medical Supplies. This is to ensure we have one point of contact for all CareFusion products. All primary care or CCG related queries should continue to be made through Williams Medical Supplies. Telephone contact details are 01256 388512 or 01256 388517 or email; GMB-UK-Respiratory-Sales@carefusion.com. Alternatively contact your local account manager.

NC

BEDFONT SMOKERLYZER

Bedfont Scientific has recently announced the iCOTM Smokerlyzer which offers a new way for smokers to monitor their habit by recording their breath CO levels which can be displayed on a smartphone or tablet. The app helps provide encouragement for smokers to quit without being in direct contact with their doctor or smoking cessation advisor.

To help maintain control over quality and supply, the good news is that the device is being manufactured in the UK.

NC

Nigel Clayton
Alan Moore
Tom Kelly
Matt Rutter

ON THE BLOWER

DEVILBISS

At the end of 2015 DeVilbiss launched the latest in their range of CPAP machines. The DeVilbiss Blue CPAP has advanced algorithms built into the software to improve patient comfort and compliance and also has improved humidification and additional connectivity options.

DeVilbiss has also just launched a new type of electronic oxygen conserver called the Evolution Satellite. The sensitivity of the device is such that it can detect weak and strong inhalation patterns making it suitable for most patients. The Evolution Satellite uses a uniform pulse method, delivering the same volume of oxygen with each breath.

2016 will see the release of Airforce One. This may sound like a hand drier or US presidential flight, but this is in fact the latest in compact compressor nebuliser to be released by DeVilbiss.

These devices will all be on display at the ARTP conference in London.

NC

SRETT MEDICAL

Remote monitoring of compliance can be a useful component of a CPAP service. French company SRETT Medical are introducing the T4P CPAP telemonitoring solution to the UK.

T4P is a simple device that works with many of the popular CPAP devices. Nightly usage data, including delivered pressures, hours on device, AHI and leak, are collected and sent daily to a secure server. No patient identifiable data is collected or transmitted.

User application software downloads usage data and marries it to locally stored patient data. A variety of user configurable reports are available, with sort and alert functions.

This is not the first CPAP telemonitoring system, but its wide compatibility, data security, and the ability to move the device between patients suggests the T4P is worth a look. Upfront and running costs for this system appear very reasonable, and depending on the type of service you provide may offer opportunities to improve your service without too much strain on resources.

Pop to srett.com for full details.

TK

A HUGE THANK YOU

I joined Nigel and Brendan on the Manufacturers Liaison Committee (MLC) some 15 years or so years ago. Sadly Nigel has reached that point in his career means that competing demands means something has to give. Despite those competing demands, he extended his stay as Chair of the group to help everyone out. That is the measure of the man. Colleagues, in the time that I have worked with Nigel, it has always been an absolute pleasure to work with him and he has worked tirelessly on your behalf. Difficult though it may be to believe for those of you who know me, I don't think that Nigel and I have ever had a cross word in all our time working with him and I want to say a huge thank you on behalf of ARTP to a colleague who I will sorely miss. Nigel, you are a great guy. May your new ventures prove as successful as everything you have achieved to date.

AM

AND WELCOME

I was absolutely delighted to find out that Tom Kelly was to join us on MLC. Having known Tom for some time in his capacities representing our colleagues in IARS, I know that Tom brings exactly the right qualities to MLC to take this most important role forward and I look forward to meeting up with him again at conference.

One word of warning for colleagues meeting him for the first time – a trip to the bar if you're in the chair could prove expensive – doubly so if I'm by his side. Welcome Tom.

AM

AND, FINALLY – AN APOLOGY

Apologies for there being a lack of content from me for this issue. As you can appreciate being Chair of the Events Committee has taken up rather a lot of my time over the past few weeks given the relocation of conference and other issues. Don't worry, I'll be back with a bang in the next issue.

AM

COMPLAINTS

Don’t forget, if you have any problems regarding equipment malfunction, quality control / calibration, service response times, software issues etc. please feel free to voice your opinions off the forum by contacting the Manufacturers Liaison Committee direct at Watchdog@artp.org.uk. We will then be able to collate this information, including verification of accuracy, before commencing on an appropriate course of action.

Finally, to all the manufacturers who may be reading this article, please remember to keep us posted with details of any new products you are about to release on the market. Details should be sent to tomkelly1@nhs.net.

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EDITORIAL. The National Fag. From 'BREATH' ISSUE Number 12, February 1981

Cigarette smoking is one of the major epidemics of our time. Its effects upon the health of this nation remain severe and once the major smoking-related diseases are established, medical science may have little to offer the patients. The treatment of lung cancer remains a disappointing enterprise for reasons already clearly spelt out in this journal[1] and the treatment of emphysema is seldom other than palliative.

It follows that the only practical ways of improving this state of affairs are to dissuade children from ever taking up the habit and to persuade established smokers to give it up or at least to curtail their consumption. There is no doubt that, for the foreseeable future, we will be faced with a hard core of smokers unwilling or unable to change their habits and any large-scale ban on smoking would be worse than useless bearing in mind the American experience in the Prohibition era.

