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HIGHLIGHTS ...

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First word

Dear Readers,

Welcome to the Winter edition of INSPIRE. By the time this is published, some of you will have attended the ARTP National Strategy day, which is always a great event focussed on tackling issues challenging our profession and improving our respiratory and sleep physiology services across the country.

For this edition, we have two articles from ARTP bursary winners. This funding allowed the successful applicants to attend the ERS in Vienna. With NHS funding for training and CPD being so scarce in the current financial climate, the ARTP bursary allows you to attend national and international conferences without having to rely on your department budget. In return, you present your abstract at the meeting and write an article for INSPIRE – not a bad deal!

We have the regular **'Word from the Chair'** and **'On the Blower'**. The research committee have also provided us with their regular instalment of **'Fresh Air'** which is an interesting article recapping a recent paper in *The Lancet* which focuses on using lung function trajectories for early detection of lung disease. For this issue's **'Respiratory Life Stories'**, I was lucky enough to interview Sanja Stanojevic to get the story of her career so far. **'Lab in the Limelight'** takes a look at one of Scotland's biggest respiratory physiology services in NHS Lothian. The ARTP secretary and head of respiratory physiology services at NHS Lothian – Sara McArthur – has given us an insight into her large department and the work they do. Finally, I have included more of the **'Getting to know the ARTP Committee Chairs'**, looking at our education, examinations and events committee representatives.

A special thanks to Sanja and Sara for taking time to provide content for their articles and to all the editorial committee for their hard work in proof-reading all the content. As ever, I am always on the lookout for more articles so please contact me if you are interested in publishing your work in INSPIRE. Sit back with a mug of tea/coffee (or mulled wine) and enjoy this issue. Have a well-deserved break and a wonderful Christmas and New Year when it comes.

Paul Burns
ARTP INSPIRE Editor
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A Word from the Chair

Dr Joanna Shakespeare
ARTP Honorary Chair

Hello and welcome to the final edition of ARTP INSPIRE for 2024. I hope that you have all had an opportunity to enjoy the summer (even if it was a bit wet) as we start to now prepare for the busy winter months and upcoming festive season.

Since the last edition we have launched the ARTP Conference 2025, which is being held at the Scottish Events Campus, Glasgow on the 1st and 2nd May. The call for abstracts has been launched with a closing date of 24th February at 12pm, giving you plenty of opportunity to analyse that data and get it ready for submission. As always, we encourage all of our PTP and STP students to submit their dissertation projects. ARTP conference is a great opportunity to receive feedback on your work and consider how to grow and further develop your research skills.

Our next big event is the National Strategy Day, being held on the 22nd November in Birmingham. This event, aimed at Heads of Service and their Deputies, provides an opportunity to discuss national issues and how they impact on our services. It also provides an opportunity to hear from our ARTP committee Chairs and the work that their committees are undertaking on behalf of the membership. Matt and I have developed an ARTP Strategy which will be launched on the day. This outlines the aims and objectives of ARTP over the course of my term as ARTP Chair. It has been designed to be aligned with the visions of the Chief Scientific Offices from across our four nations. These offices will be represented at the National Strategy Day, providing Heads of Service/Deputies with an opportunity to ask questions and discuss their plans for supporting/developing the healthcare science workforce. This will be quite timely considering we have now had our first budget announcement of the new government which has committed to significant investment in the NHS.

In the last edition I described the work that had been undertaken to update Committee terms of reference and job descriptions. This work has resulted in the development of new roles and responsibilities for many of our Committees which have recently been advertised, including Committee secretary roles to support our ARTP secretary, Sara McArthur. We have also re-advertised the ARTP vice secretary role as we continue our work to ensure succession planning across our Committees. We are about to release a job description for the new position of ARTP Chair for Equality, Diversity and Inclusion, a position that will sit on ARTP Board within the new Board Terms of Reference. Please consider if this is something that you feel that you could support moving forwards.

Once in post, the Chair will look to develop a Committee who will reach into and support the work of all the other ARTP committees. We are very grateful for the support of our new Non-Executive Director, Byron Batten, in the development of this role and Byron will continue to provide advice and guidance to the new Chair once in position.

You will see that in this edition of INSPIRE we have continued with our series of 'Introducing you to' messages aimed at providing you with an insight into who your Committee members are and what their aspirations are within their ARTP roles.

During the AGM at the ARTP 2024 Conference, Julie Lloyd announced that we would be looking to update and improve the current ARTP website. I can confirm that we have successfully completed a new website tender process and have commissioned 'Light Media' to design and build the new website. Those attending the National Strategy Day will hear a presentation from Light Media, who will provide an insight into what the website may look like and the improved website functionality that it will provide. The work to develop the website is moving at pace with weekly design meetings. We look forward to being able to update you further in the next edition of INSPIRE.

I would like to continue to encourage members to communicate with me (chair@artp.org.uk) or specific Committee Chairs (via admin@artp.org.uk) as much as possible. Please feel free to ask questions, raise comments or concerns where required. For those of you working in England, I would like to encourage you to take some time to respond to the questions raised to support the development of the new 10-Year Health Plan. The questions can be found at https://change.nhs.uk/en-GB/. ARTP will be providing a response as will the Academy of Healthcare Science, but the more responses submitted highlighting the role of healthcare scientists in the future NHS, the better.

I will leave you now to enjoy this edition of INSPIRE. I would like to take this opportunity to thank you all for your hard work and dedication to patient care in these current difficult and challenging circumstances. I will also take this opportunity to wish you all a happy and healthy New Year and I look forward to working with many of you in 2025.

Physiologist/Respiratory Life Stories

For this edition of physiologist/respiratory life stories I had the privilege to interview the 'queen of lung function reference values,' Sanja Stanojevic. I would like to show my appreciation to Sanja for taking time out of her busy schedule to chat to me about her life and career. You really couldn't make up the story of how she came to do a PhD with Janet Stocks which ultimately led to the Global Lung Function Initiative (GLI) reference values.

I first came across Sanja in 2012 whilst I was at my first ERS in Vienna, and saw her present the all-age multi-ethnic spirometry reference equations which were published that year. I knew this was a monumental time in respiratory physiology and went away from that conference alongside my colleague with one goal – implement the equations into our clinical practice. At the ERS in Amsterdam 2015, I was then introduced to Sanja whilst with the Great Ormond Street Hospital (GOSH) team. I must admit I was a bit star struck to be chatting with one of the lead authors on the GLI work. More recently, I have been working with her as part of the CPET GLI task force.

With those loose connections, I asked Sanja to be my next guest for INSPIRE. To her credit, she replied immediately and within a few days we were sitting down over Teams to chat through her story. Unfortunately, the INSPIRE expenses budget could not afford to send me over to Nova Scotia! I was slightly nervous as she is the biggest name I have interviewed to date (no offence Karl and Aidan!) However, when Sanja appeared she told me she was nervous and I was immediately put at ease. Hearing her story really amplifies the work she has done as a researcher and epidemiologist to improve patient care. Although she is mostly non-patient-facing and would prefer to sift through mounds of lung function data, her ultimate goal is to improve diagnosis and monitoring of lung disease to help patients. I think this really comes across when reading the article. She had me in bouts of laughter at regular intervals during the chat! I hope you enjoy reading her story as much as I did hearing it.

Tell me a bit about your background

I was born in Serbia and moved to Canada when I was six. My undergraduate degree was in Biology. As part of that, I studied human and animal physiology. I moved to the UK to do my Masters and PhD. Then, after a brief stop in Peru, I begrudgingly came back to Canada and stayed.

After completing my undergraduate degree, my path became very wavy: whilst studying my undergraduate, I was introduced to epidemiology. I had no idea what it was but I liked math, medical sciences and human biology, so I quickly realised I would get to work with data, numbers and statistics and I would get to inform health and work with clinical questions without having to deal with patients – this was very appealing to me!

I was a bit out of the ordinary in that most people who do a statistics course run away from it and never want to see another p-value again! However, I embraced it and thought, "I need more of that!" So, whilst studying epidemiology in the 4th year of my undergraduate degree, I started thinking of this as a potential career.

At that time, I was also really interested in international development and so I spent six months in rural Jamaica working for planned parenthood.

What did this work in Jamaica Involve?

I was participating in reproductive education program delivery and evaluating different implementation strategies. For example, does going into schools and doing health education reduce the incidence of sexually transmitted diseases? What components of the health education curriculum work better than others? So even when I was there doing field epidemiology, I wanted to collect numbers and evaluate what was going on. This was the part I really enjoyed.

What was the Jamaica experience like, did you enjoy it?

I really like the engagement with adolescents - it was a lot of fun. It was also eye opening as we were focused on reproductive health, whereas the lack of running water and toilets was an even bigger issue for many of the communities. We take a lot for granted so the experience was really good to put things into perspective.

You did your postgraduate studies in London. What did you study and how did this materialise?

During my time in Jamaica, a colleague had told me about the 'London School of Hygiene and Tropical Medicine'. I thought, that seems right up my street. The

program focused on epidemiology, as well as international development. I thought I would have no chance of getting in. I was sitting at home thinking of all the barriers to applying to the course then my dad told me that I would have no chance if I didn't apply so I should at least submit an application. I decided to apply and found out a month later that I was accepted and had to get on a plane to England! From submitting my application to physically being in London was around six weeks. It was an exciting time.

Was this a Masters course?

Yes, it was a Masters in Epidemiology and I loved it. The course was exactly the kind of work that I was doing in Jamaica but now I had the technical skill set to do it well. I was learning new techniques in data analysis and statistics. Basically, doing things that I loved together with extraordinary classmates.

Tell me more about your studies and experience in London

I was loving the course, but I was a poor student living in London and I really wanted to travel around Europe. I applied to be a medical secretary during the school breaks. Whenever there was a break, I would spend part of the time working and part traveling. On one of my stints, I got placed at GOSH with Dr Paul Aurora – who many will know was, and still is, a consultant in Paediatric Respiratory Medicine and Lung Transplantation. I was dictating his charts and was able to get through the backlog quickly. One day, one of his fellows dropped off a draft of a paper for Paul to review. I was bored so I did a terrible thing and had a look at the paper and started making notes in the margins noting that the wrong statistical tests had been used and some of the results had been interpreted incorrectly. I don't know what I was thinking!!!

Paul came in the next day and asked "is this your handwriting?" I thought, "Oh great, I'm going to get fired, and I will need to cancel my next trip." He had a lot of questions about why I knew so much about p values. I didn't spend much more time typing letters, but instead worked on a CF research project.