Children and teenagers are notoriously impervious to well-meaning efforts to make them mend their ways and anti-smoking propaganda in schools has so far had only a limited effect. The incorporation of health education within the general curriculum offers a better hope, but the sad fact is that 85% of children who start, even in a small way, end up as regular dependent smokers.

Among adults some reduction in the proportion of smokers has been achieved; the medical profession understood the message at a fairly early stage but the bulk of the population was less easily impressed. The overall percentage of smokers has indeed fallen slightly over the last ten years (to 45% in males and 37% in females—1978 figures)[2] though this was brought about largely by a reduction in the proportion of lighter smokers so that the average number of cigarettes smoked per day by each smoker actually showed a rise.

The means by which further reduction in tobacco consumption could best be achieved have aroused much controversy. For some time, the tobacco companies have kept to a voluntary agreement to exclude tobacco advertising on TV, though very effective publicity has appeared on the 'non-advertising' channels in the guise of sponsored sport. The question was debated again in Parliament in November of last year, to the accompaniment of passionate arguments both for and against any legislation to limit tobacco advertising. There is persistent pressure from a group of MPs against restrictions of this kind, backed up by a section of the press which regards such ill-mannered attempts to improve the health of the nation as 'part of the Nanny-State which does more harm than good'[3].

Cigarette advertising on hoardings and in newspapers will continue but it is a matter of argument just how much this contributes to the overall national tobacco consumption; some claim that it merely influences the choice of brand. For the keen-sighted a 'Government Health Warning' is also provided and again the effectiveness of this has been questioned. Nevertheless, the main body of many advertisements (i.e. the manufacturer's contributions) may now contain a message such as 'Low Tar' in large letters and whether in response to this or not, there has been a very marked shift towards lower-tar brands on the part of the smoking public.

With Budget date approaching the Chancellor of Exchequer (who recently kicked a habit of 60 per day) must now be trying to decide the least unpopular way of increasing Government Revenue—and what better policy than to hit the nation right in the addictions? The Tobacco Tax Revenue now stands at over £2,000 million per year, but the retail price of a

cigarette is actually less in relation to earnings than it was twenty years ago (allowing for the effect of inflation). So the Chancellor could well find reasons for putting up the tobacco tax provided that in so doing he did not depress tobacco consumption so much as to negate the effect. Which is where the economists come in - and it has been calculated[4] that although an increase in tax would result in a fall in consumption, there would still be a net gain to the Revenue; in addition the Treasury would pay out less in sickness and widows' benefits, which would admittedly be partially off-set by the need to pay more in retirement pensions!

Any campaign for the total abolition of smoking is likely to fail because the majority of cigarette smokers are already heavily dependent on nicotine. In this respect, nicotine is quite unlike alcohol. The majority of alcohol users are not alcoholics but occasional drinkers who seldom become addicted. With cigarette smokers it is quite the opposite and almost all become dependent on nicotine though they are spared the social disruption which the alcoholic almost inevitably incurs. Although many smokers wish to stop, few actually achieve it in time to avoid serious lung disease.

Nevertheless a very profound change has taken place in national smoking habits over the last 20 years. About 1950, filter-tipped cigarettes were introduced and today over 90% of cigarettes are of this type. In addition, the average amount of tar (which contains most of the cancer-producing agents) in each cigarette has over the ten years from 1966 to 1976 steadily fallen from 30mg to 17mg[5]. This trend has been accompanied by a striking decline in the incidence of precancerous histological changes in the bronchial epithelium of smokers[6]. The incidence of lung cancer, which has been increasing at an alarming rate is now starting to level off and may even be declining, a most encouraging change which can reasonably be attributed to the tar reduction.

There is some evidence however that the reduction in tar consumption is itself levelling off. This is very probably due to the fact that the ratio of tar to nicotine varies little from one brand of cigarette to another so that in changing from a 'High Tar' to a 'Low Tar' brand, the smoker has to accept a lower nicotine content which may well be unsatisfying[7]; it has been shown that many smokers will compensate for a reduction in the availability of nicotine by increasing the puffing frequency and the depth of the inhalation[8].

Various strategies could be employed to overcome this problem. Smokers can undoubtedly adapt to a lower daily nicotine intake, but there is clearly a limit below which the established smokers cannot be pushed otherwise they would stop smoking! Accepting this, one's task is to administer the drug in as harmless a manner as possible. So far as cancer is concerned, this would mean a minimal tar level and the nicotine level, if too low, could be enhanced by 'spiking' each cigarette with a small extra quantity of the drug. The Chancellor could give further encouragement by increasing the existing tax on the higher tar brands. The technology of tobacco processing is continually advancing and it should be perfectly possible to minimise the undesirable components by genetic selection of the tobacco plants, improvements in filters and by promoting the absorption of nicotine in the mouth (as happens with pipe smoke) instead of the alveoli. Flavouring agents can be added to compensate for the inadequate taste characteristics which are another reason for rejection of the very low-tar brands.