I finished the project, got my pay cheque, and went off on my trip. Months later when I was just about to graduate and had already lined up a job in Canada, I got a phone call from Paul. "Do you remember me?" to which I replied, "Yes I do". My first thought was that I had made some mistake on the project. Then he explained to me that there was a Professor at GOSH who had received a grant, and she was looking for an epidemiologist. He asked if I would you be interested in meeting the professor named Janet Stocks. My bags were packed, but I googled Janet and knew I could not miss an opportunity to do a PhD under her supervision.

Later I learned that the project would also involve working with Professor Tim Cole. Many of the younger INSPIRE readers may not know but Janet and Tim were at the top of their fields. Tim Cole had developed growth charts for children which to this day are in every GP's and paediatrician's office. Janet was well known for her leadership in paediatric pulmonary function. The project aimed to develop growth charts for lung function!

Were you familiar with them before you googled them?

No, I didn't have a clue and also didn't really know much about lung function other than what I had learned in my undergraduate degree. I decided to meet with them and was offered the PhD – which of course I accepted. So again, in a very short space of time, my plans completely changed. The job I had lined up in Canada was to work with the government and do statistics on health information which was in Toronto, but I decided to stay in London.

How did you find the PhD experience?

It was great, but really hard work. I remember when I finished in 2009, I had coffee with Janet and said, "Thank you very much, I have learnt so much from you but I never want to see FEV¬1 again!" I was planning of going back to international development and doing more field studies.

What did you do after the PhD?

A colleague of mine who had done their Masters at the same time as I, had moved back to Peru and set up a chronic disease Research centre in Lima. The main goal of the research was to understand the risk factors for cardiopulmonary disease in people living in Latin America. I went to Peru to work with the team to set up the lung function testing and the respiratory questionnaires. I'll be honest, I did not enjoy my time in Peru! It's a beautiful country and the people are lovely. But it was not a good fit for me. We performed studies at altitude and I found out quickly that I am one of those people who can't tolerate altitude, so I was sick all the time. There was also an aspect of seeing people living and working without the same rights that many of us are accustomed to. Things like working hours and a safe working environment. Whilst I wasn't necessarily affected, I worked with people every day who were. Women were also not respected the same way as men in the workplace. When Jane Kirkby came out to visit me in Peru she helped convince me that I had to leave.

After that, I ended up back in Toronto and jobless. That was when I started thinking about what I actually wanted to do with my career. All my efforts to stay away from FEV1 failed, and I continued to work in respiratory health at Sick Kids in Toronto.

When GLI was published in 2012 I remember there had been a reference values spirometry paper from you in 2008. Was this your PhD work?

Yes, my PhD was the bare bones of the GLI. I had worked out the methodology required to generate

adequate reference values for lung function - specifically how we take data from different studies and harmonise it. You assume everybody measures height and calculates age in the same way. I quickly realised they didn't, so part of my PhD was to figure out how to harmonise the data we needed to create reference equations. The second part was taking the methods that Tim Cole had developed for growth charts for height and weight and make them work for lung function. Typically, growth charts are two-dimensional. You have height and age or BMI and age but in lung function we have three dimensions - height, age and lung function therefore you need the third dimension. As part of my PhD we worked out those methods.

How did you meet and start working with Philip Quanjer?

Philip reviewed one of my papers and contacted me to ask if I wanted to combine my methods and his data. By that time he had collected over 50,000 data points from various studies. The ERS awarded us a small amount of money to establish the GLI equations. Luckily Philip was retired and wanted this to be his last project. He had developed the widely used European Community for Steel and Coal (ECSC) equations in 1983 and he knew the inherent problems with the equations. He was very uncomfortable that people had used them so widely without consideration of the limitations and he was keen to replace these with something much better.

We knew it would cost millions of dollars to prospectively gather healthy data and with the 2008 financial crisis, nobody was giving out funding. We decided that we would use Philip's 50,000+ data points and combine these with the data I had collected for my PhD plus a few other large datasets to create the GLI equations.

We knew that in order to have the equations widely accepted, we needed to have representation from all of the key respiratory societies. To do this, we had an executive that was made up of leaders from all of the major respiratory societies who were part of the planning and interpretation of the GLI equations and were responsible for disseminating the equations in their regions.

I remember using ECSC in adults and when I moved to paediatrics in 2009 we were using Rosenthal. The arbitrary break points and data only being based on people of European ancestry were such a limitation. My first ERS was in 2012 and my colleague and I saw your presentation on the new GLI spirometry reference equations and we were delighted and knew we had to implement these ASAP. It was a game changer!

Did you realise the impact you would make in the field of respiratory physiology with this publication?

No! "I don't know why you think I'm famous, all I did was create an equation!" We knew how big the problems were, the jump in the Rosenthal equations is a good example. As part of my PhD, I visited labs around the world and performed my spirometry. In one lab I could be completely normal and in another I should have been on a transplant list whilst generating the same absolute numbers!

The reality is that if you go and have a blood test or an ECG done there's some trust that you can have that test done anywhere and the results are going to be the same. Whereas in lung function you could perform spirometry in one hospital then cross the street to another lab within that hospital, and each device would have a different equation programmed. It was a real mess at that time. So, whilst we knew what we were dealing with, we didn't really consider the full impact it would have and how much having a single equation would improve things.

As a methodologist I always recognized the limitations of the equations. We were always thinking about how we were going to make it better and how we were going to get funding to fill the gaps in the data. We knew were going to have to repeat the project for lung volumes and diffusion capacity. We were also constantly responding to and resolving the implementation barriers and working together with the manufacturers. I don't think we had time to really stop and reflect on the 2012 spirometry paper's impact.

It must have been quite frustrating dealing with resistance to using the new equations. I would have thought they would have been more accepted initially considering the massive improvement that their implementation was going to make in clinical practice?

Yes, and now looking back compared to where we were in 2008, it solved a really big problem. Is it perfect? No. Did we have growing pains, and do we have to work very closely with the manufacturers? Yes – and in doing so we were able to build really good relationships with people in industry and with other researchers. I think that is maybe why GLI ended up being so successful. Rather than just telling people to 'get on with it,' we responded to all the feedback and were constantly iterating the tools we had developed.

Did you know that the GLI spirometry would eventually lead onto transfer factor and static lung volumes? I remember it being a big issue for some that they didn't want to implement the equations as it was only spirometry.

Oh, you're digging up painful memories, Paul! In all seriousness, if money grew on trees we would have done all of the tests at the same time. It was always in the back of our minds to do the full PFT set. Transfer factor came next, then lung volumes. We've tried to combine data for fraction of expired nitric oxide (FeNO) and cardiopulmonary exercise testing (CPET) but the equipment and protocol differences were too great to

effectively combine the data. We were able to create GLI equations for multiple breath washout (MBW). I think that people didn't really appreciate that we ran GLI on fumes. We got support from ERS but the funding was very limited. We didn't do it for any financial benefit, we did it because we wanted to improve lung function interpretation and people kindly submitted data because they wanted to improve outcomes for patients. A big reason for why GLI was successful was because people from different disciplines and different areas of the world all worked together and shared data and expertise to improve how we use lung function measurements.

When we think about the future, I think it's easy to find gaps and limitations, but I often don't stop to appreciate how far we've come.

You have a great working and social relationship with the GOSH team. How did that happen, was it all from doing your PhD there?

It was the best time! Jane Kirkby started at Great Ormond Street around one week before me, then Liam Welsh from Melbourne started shortly after. Aidan Laverty, Emma Fettes, Cara Oliver, and Johanna Dingle-Gavlak were there already. It was a very unique time and place because we were all roughly the same age (and we count Aidan in that bracket as well!) We all had very different roles at GOSH, so we weren't competing which made it a nice supportive environment. Janet was a great mentor. She gave us the space and encouraged us to get the work done!

A highlight for me was the JOC "just one club", where one day a week we all turned our computers off at 5pm and headed to the local pub(s). Unfortunately, none of us ever stayed for just one! We had a lot in common and mutual respect for the work we were doing which made our friendships strong. As you saw at the recent ERS we are all still very good friends today despite all living in different parts of the world.

I imagine conferences like the ERS are a great opportunity for you all to meet up?

Absolutely, yes they are. Although over the years our group has grown - I'm not sure where all the extra people came from (she was referring to me!)

Going back a bit, what was your role at Sick Kids in Toronto when you went back after your PhD?

I was employed by the hospital and taught at the university. At that time I didn't have an independent academic position. Dr Felix Ratjen was there and had just acquired the commercial Nitrogen washout devices for multiple breath washout. The team at Sick Kids was also unique we have a diverse team that contributed some important work to early CF pathophysiology.

I was drawn to Sick Kids because I knew they had the Toronto CF database and the Canadian CF registry, and so as an epidemiologist, there were lots of questions that

Some of the "Just one club" Left to right: Aidan, Sanja, Jane, Liam

I had about disease progression and how interpretation of lung function influences so many aspects of a pulmonary exacerbation. Once we standardised how lung function was interpreted, we were able to try and answer these questions. In Canada and in many parts of the world people were referred for transplant once they reach 30% predicted and we all know how much I loathe percent predicted! So, one of my first projects was to re-evaluate that threshold and try to find better ways of identifying people who are eligible or should be considered for transplant.

It was a good place for me because it had unique datasets. I had done some initial work with multiple breath washout data while I was in London, and at Sick Kids I was able to focus on understanding how we can use LCI to track disease progression and as a clinical test. It was a good fit in terms of opportunities for me to apply my skill set and my interest in respiratory physiology in a very different capacity to what I was doing at GOSH.

Can you tell me about me some people who have inspired you throughout your career?

Many of the people that have inspired me did so in unexpected ways. Meeting Paul Aurora and being introduced to the amazing team at GOSH really set the path for where I am today.

Janet Stocks, Tim Cole, and my other PhD supervisor, Angie Wade were so influential. They made me question everything that I thought I knew and helped me become the researcher I am today.

Having spent most of my career working in children's hospitals, I have to say seeing children show up to clinic with smiles on their faces, inspired me to do as much as I could with the data they shared.

Finally, the whole team at GOSH was very influential in helping me get to where I am today. If I didn't have such a skilled group of colleagues to support me, I'm not sure I would have completed all the project. I don't know how many times they had to explain to me how spirometry worked and what all the outcomes meant!

Name some of the highlights of your career

Getting the ARTP award in 2020 was a big honour. I am not a physiologist, I'm an epidemiologist, so gaining the award was a real highlight. I was disappointed that I

didn't make it in person as missed my connection! I have great respect for the ARTP and have always enjoyed attending the conference.

It also a highlight for me to see the people I have mentored succeed. I've worked with people who are now doing things much better than me.

Reflecting on the impact that GLI has had on people. I do think that we have allowed people to get their lung function interpreted and done so in a way that's more robust which has helped people get the correct diagnosis and get started on the right treatments. This is a highlight to me because even though I'm not involved clinically at the bedside, the work I've done has had a really big impact improving patient care and outcomes.

Your husband is also an epidemiologist and you have two young children (ten & seven years old.) It must be hard balancing your busy work and family life?

Yes, but my children have been really important to keep me grounded and help me prioritise things. If I get asked to speak at a conference, it's now a different equation that I apply. My first thought isn't "what a cool place to visit," it is "what's the school schedule? And do I spend more time travelling than attending the conference?" I love my job but none of the papers I write will hug me at the end of the night. I am lucky to have a very supportive husband who helps hold the fort. He also does most of the cooking which is important for keeping my children alive as I am a terrible cook!

There have been times when we have high fived at the airport and it's not easy. I hope that we're setting examples for our kids and role modelling that you can have rewarding and successful careers and contribute to a bigger societal impact, but also prioritise time at home and do things as a family.

You live in Nova Scotia now. What's your current job role?

This is my first official academic appointment. I am at Dalhousie University. I really like this new role because I get to do the research that I want to do. It is allowing me to work towards addressing some of the other barriers to pulmonary function testing. For example, how can we simplify testing to allow for greater access in the community?

What does the future hold for Sanja Stanojevic?

I think we've come so far but in addressing one set of problems we've unearthed another. I think of it as like the whack a mole carnival game. Reflecting on how pulmonary function is used (or not used) clinically has made me think more broadly about the problems. It would be unheard of to be diagnosed with diabetes or heart disease without a blood test. What I would like to do in the next chapter is to really look at how we can better use measures of lung function – the right test for the right conditions. Spirometry is great, but it is not the best test for every different presentation and so, how do we identify what tests are most useful for what patients at the right point of the disease progression? How can we simplify the tests? I'm all about quality and think we cannot compromise quality, but in aiming for that optimal quality, we've made these tests inaccessible. In Nova Scotia, where I live now, people referred from primary can wait between 12 and 24 months to get a spirometry test. That is not ok.

I would like to see how we can implement a hierarchical testing structure where certain tests can be done in a primary care office to rule out disease and those that need more specific diagnostic testing get referred to pulmonary function labs. Overall, I'd like to see us use lung function better. Lung disease has so much stigma around it. I think it is important to advocate to lung health, and to help people understand how they can improve their lung health.

I have some quick fire questions for you now Sanja so just tell me what comes to your mind first.

QUICK FIRE QUESTIONS

Favourite food & drink?
Vietnamese food and gin and tonic

Celebrity crush?
Ryan Reynolds

Favourite film?
Anchorman

Favourite band?
Easy going when it comes to music

Nicknames?
San

Favourite pastime?
Photography

Karaoke song?
Living on a Prayer – Bon Jovi

Favourite memory?
Trémalot (cycling trip through France)

Biggest bugbear?
Percent predicted

Sefam Medical UK

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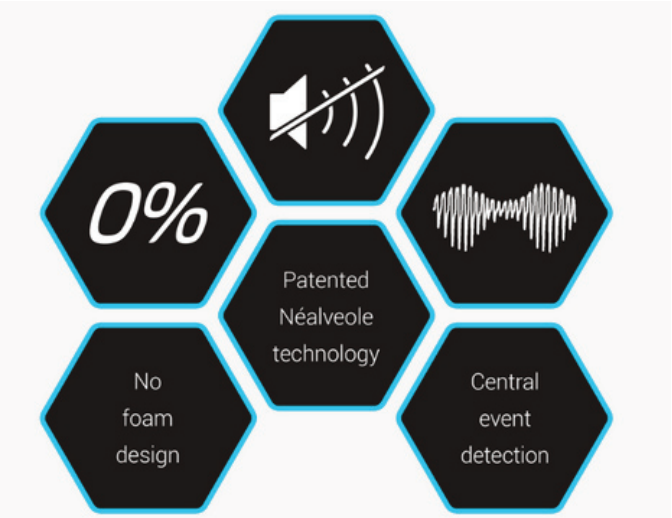

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Changes in lung function and exercise capacity in young people after posterior spinal fusion (PSF) for adolescent idiopathic scoliosis (AIS)

Laura L Jess[1], Dr Kaustubh Ahuja[2], Mr Athanasios I Tsirikos[2], Dr Don S Urquhart[1,3]

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Introduction

Spinal deformity constitutes a diverse group of conditions which change the shape and position of the spine, thorax, and trunk in a three-dimensional manner[1]. Characterised primarily as kyphosis (abnormal spinal curvature in the sagittal plane) or scoliosis (abnormal spinal curvature in the lateral or coronal plane), spinal deformity more commonly presents after the age of 10 years due to skeletal growth acceleration, and may be progressive, often with unknown aetiology.

In most cases of spinal deformity in young people, scoliosis is more prevalent than kyphosis[2], with a female predominance1. Patients present with sagittal imbalance and varying burdensome symptoms including pain, core muscle and leg weakness, breathlessness, and exercise intolerance. If left untreated there is a risk that lung growth will be affected, with worsening extrinsic restrictive or obstructive lung disease emerging[1], and co-morbid complications which may lead to death (although rare), such as cor pulmonale. Making the diagnosis of abnormal spinal curvature due to scoliosis and defining severity is therefore necessary to enable surgical corrective procedures to be undertaken (spinal fusion with anterior or posterior approach) in order to prevent progressive impact on the developing lung, and cardiopulmonary complications.

We have previously undertaken a piece of work in patients with adolescent idiopathic scoliosis (AIS) and reported that those with greater spinal curvature have associated poorer lung function1. This is in keeping with findings previously reported in other literature, whereby impaired lung function as a direct consequence of untreated scoliosis[3-7] and negative correlations between respiratory function and spinal curvature[8], have been identified. We also, surprisingly, observed that patients with greater curvature and more severe AIS show improved levels of exercise capacity when compared with those whose curves were less severe. This contradicts the theoretical hypothesis that exercise capacity would be impaired in those with spinal deformity as a result of worsening extrinsic lung disease (leading to ventilatory limitation), or worsening pain (leading to exercise avoidance and thus physical deconditioning). We therefore postulate these good levels of baseline fitness in this patient group to be a consequence of improved physical conditioning from physical adaptation (or 'auto-training').

We now wish to understand the impact of corrective spinal surgery on lung function and cardiorespiratory fitness in patients with AIS. By understanding changes in respiratory mechanics and exercise capacity after surgical intervention, this will enable us to identify the requirement for rehabilitative support for timely re-introduction to physical activity and facilitate optimal return to baseline fitness levels post surgery for this patient group.

Hypotheses and Objectives

We hypothesised that following corrective spinal surgery (posterior spinal fusion (PSF)) for adolescent idiopathic scoliosis, cardiorespiratory fitness may be impacted in one of two ways:

a) Improved respiratory mechanics lead to better 'trainability' (physical adaptation) and improve exercise capacity.
b) Exercise capacity may fall after corrective spinal surgery due to reduced participation in physical activity and a loss of the previously hypothesised physical adaptation/'autotraining'.

The objective of this study was therefore to identify changes in lung function and exercise parameters from pre surgery after posterior spinal fusion. These findings would then enable us to make clinical

decisions regarding the need for exercise intervention as part of post operative rehabilitation.

Material and Methods

Study participants

Young people that underwent PSF for AIS at the Royal Hospital for Children and Young People, Edinburgh were evaluated before and after surgery.

Outcomes

Data were collated on patient demographics including anthropometric data (height (from arm span), weight, and BMI), ethnicity, age, birth sex and degree of spinal curvature (Cobb angle). Each subject performed detailed lung function (spirometry, carbon monoxide transfer factor and body plethysmography) in addition to cardiopulmonary exercise testing (CPET) using breath-by-breath analysis and a continuous ramp protocol on a cycle ergometer. The aim was to see patients approximately two years after surgery for post operative investigations.

Statistical analyses

Statistical analyses (paired t-test) were undertaken to measure the change in degree of spinal curvature, lung function and exercise parameters pre and post surgery in addition to calculating mean correction index. The following subjects were excluded from analyses:

a) Sub-maximal lung function and CPET on either pre or post PSF visits.
b) Pregnancy prior to post PSF visit (due to changes in lumbosacral curvature).

Sample size calculation

It is acknowledged that this cohort is essentially a convenience sample, and a formal power calculation to establish sample size was not performed.

Sub-analysis to assess for potential effect of COVID-19

In addition to primary analyses, subsets of patients who completed post surgery visits either before or after March 2020 were separately evaluated. The purpose was to eliminate any bias associated with the COVID-19 pandemic lockdown strategy, which saw the cessation of sports clubs and access to many forms of exercise.

Ethical considerations

This study was undertaken retrospectively on a cohort of young people that had undergone lung function and CPET testing both before and after spinal surgery. Locally, this is classed as an audit of clinical practice or service evaluation, and as such ethical approval was not required. The project was registered with the NHS Lothian Quality Improvement team and NHS Lothian Caldicott Guardian approval (#24191) was sought to use patient data.

Results

Study participants

After exclusion criteria were applied, 52 young people were studied. Demographics for subjects within the study population are detailed in Table 1.

Table 1: Baseline demographics

Demographic	Measure
Birth Sex (M/F)	16/36
Mean [SD] age at pre PSF visit (years)	14.9 [1.7]
Ethnicity*	Caucasian n=52 Black n=0 NE Asian n=0 SE Asian n=0 Other n=0

*Based on GLI 2012[9]

Subjects were studied at a mean (range) of 19.0 (1 – 274) days pre surgery with post operative investigations performed at a mean (range) of 3.1 (1.9 – 5.6) years later.

Anthropometric data for study subjects recorded at both pre and post PSF visits are detailed in Table 2.

Table 2: Anthropometric data before and after spinal surgery for AIS

Anthropometric Data	Pre Op Mean [SD]	Post Op Mean [SD]
Height (arm span M)	1.70 [0.10]	1.73 [0.10]
Weight (kg)	55.2 [12.7]	61.0 [11.5]
BMI z-score	-0.62 [1.24]	-0.48 [1.34] *

* In 44 subjects only as patient age >16 years.

Degree of surgical correction of spinal curvature

The Cobb angle method was used to measure the degree of spinal curvature on spinal radiograph in study subjects both before and after undergoing PSF. The changes in the degree of spinal curvature from pre to post surgery are detailed in Table 3.