For those unable to give up smoking, a low-risk smoking policy could therefore be advocated[9] and it might be possible to formulate a 'maximal permissible daily tar load', analogous to the permitted levels of toxic chemicals in industry. Individual smokers, however, would have to treat such a figure with the greatest caution as some may well have a

predisposition towards smoking-related diseases such as cancer, emphysema or heart disease; such predispositions are seldom recognised (if at all) until the disease is already causing symptoms.

In spite of the reservations which we have outlined, it seems clear that the risks of smoking could be substantially reduced, though the smokers' dream of a universally 'safe' cigarette is far from realisation at the present time. The only rational smoking policy which can be advocated today therefore, is never to start and the only safe cigarette is the one that stays in the packet.

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ARTP MEETINGS

Year	Date AGM	Venue	Town/City
1975		Inaugural Meeting King College Hospital	London
1976	12/06/1976	“General Meeting" Brompton Hospital	London
1977		NO MEETING?	
1978		Spring Meeting, Derbyshire Royal Infirmary	Derby
1978		AGM. Charing Cross Hospital	London
1979		Spring:	
1979		AGM;	
1980		Spring: Harefield Hospital	London
1980	04/10/1980	AGM, Walsgrave Hospital	Coventry
1981	04/04/1981	Spring: Hope Hospital	Manchester
1981	10/10/1981	AGM. Derbyshire Royal Infirmary	Derby
1982		Spring:	
1982	16/10/1982	AGM: Harefield Hospital	London
1983	16/04/1983	Spring: Royal Liverpool Hospital	Liverpool
1983	08/10/I 983	AGM: Kings College Hospital	London
1984	06/04/1984	Spring: Stoke Mandeville Hospital	Aylesbury
1984	06/10/1984	AGM: Lodge Moor Hospital	Sheffield
1985	20/04/1985	Spring Leeds General Infirmary	Leeds
1985	05/10/1985	AGM 10th Anniversary Papworth Hospital	Cambridge
1986		Spring	
1986	31/10/1986	AGM:York District Hospital	York
1987	04/04/1 987	Spring: City Hospital	Edinburgh
1987	31/10/1987’	AGM: Manor Hospital	Walsall
1988		Spring ??? With BTS?	Newcastle
1988	14/10/1988	AGM:City Hospital	Edinburgh
1989		Spring Meeting, St Thomas’ Hospital	London
1990	08/12/1990	AGM. Kensington Town Hall	London
1991	30/11/1991	AGM: Queen Mary Westerfield Hall	London
1992		Spring	Stirling
1992	21/11/1992	AGM: B’ham General Hospital	Birmingham
1993		NO MEETING	
1994	18/02/1994	Spring:North Staffs Hospital	Stoke on Trent
1994	26/11/1994	AGM: Stirling University	Stirling
1995		Summer:QMC	Nottingham
1995	24/11/1995	AGM: Pontefract General Infirmary	Pontefract
1996	04/07/1996	Summer:University of Warwick	Warwick
1996	22/11/1996	AGM: Park Hotel Fazakerley	Liverpool
1997	03/07/1997	Univ of Loughborough	Loughborough
1998	22/01/1998	AGM:ICC "25th Anniversary"	Birmingham
1999		AGM:Racecourse/Moat House	Doncaster
2000	10/02/2000	AGM:Hanover International	Daventry
2001	22/02/2001	AGM:Hilton	Blackpool
2002	17/01/2002	AGM:Hilton	Blackpool
2003	16/01/2003	AGM:Moat House	Stratford upon Avon
2004	28/01/2004.	AGM:ICC	Telford
2005	24/02/2005	AGM-Moat House 30th Anniversary	Glasgow
2006	26/01/2006	AGM Hilton Metropole	Brighton
2007		AGM-Moat House	Glasgow
2008		AGM Hinckley Island Roundabout	Hinckley
2009		AGM Hinckley Island Roundabout	Hinckley
2010	28/01/2010	AGM Park Inn Hotel	Heathrow
2011	03/03/2011	AGM Marriott Hotel	Glasgow
2012	26/01/2012	AGM Hinckley Island Roundabout	Hinckley
2013	07/02/2013	AGM Hinckley Island Roundabout	Hinckley
2014	30/01/2014	AGM:Hilton	Blackpool
2015	22/01/2015	AGM:Hilton	Blackpool
2016	14/01/2016	AGM Russell Hotel 40th Anniversary	London

40 years of ARTP

1975	Inaugural Meeting
1976	1st AGM
1977	Formation of Constitution
1985/86	Charitable Status
1985	10th Anniversary
1988	BTS/ARTP Liaison Committee
1989	Start First Handbook with BTS
1992	BTS/ARTP National Assessment in Respiratory Physiology
1994	BTS/ARTP Guidelines
1994	Clinical Scientists join ACS, Incorporated onto CPSM
1998	“25th Anniversary”
1998	Appoint EBS as Administrators
2000	Publish First Edition of Handbook
2001	Publish First Edition of Spirometry Handbook
2002	Publish Second Edition of Handbook (Part One)
2003	Past Chair of ARTP becomes CSO at DoH
2005	Publish First Edition of Handbook (Part Two)
2006	30th Anniversary Conference

Watch out for updates over 2016...