Table 3: Spinal curvature pre and post operatively

Parameter	Pre Op Mean [SD]	CI 95%	Post Op Mean [SD]	CI 95%	p-value
Degree of Curve (Cobb angle°)	62 [12]	(59-65)	18 [7]	(16-20)	<0.001

Table 4: Selected lung function measures before and after spinal surgery for AIS

Parameter	Pre Op Mean [SD]	CI 95%	Post Op Mean [SD]	CI 95%	p-value
FEV_1 z-score	-2.03 [0.96]	(-2.28 to -1.77)	-1.72 [0.92]	(-1.96 to -1.46)	0.002
FVC z-score	-1.82 [1.02]	(-2.11 to -1.55)	-1.53 [0.96]	(-1.81 to -1.26)	0.001
TLC z-score	-1.16 [0.95]	(-1.43 to -0.89)	-1.22 [1.10]	(-1.54 to -0.91)	0.49
RV/TLC Ratio z-score	0.60 [0.52]	(-0.45 to 0.75)	0.21 [0.78]	(-0.01 to 0.41)	<0.001

Table 5: Selected exercise measures before and after spinal surgery for AIS

Parameter	Pre Op Mean [SD]	CI 95%	Post Op Mean [SD]	CI 95%	p-value
VO_{2peak} ($ml.kg^{-1}.min^{-1}$)	37.1 [7.1]	(35.1 - 39.0)	32.5 [6.2]	(30.8 - 34.2)	<0.001
VO_2 at Anaerobic Threshold (AT) (%predicted VO_{2max})	51 [9]	(49 - 53)	45 [9]	(42 -47)	<0.001
HR ($beats.min^{-1}$)	185 [12]	(181 - 188)	181 [12]	(177 - 184)	0.001
Breathing Reserve (%MVV)	36 [16]	(31 - 41)	43 [12]	(39 - 46)	0.001
V_E (L)	68 [20]	(63 - 74)	71 [20]	(66 - 76)	0.31
RER	1.17 [0.10]	(1.14 - 1.19)	1.30 [0.50]	(1.21 - 1.44)	0.05
Borg (Dyspnoea)	6.2 [2.2]	(5.6 - 6.8)	5.2 [2]	(4.7 - 5.7)	0.003
Borg (RPE)	7.8 [2]	(7.3 - 8.3)	7.3 [1.8]	(6.8 - 7.8)	0.15

Table 6: Selected lung function and exercise measures before and after spinal surgery for AIS in patients completing post PSF follow-up prior to March 2020

Parameter	Pre Op Mean [SD]	Post Op Mean [SD]	p-value
FEV_1 z-score	-1.80 [0.91]	-1.80 [0.75]	1.00
FVC z-score	-1.65 [0.99]	-1.68 [0.93]	0.78
TLC z-score	-0.95 [0.80]	-1.09 [0.72]	0.27
RV/TLC Ratio z-score	0.59 [0.56]	0.48 [0.51]	0.26
VO_{2peak} ($ml.kg^{-1}.min^{-1}$)	38.5 [7.3]	33.6 [5.1]	<0.001
VO_2 at Anaerobic Threshold (AT) (%predicted VO_{2max})	50 [9]	44 [9]	<0.001
Breathing Reserve (%MVV)	35 [15]	41 [9]	0.04
Borg (Dyspnoea)	6.5 [2.1]	5.1 [1.8]	0.07

Table 7: Selected lung function and exercise measures before and after spinal surgery for AIS in patients completing post PSF follow up after March 2020

Parameter	Pre Op Mean [SD]	Post Op Mean [SD]	p-value
FEV_1 z-score	-2.19 [0.98]	-1.66 [1.04]	<0.001
FVC z-score	-1.95 [1.04]	-1.42 [0.98]	<0.001
TLC z-score	-1.31 [1.03]	-1.31 [1.34]	0.97
RV/TLC Ratio z-score	0.62 [0.10]	-0.01 [0.17]	<0.001
VO_{2peak} ($ml.kg^{-1}.min^{-1}$)	36.1 [6.9]	31.8 [6.9]	<0.001
VO_2 at Anaerobic Threshold (AT) (%predicted VO_{2max})	52 [8]	46 [9]	0.006
Breathing Reserve (%MVV)	37 [17]	44 [14]	0.01
Borg (Dyspnoea)	6.0 [2.4]	5.2 [2.1]	0.12

Surgical correction was achieved with a highly significant improvement in spinal curvature being noted from pre to post surgery. The mean [SD] correction index achieved was calculated to be 70.3% [10.2].

Changes in lung function after posterior spinal fusion

Changes in selected lung function parameters after PSF are detailed in Table 4. Improvements in dynamic lung volumes and a reduction in gas trapping were noted.

Changes in exercise parameters after posterior spinal fusion

Changes in selected exercise parameters after PSF are detailed in Table 5. Statistically significant reductions in exercise capacity together with an increase in breathing reserve at peak exercise were noted at follow-up. Breathlessness scores improved from pre surgery to follow-up.

Sub-analysis to assess for potential effect of COVID-19

Changes in selected lung function and exercise parameters after PSF for patients who completed post surgery follow-up prior to March 2020 (n=22) are detailed in Table 6. Statistically significant reductions in exercise capacity together with an increase in breathing reserve at peak exercise and improvements in breathlessness scores from pre surgery to follow up were noted. Findings are similar to the overall study sample with the exception of little change in lung function parameters.

Changes in selected lung function and exercise parameters after PSF for patients who completed post surgery follow-up after March 2020 (n=30) are detailed in Table 7. Statistically significant improvements in dynamic lung volumes and gas trapping were noted in addition to reductions in exercise capacity and improvements in breathlessness scores. Findings are similar to the overall study sample.

Discussion

The study demonstrated correction of spinal deformity with marked reductions in curvature post operatively from severity category 'severe' to 'mild'[10].

Overall results show strong evidence of a significant increase in FEV_1 z-score and FVC z-score, in addition to a change in severity category from moderate to mild reduction[11], and mild reduction to normal range, respectively. In addition, RV/TLC ratio z-score decreased, indicating a likely reduction in gas trapping due to relief of the extrinsic restriction associated with spinal curvature. Concurrently, breathing reserve increased in keeping with dynamic improvements in respiratory mechanics after surgery, which in turn demonstrated improvements in breathlessness perception at peak exercise.

Despite improved ventilatory mechanics that would be expected to enable exercise performance, we observed statistically significant reductions in VO_2 at both peak exercise and anaerobic threshold, indicating a reduction in exercise capacity from pre surgery. Although the earlier onset VO_2 at anaerobic threshold suggests reduction in cardiorespiratory fitness after spinal surgery is likely due to physical deconditioning, other possible contributory factors should not be ignored.

An increase in weight could offer an explanation why an apparent fall in exercise capacity may occur, however a change in BMI z-score was not observed in our study making this perhaps less likely. Body composition data were not collected, and therefore no conclusions on whether weight changes were lean body mass or fat mass can be drawn.

It is not clear why young people would be less fit after spinal surgery than before. Causes for this could be a result of undertaking less physical activity, possibly related to prolonged recovery post surgery, and a prolonged period of exercise avoidance after surgery. Alternatively, lifestyle and exercise habits may alter with age, with evidence suggesting that exercise participation in adolescent girls declines as entry into adulthood approaches[12-14].

In our previous work we considered the possibility of 'auto-training' (physical adaptation), in that the increased intrinsic work (respiratory and mechanical) of exercise in those with greater spinal curvature led to a degree of 'auto-training' and preservation of fitness.[15] The stimulus for 'auto-training' (in this instance spinal deformity) removed/improved by surgical correction, therefore leading to less workload for any given activity, is such that unless training intensity is increased after surgery, then deconditioning will ensue. In this instance training has decreased for a period of time due to recommended reduction in physical activity (advised for approximately 6 months) during post operative recovery. We do not have details on when or even whether study subjects returned to pre surgery exercise levels.

There is a requirement to consider potential confounders for deconditioning to test the validity of rationale for diminished 'auto-training' in this instance. The COVID-19 pandemic lockdown strategy encouraged the suspension of exercise facilities, sports groups, and subsequent access to physical activity for all, leading to a prolonged period of sedentary lifestyle and inactivity. It would therefore be expected this would contribute to physical deconditioning during this time period. We present data in Table 6 and 7 on key parameters for those that underwent post operative testing before and after the onset of the pandemic in March 2020. Although improvements in lung function appear greatest in those tested post operatively after the pandemic, the trends in change of exercise measurements before and after spinal surgery are very similar for both sets of patients and the whole-group data. e.g. although breathing reserve and lung function improvements may be ventilatory enablers of exercise performance, falls were noted between pre and post operative measurements in all groups. We suggest that COVID-19 does not seem a likely confounder for our study findings.

Study strengths/limitations

We have previously reported that the inverse association between lung function and exercise capacity is a novel finding[2]. The findings from this latest study suggest a fall in exercise capacity is likely to occur after surgery for AIS, highlighting the need for a focus on exercise training as part of post operative rehabilitation following spinal deformity surgery.

Study limitations have been identified to include challenges around undertaking post surgery investigations at the intended two-year time point for several patients due to travel and hospital footfall restrictions associated with the COVID-19 pandemic. In addition, the study has recognised limitations corresponding to study design (retrospective data collected, single-surgeon experience).

Conclusions

In conclusion, this study showed that despite improved ventilatory mechanics, young people demonstrated reduced exercise capacity after posterior spinal fusion. The earlier onset anaerobic threshold suggests this is likely due to physical deconditioning. Possible reasons for this could include reduced participation in physical activity during post operative recovery and exercise 'drop-off' in late adolescence and into adulthood.

Consideration should therefore be given to measuring exercise capacity before spinal surgery and to provide structured exercise programmes to facilitate an optimal return to pre surgery cardiorespiratory fitness and potentially improve the recovery pathway for this patient group.

Acknowledgements

Paediatric Respiratory and Sleep Physiology Team, Royal Hospital for Children and Young People

Scottish National Spine Service Team, Royal Hospital for Children and Young People

Taylor Gilchrist, Paediatric Respiratory and Sleep Physiology Coordinator

References

1. Prentice K.M., Tsirikos A.I., Urquhart D.S., 2022, "Pre-operative respiratory assessment for children with spinal deformity", Paediatric Respiratory Reviews, 43:60-66.
2. Jagger F. et al, 2020, "Adaptation to reduced lung function in children and young people with spinal deformity", Journal of Clinical Orthopaedics and Trauma, 11(2):191-195.
3. Newton P. et al, 2005, "Results of preoperative pulmonary function testing of adolescents with idiopathic scoliosis. A study of six hundred and thirty one patients", The Journal of Bone and Joint Surgery, 87(9):1937-1946.
4. Johnston C. et al, 2011, "Correlation of preoperative deformity magnitude and pulmonary function tests in adolescent idiopathic scoliosis", Spine, 36(14):1096-1102.
5. Pehrrson K., Danielsson A., Nachemson A., 2001, "Pulmonary function in adolescent idiopathic scoliosis: a 25 year follow up after surgery or brace treatment", Thorax, 56(5):388-393.
6. Kim Y. et al, 2005, "Pulmonary function in adolescent idiopathic scoliosis relative to the procedure", The Journal of Bone and Joint Surgery, 87(7):1534-1541.
7. Wong C. et al, "Pulmonary function before and after anterior spinal surgery in adult idiopathic scoliosis", Thorax, 51(5):534-536.
8. Stickland M. et al, 2012, "Assessing exercise limitation using cardiopulmonary exercise testing", Pulmonary Medicine, 824091.
9. Quanjer P.H. et al, 2012, "Multi-ethnic reference values for spirometry for the 3–95-yr age range: the global lung function 2012 equations", European Respiratory Journal, 40:1324-1343.
10. Horng M.H. et al, 2019, "Cobb Angle Measurement of Spine from X-Ray Images Using Convolutional Neural Network", Computational and Mathematical Methods in Medicine: 6357171.
11. Sylvester K.P. et al, 2020, "ARTP statement on pulmonary function testing 2020", BMJ Open Respiratory Research 2020;7:e000575.
12. Cumming S.P. et al, 2007, "Sex Differences in Exercise Behaviour During Adolescence: Is Biological Maturation a Confounding Factor?", Journal of Adolescent Health, 42: 480-485.
13. Eime R.M. et al, 2012, "Understanding the Contexts of Adolescent Female Participation in Sport and Physical Activity", Research Quarterly for Exercise and Sport, 84(2): 157-166.
14. Hamad A., Ahmed E.B., Tsirikos A.I., 2017, "Adolescent idiopathic scoliosis: a comprehensive approach to aetiology, diagnostic assessment and treatment", Journal of Clinical Orthopaedics and Trauma, 31(6):343-349.
15. Urquhart D.S. et al, 2014, "Six-year follow up study on the effect of combined anterior and posterior spinal fusion on lung function and quality of life in young people with adolescent idiopathic scoliosis", Archives of Disease in Childhood, 99:922-926.

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Lab in the Limelight

Sara McArthur
Head of Service
Clinical Scientist

NHS Lothian – Royal Infirmary of Edinburgh, Western General Hospital & St John's Hospital

History & Overview of the Department

In the 1980s there were many hospitals in the Lothian area which performed respiratory physiology testing, such as the City Hospital, Northern General Hospital, Western General Hospital and Edenhall. Some of these were closed whilst others merged in 1992 to create the Lothian Service. The NHS Lothian service now consists of the Royal Infirmary of Edinburgh, The Western General Hospital and St John's Hospital. Jill MacLeod was appointed head of service in 2002. Prior to Jill's appointment, physiologists did not report on their own tests.

The Royal Infirmary of Edinburgh (RIE)

The RIE was established in 1729, and is the oldest voluntary hospital in Scotland. The new buildings of 1879 were claimed to be the largest voluntary hospital in the United Kingdom, and later on, the Empire. The hospital moved to a new nine hundred bed site in 2003 in Little France, named by members of the entourage brought to Scotland from France by Mary, Queen of Scots, who took up residence at nearby Craigmillar Castle.

Figure 1: Aerial view of the Royal Infirmary of Edinburgh

Figure 2: Craigmillar Castle

The RIE is the site of clinical medicine teaching as well as a teaching hospital for the University of Edinburgh Medical School. The respiratory physiology team assists with the respiratory physiology teaching of undergraduates and medical fellows. In 1960 the first successful kidney transplant performed in the UK was at the RIE and it is the only site for liver, pancreas, and pancreatic islet cell transplantation in Scotland. It is also one of the country's two sites for kidney transplantation. The respiratory physiology team perform pre-operative pulmonary function tests (PFTs) and cardiopulmonary exercise tests (CPETs) for these patient groups to risk assess prior to surgery. We also perform tests for many disciplines and pre-operative testing for the Scottish National Thoraco-Abdominal Aortic Aneurysm & Complex Aortic Service, congenital heart disease, oesophageal cancer and cardiac surgery. The Edinburgh BioQuarter is also within the campus which is a leading location for healthcare delivery, medical research and health innovation.

The Western General Hospital (WGH)

The WGH was opened as the St. Cuthberts and Canongate Poorhouse in 1868. In 1915, during the First World War, the building was requisitioned by the War Office to create the second Scottish General Hospital, which was a facility for the Royal Army Medical Corps to treat military casualties. It was returned

Lab in the Limelight continued

to a poorhouse in 1920 and then to hospital use in 1927. It joined the National Health Service in 1948. The WGH is home to the Scottish Adult Cystic Fibrosis Service, funded by the National Services Division of NHS Scotland. It had two hundred and sixty patients in 2024 plus another sixty reviewed at an outreach clinic in Dundee. The respiratory physiology lab within the WGH performs tests on patients from many disciplines such as haematology, oncology etc.

Figure 3: The Western General Hospital

Figure 4: St John's Hospital, Livingston

St John's Hospital (SJH)

SJH is based in Livingston, West Lothian. It was commissioned to replace Bangour General Hospital and was opened by the Queen in 1989. SJH is the smallest hospital within the respiratory physiology service with patients mostly being referred from respiratory medicine, haematology and oncology.

Lead physiologist background & career

My name is Sara and I had a very convoluted route into respiratory physiology - Hence why I am usually involved in the "No wrong path" scheme when exam results are issued. I started a degree in forensic and analytical chemistry, in which I lasted one and a half years then left. I then worked in an afterschool club, bars and night clubs, before working as a croupier in a casino. Whilst I worked in the casino I studied for my BSc in biological science. In 2008 I started working as a trainee respiratory physiologist at the Royal Infirmary of Edinburgh and as part of this completed my BSc (Hons) in clinical physiology through the University of Sunderland. I successfully passed my ARTP Part one and Part two examinations through this time which were incorporated into the clinical physiology degree. I quickly progressed to a band 6 and acted as team lead for the WGH and SJH. Whilst a band 6, I decided to carry out the STP equivalence route to become a registered clinical scientist with the Health and Care Professions Council, which I attained in 2018.

In 2019 I became the deputy head of service in NHS Lothian whilst Jill MacLeod was still the head of service. As we work in busy teaching hospitals, I completed my post graduate certificate in Clinical Education through Edinburgh University in 2020. In April this year I successfully interviewed for the head of service role when Jill retired.

Throughout my time in respiratory physiology I have been involved in clinical research and the promotion of healthcare science. I became a member of the ARTP workforce committee in 2013 and progressed to vice-chair and chair, before I took up the role of honorary secretary in 2022. I continue to help support the workforce committee and attend events to help promote the ARTP.

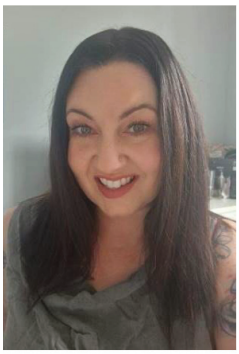


Figure 5: Sara, Head of Service, Respiratory Physiology, NHS Lothian. Sara and Rosie Fillingham (workforce committee) representing ARTP at the Winter BTS, London, November 2023

Lab in the Limelight continued

The Team

Over the three hospital sites we have a total of twenty five staff members employed by the respiratory physiology service:

Administration assistants - Fiona and Paula, without whom we would be lost.

Clinical physiology assistants - Elaine, Gordon, Tomiwa, Michelle, Meika, Janice and Rachel, who all hold their certificates in spirometry.

One sleep physiologist - Leigh who also helps perform spirometry.

Trainee physiologists - Carly, Laura, Luke, Erin and Euan. Carly, Laura and Luke are to sit their practitioner exams very shortly.

Trained physiologists - Julie and Cameron.

Specialist/senior physiologists - Wendy (team lead at SJH) and Joanne.

Head of research - Lisa who works closely with the clinical research team covering commercially funded and university/ consultant-led studies.

Highly specialised physiologists - Gemma (team lead at RIE), (team lead at WGH), Shaun (pre-operative CPET lead) and Jill who lends her expertise to aid me!

Figure 6: Three of our assistants (L to R) Gordon, Elaine and Michelle

Figure 7: ARTP conference 2024 in Harrogate (L to R) Sara, Joanna, Laura (Paediatric Head of Service), Lisa, Laura, Jill and Carly. Christmas night out 2023 (L to R) Laura, Carly, Sara, Cameron, Lisa, Joanna, Alison-Grace (retired) and Julie. Luke (with Tigger)

Figure 8: (L to R) Gemma and Sara after work catch-up. Jill's retirement meal (L to R) Shaun, Wendy, Shirley (retired), Sara, Lisa (Wishaw), Leigh, Jennifer (retired), Jill, Amanda (ex-colleague), Kim (retired), Aggie (retired), Paula and Joanne

Figure 9: (L to R) Euan at the Respiratory Care Conference 2024 (not a Trump supporter!). Janice, Sara and Rachel at an evening education event. Erin at her graduation.

Lab in the Limelight continued

Achievements & Innovation

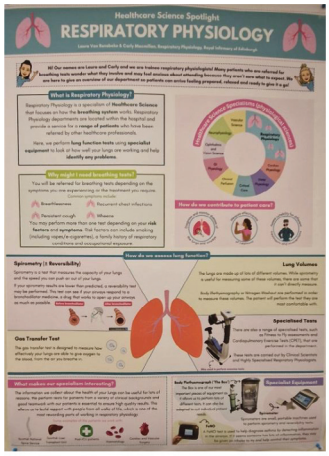
Over the last few years the department has had a number of achievements, especially at the ARTP 2023 Conference in Brighton. Jill received a nomination for her services to respiratory physiology, Cameron received the best practitioner award and I received the best QIP poster for our transition to a physiologist-led CPET service.

Figure 10: Jill at the ARTP conference in Brighton; Cameron and Sara with their awards

Joanna was invited to chair a session, on managing the breathless patient, at the ARTP 2024 conference.

Figure 11: (L to R) Joanna, Karl and Matt (Cambridge and Papworth)

Figure 12: (L to R) Dr Rob Farley (NHS Education Scotland), Laura and Carly with their winning poster



Our trainee physiologists, Carly and Laura were awarded the best poster at the NHS Education Scotland Healthcare Science event in February this year. The brief was to design a poster that clearly communicated their HCS specialism and role to the public, imagining it would be displayed in their local GP practice.

Over the last few years staff have presented their work at the ARTP conference, ERS congress and Winter

Lab in the Limelight continued

BTS meeting. We have also been involved in a multi-centre study which was published in the Annals of the American Thoracic Society.

We try to ensure high standards by promoting voluntary and statutory regulation to all staff who are eligible to be registered with the Academy for Healthcare Science (AHCS). We also support and encourage staff to obtain their scientist training programme equivalence (three so far).

Our clinical physiology assistants Rachel, Janice and Tomiwa have received their certificates in spirometry and all assistants remain on the spirometry register.

Julie is now on the AHCS register.

We work hard to promote Healthcare Science and respiratory physiology at local events during Healthcare Science Week and to schools. Laura and Lisa were at the Midlothian Primary School Careers Event whilst Carly and Laura had a stand in the main mall at the RIE and I represented physiology at St Andrews House for the Scottish Government at the “healthcare science: give it a go” event.

Figure 13: (L to R) Laura and Lisa at a primary school career event. (L to R) Laura and Carly on a stand in the main mall of the RIE for HCS week.

Due to a lack of education opportunities in clinical physiology within Scotland and the need to bolster the workforce, a two year postgraduate training programme was developed in NHS Lothian. This has now also been adopted by another health board.

I have been the physiology core member for the Scottish Strategic Network for Diagnostics (SSND) which feeds into the Scottish Government. I am also currently on the Centre for Sustainable Delivery modernising patient pathway programme (CfSD MPPP) for COPD sub-group and on our current respiratory Managed Clinical Network (MCN). To ensure that respiratory physiology is kept at the forefront of discussions at Government level, I regularly attend the cross party parliamentary group meeting on Lung Health.

Jill and one of our consultants, Dr Bradshaw were nominated for an Advancing Healthcare Award in 2019.

Figure 14: (L to R) Joanna, Meika, Wendy, Jill and Dr Bradshaw

Future directions/aspirations

Since taking over the lead role in April of this year, as a service we wish to standardise and streamline our current standard operating protocols through better document management, which should help us if we wish to go for IQIPS accreditation. We also wish to look at introducing new tests within the service such as exercise induced laryngeal obstruction detection through CPET, eucapnic hyperventilation and hand held oscillometry. Due to the current lack of spirometry provision across the area our direct access service is under considerable pressure so we are working closely with many stakeholders to see if we can improve access to speed up diagnosis.

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Getting to know your ARTP committee chairs

Who am I?

I am currently the Chief Respiratory Physiologist at University College London Hospitals. I have been in this role since January 2020 (I didn't bring COVID with me, I promise?!).

I started my career at St Mary's, Imperial College in 2007 and have worked both clinically and in research in and around London since then.

Currently I am working towards opening a respiratory physiology unit within our specialist neurology hospital to deliver more advanced measurements of respiratory muscle physiology for neuromuscular patients with respiratory failure.

A bit about me

Outside of work I love nothing more to travel all over the world and sample all the local food and wine - preferably in the sunshine, by the sea, with some good tunes on in the background.

I am an avid runner, still not getting any quicker but enjoy being outside in the fresh air. It also makes me feel less guilty about telling my patients to get out and exercise on the daily.

I am a massive football fan, lifelong member of the Toon Army and can regularly be found in the Kingfield Road End supporting my local team.

What would you like to achieve in your role?

I have been involved in the ARTP Education committee for a number of years as: portfolio marker, examiner, Exams Chair and course organiser.

In my time as chair I would like to be able to make more advanced practitioner training modules available in the areas of interest to all of the membership to continue their CPD no matter what stage of their career they are at.

Introducing ARTP Board Members

Marie Belcher – ARTP Education Vice Chair

Who am I?

I am a Clinical Scientist and the Respiratory and Sleep Service Manager at Mersey and West Lancashire Teaching Hospitals.

After completing a BSc in Exercise and Sport Science in 2004, I began my career in Respiratory physiology as a student of University of Wolverhampton at Royal Stoke University Hospital, completing my BSc in Respiratory Physiology at the Royal Derby Hospital.

In 2009 I moved back to the Royal Stoke as a Senior Physiologist, where I further developed my knowledge and skills under the leadership of Dr Ian Cliff and completed the STP equivalence process.

I took on the position of Respiratory and Sleep Lead at the Countess of Chester Hospital in 2017, where I spent five years growing and developing the service, before moving to my current role at MWL in 2022.

A bit about me

I became a member of the education committee in 2017 when I took on the role as Examinations secretary. Subsequently I became Vice Chair, then Chair of Examinations moving to the role as Vice Chair of Education in April this year. I am passionate about education and actively involved in the STP assessments. I also complete the End Point Assessments for Healthcare Science apprenticeships.

Locally I chair the Cheshire and Merseyside Respiratory Physiology Network and attend the ICB respiratory programme board meetings representing and promoting physiologists and our role within the ICB.

I am very driven and determined when I put my mind to something both professionally and socially. Outside of work one of my greatest and toughest achievements is summiting Mount Kilimanjaro. In my spare time I enjoy watching sports and follow Crewe Alexandra FC, attending as many matches as I can.

What would you like to achieve in your new role?

I feel it is important as an organisation that we remain current, continuing to grow and develop education and opportunities for our professional workforce. To achieve this, I aim to work with the committee on developing new, and improving current courses and competencies.

I will also continue to promote Respiratory Physiology and Healthcare Science not only within the NHS but also our potential new workforce in schools, colleges, and universities.

Who am I?

I am the lead respiratory physiologist at the Royal Berkshire NHS Foundation Trust. I have worked in respiratory physiology for nearly 25 years, training at the Royal Brompton under Derek Cramer and Simon Ward before moving to Reading in 2012.

A bit about me

I have been on the education committee for around six years. It's really enjoyable working in the group, full of really enthusiastic members who have a great range of experience - all dedicated to improving ARTP education activities and the examination process. More recently, I have been the examinations vice-chair working with Marie Belcher who has been an enormous help in helping me prepare for this role. I think most people that know me would say I am fair, very hard working and usually in a good mood! As I look forward to my tenure as chair, I hope to bring these qualities to the post.

In my spare time I enjoy riding most forms of bicycle (always space for one more bike), walking the dog and attempting some DIY.

Introducing ARTP Board Members

Laura Jess – ARTP Events Chair

Who am I?

I am the Head of Paediatric Respiratory and Sleep Physiology at NHS Lothian in Edinburgh. I started as a Trainee Physiologist in 2008 in adult services within the Health Board, gained post-graduate and leadership experience through internal specialist roles, and then in 2019 moved to a role as Lead for Sleep Medicine. Fast forward 3 years, I then found myself in my current role in Paediatrics, working with the most fantastic team, patients and families.

In 2016, I was the recipient of two awards – one at the Healthcare Science National Event, and the second - the ARTP Scotland Barbara Oatway award. I have been fortunate enough to be encouraged and invested in from early in my career, and therefore development and providing opportunities is something I continually strive to adopt in the leadership of my workforce.

I hold further committee posts, including Chair of the ARTP Scotland regional group, and I am passionate about all things strategic and working with relevant stakeholders to progress and increase the visibility of Healthcare Science. My most recent accomplishment was being asked to speak at the Cross-Parliamentary Group for Lung Health at the Scottish Parliament.

A bit about me

My number one main quality is my level of organisation. I am the organiser of work life, family life, social life, holiday life, treasurer and secretary all in one. For this reason I have inherited the nickname of “the octopus”, due to my ability to multi-task. Not many people know, but this is likely inherited from a previous role I had as an Events and Marketing Manager for a conferencing and events company. In the past I have also worked for a pharmaceutical company in Dispensary and Toxicology, and therefore it could be said that science has always been my calling, as this is where I have come full circle back to (and plan to stay!).

Personally, I am a wife, mum, dog mum and “soccer mom” (I spend much of my entire weekend cheering at the side of my daughter’s football pitch). Over the last couple of years I have enjoyed supporting a local football team and even more so supporting Scotland in international championships – it’s not about winning but taking part, right? Unintentionally, football has become what seems a big part of my life, and in 2017 I was involved in setting up a football development club which is free to attend for 2-9 year olds in my local community. This is something that I am still involved in, is so rewarding and is something that I am particularly proud of.

Lastly, my other great passion in life is travelling. My method to ensuring I never get holiday blues is to ensure I have at least another one booked! My most recent trip abroad was to the beautiful island of Santorini. My bucket list place (should I ever be fortunate enough to be able to go) is the island of Bora Bora.

continued....

What would you like to achieve in your new role?

Being involved in the organisation of events for ARTP is extremely rewarding. Seeing the finer details come together and any challenges overcome to improve the experience of the delegates makes me incredibly happy. To know that this experience contributes to the development of our Healthcare Scientists at all stages of their career makes me feel like I am giving something back, in addition to developing the future leaders of our profession.

As we navigate from hotel to conference centre, this is a new era for the ARTP events committee. We have taken much learning from our first conference centre event this year, and hope to do even bigger and better next year!

Who am I?

I am a Respiratory Physiologist working at Royal Hospital for Children, Glasgow. I have been working within respiratory for around twenty years, starting in adult services in Glasgow Royal Infirmary, where I undertook training to complete ARTP Parts 1 & 2.

I moved to Paediatrics in 2010 and after a short period in adult services again. I moved back to Paediatrics to become the Lead Physiologist in Lung Function & CPET.

A bit about me

I am an organised and dedicated person and I am keen to encourage others into Healthcare Sciences (in particular, respiratory!) I have been active within the ARTP Scottish Forum over several years as Secretary and then Vice-Chair.

I am now Vice-Chair for ARTP Events and look forward to assisting in the continuing provision of excellent conferences over the next few years.

Outside of work, I enjoy horse-riding with my horse – Millie, and walking my dogs. I am also a qualified Equine and Canine massage therapist in my free time.

What would you like to achieve in your new role?

I am keen to continue to help deliver the excellent standard of conference that we are used to attending and also to encourage new people onto the committees within ARTP.

FRESH AIR

Edited by **Dr James Stockley** *ARTP Chair of Research and Innovation*

Dear Reader,

Welcome back to Fresh Air. These articles are designed to communicate novel trends in research, innovation and clinical practice from both respiratory and sleep sciences. Our aim is to provoke thought and conversation within the ARTP community that we hope will benefit the future direction of physiological practice.

For this issue, George Bingham has provided insight into a proactive method of monitoring lung function trajectories that aims to identify abnormality early and facilitate early intervention. George is a member of the ARTP Research & Innovation Committee and has experience in many fields, including paediatrics, non-invasive ventilation, and CPET. He currently works at York and Scarborough Teaching Hospitals NHS Foundation Trust as an STP student.

Harnessing Lung Function Trajectories: A Proactive Framework for Early Detection, Monitoring, and Promoting Respiratory Health

George Bingham *Respiratory and Sleep Clinical Physiologist, Trainee Clinical Scientist, Cardio-Respiratory Department, York and Scarborough Teaching Hospitals NHS Foundation Trust, York.*

Introduction

Lung health, like many other areas of healthcare, has traditionally been addressed reactively, with interventions triggered once symptoms appear[1]. This approach, while widely accepted, may not be sufficient for effectively identifying and managing respiratory diseases. Recent advances, however, suggest that monitoring lung function trajectories across an individual's life could significantly improve early detection and hence long-term outcomes.

This article focuses on *Lung-Function Trajectories: Relevance and Implementation in Clinical Practice*[2], which introduces a proactive model for monitoring lung function at specific life stages, similar to how we track growth in children. By shifting the focus to earlier detection and prevention, this model has the potential to transform respiratory care. Additionally, this article explores the role of the Association for Respiratory Technology & Physiology (ARTP) in driving this change.

A Proactive Approach

Figure 1 illustrates the different patterns of lung function growth and decline, categorised into low, average, and high trajectories. In childhood and adolescence, both catch-up and growth failure can occur, while in adulthood, accelerated decline can become more prevalent (indicated by the dashed lines). The figure highlights the importance of early detection and intervention in preventing adverse long-term health outcomes by monitoring deviations from normal trajectories. (Image taken from [2].)

Lung function follows a trajectory that begins in utero, peaks in early adulthood, and gradually declines due to physiological ageing[3,4]. Factors such as genetics, environmental exposures, disease, and lifestyle choices play significant roles in lung development and ageing, making lung function trajectories an essential tool for understanding long-term respiratory health. Despite its importance, spirometry has historically been underused in primary care, even

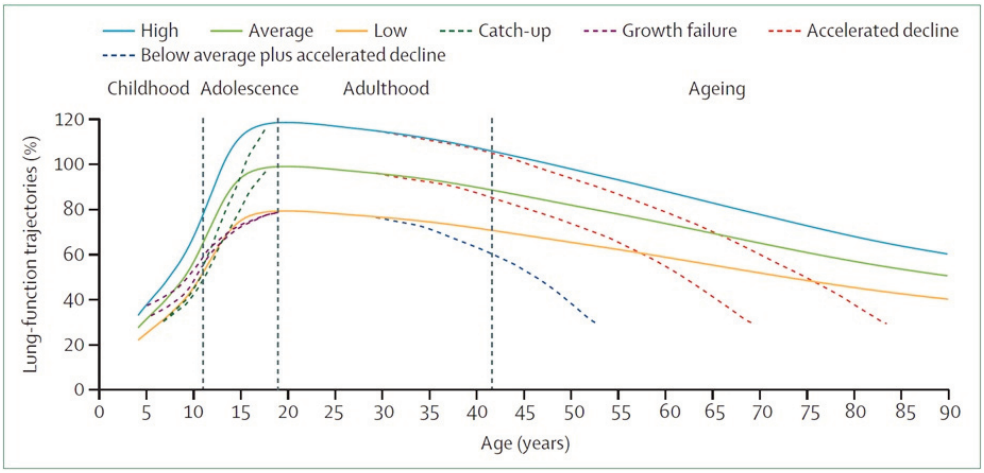

Figure 1: Lung Function Trajectories as percent predicted from Childhood to Adulthood

though it is non-invasive, cost-effective, and an excellent health indicator[5]. Recently, lung function trajectories have been recognised not only as predictors of respiratory diseases such as chronic obstructive pulmonary disease (COPD), but also of broader health issues including cardiovascular disease, metabolic disorders, mental health conditions, and premature death[6].

Melén *et al*[2] propose the development of a Lung Function Tracker, a tool that visualises individual lung function trajectories similarly to paediatric growth charts. This tool enables healthcare professionals to identify deviations from normal lung function early, shifting the focus from reactive, symptom-driven monitoring to a proactive, life-course approach.

Benefits

Proactive lung function monitoring offers several key benefits, with early detection of suboptimal trajectories playing a critical role in preventing long-term health complications[6]. While many individuals maintain stable lung function, some show "catch-up" growth, where lung function improves from low to normal, especially between ages 8 and 16. Conversely, some individuals with normal or high lung function may experience growth failure during this period, underscoring the need for continuous monitoring.

Deviations from normal lung function trajectories are often caused by factors such as childhood respiratory infections, asthma, smoking, and environmental exposures like air pollution[7]. Notably, below-average lung function is linked to higher risks of developing respiratory diseases and other health complications later in life.

Early identification of these deviations allows healthcare providers to implement targeted interventions before significant clinical symptoms manifest[2]. Interventions could include smoking cessation programmes (particularly for early COPD), physical activity promotion, or early treatment initiation for conditions such as asthma. Research shows that timely interventions can allow suboptimal lung function to "catch up" to healthier trajectories, potentially preventing severe long-term outcomes[6].

This proactive approach contrasts with current practices, which often monitor lung function only after sufficient symptoms arise to prompt patients to present to a healthcare service. Shifting towards earlier diagnoses and better chronic disease management could improve clinical outcomes and reduce the burden on healthcare systems.

Figure 2 shows outputs from the Lung Function Tracker, demonstrating how patient lung function trajectories can be monitored over time.
(A) displays the lung function trajectory of a hypothetical male paediatric patient, tracked from age 8 to 19. (B) depicts the trajectory of a hypothetical female adult patient, monitored from

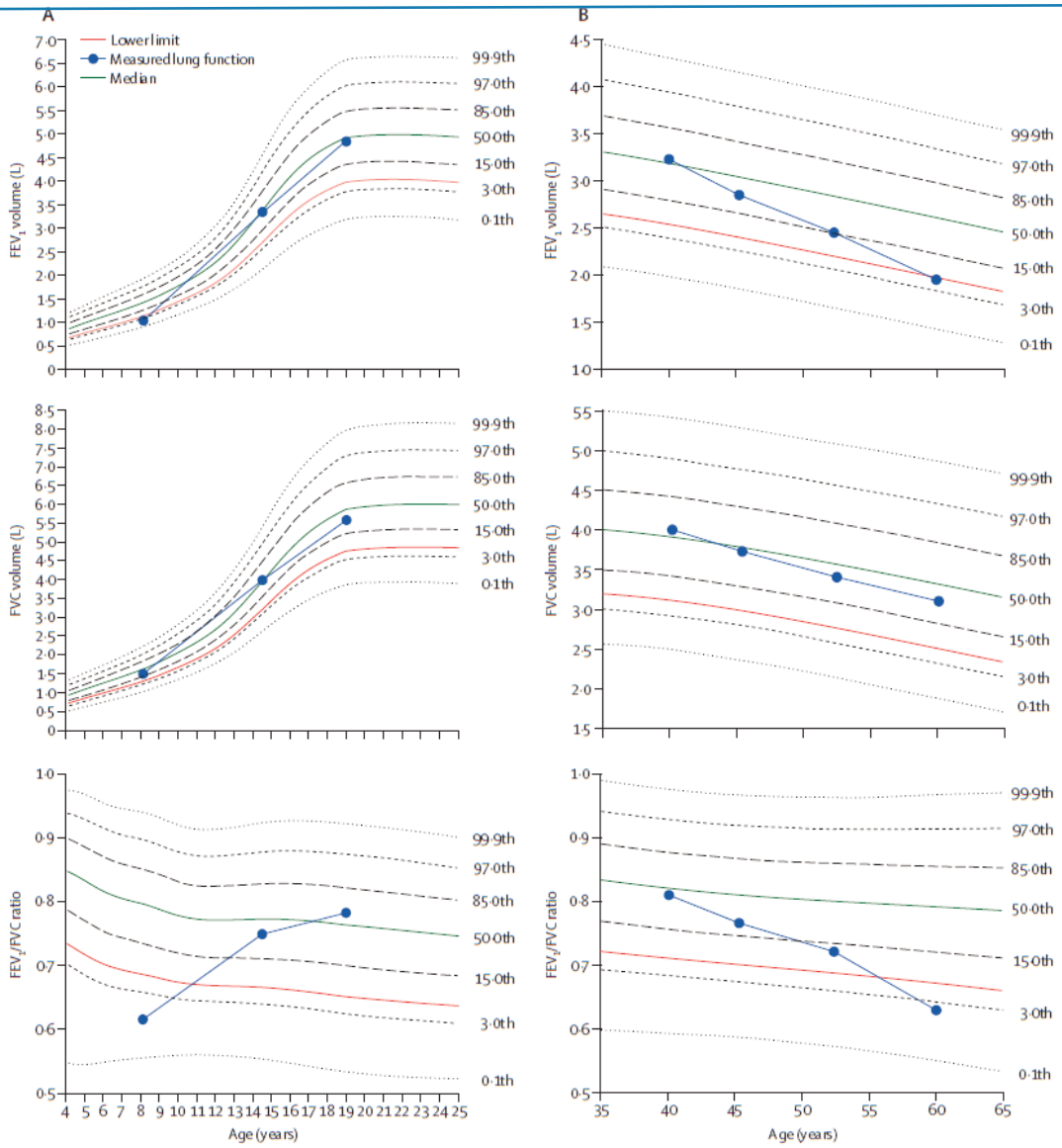

Figure 2: Lung Function Tracker Outputs

age 40 to 60, showing an accelerated decline. In both cases, the percentiles and trajectories of FEV_1 (forced expiratory volume in 1 second), FVC (forced vital capacity), and the FEV_1/FVC ratio are visualised separately, enabling detailed assessment of lung function trends. (Image taken from[2].)

Clinical Practice

While spirometry is a well-established diagnostic tool for conditions such as asthma[1], its role in population-wide screening for future poor health outcomes remains unproven[2]. Implementing a population-based screening programme requires careful assessment of both the potential benefits and limitations, as well as an evaluation of cost-effectiveness and the broader impact on healthcare resources[8].

The Lung Function Tracker offers a novel solution by using age, height, sex, and spirometry data (FEV_1 and FVC in litres) to generate personalised plots of lung function and predict changes over

time[2]. This tool can map lung function trajectories across the lifespan, capturing both lung growth, as shown in Figure 2A for children, and lung ageing, as shown in Figure 2B for adults. By facilitating the interpretation of longitudinal lung function data, this tool could be seamlessly integrated into clinical practice, enhancing early detection and management of respiratory diseases.

Implications for ARTP

The ARTP is well-positioned to lead the integration of lung function trajectories into clinical practice. This proactive approach aligns with ARTP's mission to advance respiratory physiology through research, education, and standard setting.

Promoting research is central to ARTP's objectives. The growing evidence surrounding lung function trajectories presents an opportunity for ARTP to lead research initiatives that validate the clinical benefits of proactive monitoring. This research should explore the cost-effectiveness of lung function monitoring, its long-term health benefits, and the optimal stages for spirometry testing.

ARTP also plays a critical role in shaping public health policies that incorporate proactive lung function monitoring into routine care. Lung function, recognised as a key indicator of overall health, is linked to increased risks of morbidity and premature mortality when suboptimal trajectories are left unmanaged. Advocating for regular lung function assessments at key life stages, particularly for those at higher risk, could significantly reduce the burden of respiratory diseases on healthcare systems and improve patient outcomes.[9]

Once research and policy frameworks are established, the role of the ARTP in setting national standards and providing educational programmes will become essential. Training healthcare professionals in the interpretation of lung function trajectories will equip them with the necessary skills to make informed clinical decisions. The ARTP qualifications in spirometry and respiratory testing will ensure that practitioners are ready to adopt this innovative approach.

Technology: Big Data and AI

The advancement of technology, particularly in big data and artificial intelligence (AI), presents a promising path for the widespread adoption of lung function trajectory tracking. Big data analytics enables healthcare providers to identify trends and risk factors associated with suboptimal lung function at an unprecedented scale, improving both diagnosis and preventive care[10]. AI can streamline this process by providing real-time analysis of lung function trajectories, predicting outcomes, and enabling earlier intervention.

By leveraging these technologies, healthcare providers can shift from reactive to proactive, personalised care, improving clinical outcomes and reducing the burden on the NHS by minimising the need for costly treatments.

Conclusion

Adopting lung function trajectory tracking for proactive monitoring represents a major shift in respiratory care. Moving from reactive, symptom-based interventions to early detection can significantly improve patient outcomes and reduce strain on healthcare systems.

The Lung Function Tracker is a practical tool for personalised monitoring, enabling timely interventions. ARTP leadership in research, policy advocacy, and education will be crucial to embedding this approach in clinical practice. The integration of big data and AI further enhances the potential for early detection and personalised care, meeting the growing demands of modern healthcare.

References

1. National Institute for Health and Care Excellence (NICE), 2017. Asthma: diagnosis and monitoring of asthma in adults, children and young people. NICE Guideline NG80. Available at: https://www.nice.org.uk/guidance/ng80/evidence/asthma-diagnosis-and-monitoring-of-asthma-in-adults-children-and-young-people-pdf-7079863936
2. Melén, E., Faner, R., Allinson, J.P., Bui, D., Bush, A., Custovic, A., Garcia-Aymerich, J., Guerra, S., Breyer-Kohansal, R., Hallberg, J. and Lahousse, L., 2024. Lung-function trajectories: relevance and implementation in clinical practice. The Lancet, 403(10435), pp. 1494-1503.

3. Melén, E., Guerra, S., Hallberg, J., Jarvis, D. and Stanojevic, S., 2019. Linking COPD epidemiology with pediatric asthma care: implications for the patient and the physician. Pediatric Allergy and Immunology, 30(6), pp.589-597.
4. Agusti, A. and Faner, R., 2019. Lung function trajectories in health and disease. The Lancet Respiratory Medicine, 7(4), pp.358-364
5. Williams, S., Sheikh, A., Campbell, H., Fitch, N., Griffiths, C., Heyderman, R.S., Jordan, R.E., Katikireddi, S.V., Tsiligianni, I. and Obasi, A., 2020. Respiratory research funding is inadequate, inequitable, and a missed opportunity. The Lancet Respiratory Medicine, 8(8), pp.e67-e68.
6. Agustí, A., Noell, G., Brugada, J. and Faner, R., 2017. Lung function in early adulthood and health in later life: a transgenerational cohort analysis. The Lancet Respiratory Medicine, 5(12), pp.935-945.
7. Wang, G., Hallberg, J., Faner, R., Koefoed, H.J., Kebede Merid, S., Klevebro, S., Björkander, S., Gruzieva, O., Pershagen, G., van Hage, M. and Guerra, S., 2023. Plasticity of individual lung function states from childhood to adulthood. American journal of respiratory and critical care medicine, 207(4), pp.406-415.
8. Okyere, D.O., Bui, D.S., Washko, G.R., Lodge, C.J., Lowe, A.J., Cassim, R., Perret, J.L., Abramson, M.J., Walters, E.H., Waidyatillake, N.T. and Dharmage, S.C., 2021. Predictors of lung function trajectories in population based studies: a systematic review. Respirology, 26(10), pp.938-959.
9. Iragorri, N. and Spackman, E., 2018. Assessing the value of screening tools: reviewing the challenges and opportunities of cost-effectiveness analysis. Public health reviews, 39, pp.1-27.
10. Capraro, G.T., 2016. Artificial intelligence (AI), big data, and healthcare. In Proceedings on the International Conference on Artificial Intelligence (ICAI) (p. 425). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

Embarking on Level 4 Apprenticeship: A Respiratory and Sleep Physiology Apprentice's Perspective

Kimberley Healey
Queen Victoria Hospital, West Sussex

I started working at the Queen Victoria Hospital in January 2019. I initially joined as a Health Care Assistant working in the Burns unit, but after a month I was transferred to the Sleep Disorder Centre (SDC). After a couple of weeks of working nights in the SDC, I found my passion was in sleep and was offered a permanent position within the department.

After completing my internal training at the QVH and the A-STEP modules via American Academy of Sleep Medicine, I was emailed about an exciting opportunity: the Level 4 Apprenticeship in Healthcare Science, studying Sleep and Respiratory Science. After completing the application form I had to attend an interview. It was during this interview that I was asked the question, “Where do you see yourself in five and ten years?” I have always wanted to excel in life and be the best I can be, so when answering this I looked straight at my manager and said “in 10 years I would hope to be doing your job!” This response did raise eyebrows, but I am committed to progressing and advancing in my career.

My application for the Level 4 apprenticeship was accepted and I was offered a place with ‘Dynamic Training’, which is an apprenticeship, adult education and bespoke training specialist company. I have never been very academic; I am more of a hands-on learner, so I saw this apprenticeship as my opportunity to progress within the industry. The good thing about an apprenticeship is you learn whilst working, and it does not matter if you are young, old, experienced, or inexperienced. Having five and a half years' worth of experience at the SDC, I was quite confident with the sleep units, but having no exposure or experience in respiratory, this was going to be my challenge.

I embarked on my apprenticeship journey with Dynamic in August 2023, and so far, it has been a fun and exciting journey. My Skills and Development Coach, Jennifer Colbourne, is so knowledgeable and super supportive. The apprenticeship started with the mandatory units, which included health, safety and security, effective communication, and continuous personal and professional development. There are ten mandatory units in total, which account for thirty seven credits towards your qualification. Having completed these units, you move on to your specialist units, which contribute a minimum of sixty three credits towards your apprenticeship. These are decided at the beginning of your apprenticeship and will be set around your speciality. My favourite unit so far has been learning about the scientific basis of respiratory sleep disorders, and although sleep is my strong point, I found that when completing this unit, I was still learning.

Although the course is full on, it is very well structured, and once you get your head around balancing your work, learning and life schedules, you will have enough time to complete your assignment work, as well as learning whilst working. The trick is not to fall behind and to ask for help if needed. I have been incredibly lucky to have the full support of my manager and team around me.

I feel privileged to have been given this opportunity, and I am enjoying every moment of my experience. My plan is to apply for the Level 6 apprenticeship after completing my Level 4. I am looking forward to seeing what the future holds for me and my career in Sleep and Respiratory.

ON THE BLOWER

Paul Burns
ARTP INSPIRE Editor

Following on from the announcement in the last edition of INSPIRE that Vyaire had filed for chapter 11 protection, they have subsequently been acquired by Canadian device firm, Trudell Medical. Vyaire published the following on their website:

> *Vyaire Medical has entered into a definitive agreement with Trudell Medical Limited for the sale of the Vyaire Respiratory Diagnostics (RDx) Business Unit and its products. The agreement, which was approved by the US Bankruptcy Court for the District of Delaware, ensures the continuation of service to Vyaire RDx customers. Vyaire and Trudell Medical now begin work to close the transaction.*

Vyaire RDx CEO Will Throp said: "Trudell has been an outstanding distribution partner for Vyaire RDx in Canada. This well-established relationship serves as a firm foundation for Vyaire RDx to become part of the Trudell family."

The deal expands Trudell's existing portfolio of aerosol drug delivery and lung health devices to include Vyaire's range of respiratory diagnostics. Trudell Medical revealed it will operate RDx as a separate business unit and maintain operations in Germany and California. Trudell may be best known to UK customers for selling 'Aerochamber' spacer devices.

Intermedical UK have begun selling and distributing cardio-pulmonary exercise and pulmonary function testing equipment by COSMED – the metabolic company within the UK. Cosmed already have a strong foothold in sports science and university departments but have yet to make a significant breakthrough within NHS institutions. With the help of Intermedical's expertise, they hope to increase their NHS customer base. You can contact Intermedical directly for any queries on the Cosmed range of products.

Vitalograph acquires Morgan Scientific to meet growing global demands for Respiratory Diagnostic Solutions

Vitalograph is delighted to announce the recent acquisition of PFT software experts, Morgan Scientific, our long-term partner in respiratory diagnostics. This exciting new chapter will enable us to meet the growing global demand for our innovative solutions, particularly in advanced pulmonary function testing.

Speaking of the acquisition, Frank Keane, CEO of Vitalograph said: “We have a long and successful relationship with Morgan Scientific. This agreement is the natural progression for both companies as our combined expertise allows us to focus on delivering the best possible diagnostic solutions that can enable a better understanding of lung health.”

(Left to Right): Gareth Morgan, President of Morgan Scientific, Helen Venn, Chief Science and Strategy officer Vitalograph, Gary Lancaster Chief Commercial Officer Respiratory Diagnostics Vitalograph.

Morgan Scientific is a specialist in customer-facing software for advanced PFT systems. **ComPAS2**, the company’s flagship software, powers Vitalograph’s innovative range of advanced PFT solutions - the **VitaloPFT Series**. Morgan Scientific is also a key distributor for Vitalograph’s pulmonary function testing solutions in the US.

Speaking of their collaboration to date, Mr Keane said: “The recent creation of the VitaloPFT Series has given us valuable experience in working as a team and built mutual respect for our individual expertise. Morgan Scientific is a natural complement to the Vitalograph brand, and this development brings incredible value to our customers all over the world. This acquisition paves the way for us to develop our comprehensive PFT range further.”

He continued: “Vitalograph is a family-owned company and recognises the pioneering drive of the Morgan family to create a business founded on people, integrity, quality, and innovation. These values are at the heart of Vitalograph and are instilled in every part of our business today.”

Adrian Fineberg, Executive Vice President for PFT Solutions said, “We are excited to bring the extensive expertise and experience of Morgan Scientific into Vitalograph, as we work together to bring to market pulmonary function solutions that truly focus on the current and future needs of our customers.”

Please get in touch to arrange a meeting with one of our VitaloPFT solutions experts to discover how we can help to maximise your services’ efficiencies and address the challenges you face.

Enquiries and Updates

Click HERE for updates and news. Call us on 01280 827110 or email us sales@vitalograph.com

We look forward to your feedback of **“On the Blower”** and the issues we have presented. We want the MLC to be your voice and to help us pursue projects and taskforces that affect your service and patients. We look forward to hearing your responses via our ARTP Watchdog link on the website.

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