

Congress Review

Review of the Virtual European Respiratory Society (ERS) International Congress 2021

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THE EUROPEAN Respiratory Society (ERS) International Congress is the world's largest gathering of respiratory professionals, with over 300 speakers and more than 500 chairs. This year's congress was planned to take place in Barcelona, Spain; however, for the second year running, the ERS congress occurred virtually due to the COVID-19 pandemic. With guidelines advising against large gatherings and many respiratory professionals being frontline workers, this was the best option, and the silver lining of the virtual congress is that all sessions can be replayed by attendees until December this year.

Despite the ERS congress being virtual, the sessions were interactive and engaging, with polls throughout case studies, question and answer sessions, and breakout rooms with some of the faculty members. This allowed participants to experience the interactive and networking element of the traditional face-to-face congress. The ERS president,

Anita Simonds, discussed her aims in a welcome video clip at the start of congress: "My aim has been to advance the ERS digital respiratory health agenda, make our voice heard loud and clear on health policy issues, and celebrate our multidisciplinary teams across Europe and globally."

Simonds also shared the theme of this year's ERS congress as being digital health. Many speakers across a variety of sessions unanimously agreed that the COVID-19 pandemic helped push forward digital healthcare because physicians were forced to take a different approach to provide care for their patients, especially in countries where patients were unable to leave their homes due to strict lockdowns. In an inspiring session on the second day of the congress, patients with tuberculosis discussed their experience with accessing healthcare virtually and doctors shared obstacles they faced, such as poor internet connection and having to adapt to this new way of managing conditions virtually.



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The congress programme contained 320 scientific sessions, and there were plenty of standout presentations, ranging from emerging imaging biomarkers in lung disease to the latest ERS guidelines on non-continuous positive airway pressure in sleep apnoea. Additional riveting talks included the 'lungs on fire' paediatric disease session, which shared rare and fascinating case studies. Other notable sessions included using digital health to manage respiratory conditions and inspiring conversations surrounding innovative technologies to evaluate sleepiness.

There were different types of sessions, some more interactive than others. For example, 'lungs on fire', clinical cases, and the grand rounds all included polls. On top of this, there were hot topics, pro/con debates, six guidelines sessions, state-of-the-art sessions, and, for the first time ever, a skills lab. The skills lab was a new session added to the ERS congress this year and involved speakers explaining equipment and procedures used by respiratory professionals.

With an impressive 3,000 plus abstracts, a variety of research was shared at this year's virtual congress. Several of these abstract summaries are included in this year's journal, covering topics such as tracheal stenosis, asthma, chronic obstructive pulmonary disease, pneumomediastinum as a complication of COVID-19 pneumonia, and skeletal muscle afferent sensitivity in interstitial lung disease.

Next year's congress is planned to take place in early September in Barcelona, and the committee are hopeful and optimistic that this can take place in person for the first time in 2 years. Although there are a few benefits to a virtual congress, the speakers are looking forward to sharing their new respiratory research and developments in person next year, and believe that the future, post-COVID-19, is bound to look very different, with a mix of digital and in-person healthcare. The team at EMJ are excited to attend the ERS congress in 2022 in Barcelona; however, for now, please enjoy our highlights and reviews of the ERS International Congress 2021. ■

ERS 2021 REVIEWED →

Obesity Affects Steroid Medication in Asthmatic Children

"A more personalised approach should be taken to treating children with asthma who are also overweight, counteracting the current 'one size fits all' method of steroid prescription."

FASCINATING research has emerged from an international study showing that asthmatic children who are also overweight or obese are less likely to respond to inhaled steroid medication. Presented at the virtual ERS International Congress on 8th September 2021, scientists involved in this discovery have linked this to increased asthma attacks in these children, which can have fatal consequences.

The international study aimed to examine whether a poor response to inhaled corticosteroids (ICS) is linked to excess weight or environmental factors. Researchers used information on genetic variants linked to BMI to investigate this, making the study the first of its kind. Cristina Longo, Assistant Professor, University of Montreal, Canada, who carried out research in the study, explained: "Children with asthma who are overweight or obese are more likely to have worse symptoms despite being on the recommended treatment of inhaled corticosteroids, making it not only challenging to achieve a healthy weight but also to improve their quality of life." She also noted that children with asthma may exercise less due to their condition, in turn making them more susceptible to weight gain.

The research included data from five studies involving 1,511 children with asthma. Participants all experienced a poor response to ICS, which was characterised by one or more asthma attacks that required urgent medical care or a course of corticosteroids. Longo and colleagues collected information to create a 'risk score', which increased with the amount of BMI-linked genetic variants each child had. This score was used to

estimate fluctuation in their BMI z-score, which indicates how each child's BMI deviates from the average healthy child of the same demographic; a score of 1 indicates a risk of being overweight, 2 suggests a child is overweight, and 3 that a child is obese.

The scientists used Mendelian randomisation to assess differences in the children's responses to ICS treatment. A higher incidence of asthma attacks in children with a high BMI z-score indicated a higher prevalence of genetic variants that increased their susceptibility to being overweight. This would likely be linked to the child's BMI, rather than environmental factors. The study saw an average BMI z-score of 0.69, with 21% of participants being obese. Longo explained: "Although poor ICS response ranged from 20% to 80% between the five international studies, we consistently show that the proportion of children with poor ICS response more than doubled for each one unit increase in the BMI z-score."

The results from this study have indicated that a more personalised approach should be taken to treating children with asthma who are also overweight, counteracting the current 'one size fits all' method of steroid prescription. Although some limitations remain, this research has provided an insight into why some children may have limited responses to treatment. Longo has since continued her research, focusing on the prevalence of specific genetic variants in obese and non-obese children with asthma, and their link to a poor ICS response. ■





"The results demonstrated that arrival at the site within the first day or two, when the smoke and dust were at their worst, was associated with poorer lung function."

World Trade Centre Site Emergency Workers Chronic Obstructive Pulmonary Disease Risk

RESCUE workers and volunteers who arrived at the site of the World Trade Centre in the wake of September 11th 2001 are beginning to develop chronic obstructive pulmonary disease (COPD), according to research presented at the ERS International Congress on the 7th September 2021, 4 days before the 20-year anniversary of the attacks.

In general, COPD mainly affects older people who smoke; however, occupational and environmental exposure are increasingly being recognised as contributory risk factors. Research presented by Rafael E de la Hoz from the Icahn School of Medicine at Mount Sinai, New York City, New York, USA, examined almost 18,000 workers and volunteers and demonstrated that those who arrived at the site soon after the collapse of the Twin Towers faced the greatest risk of COPD.

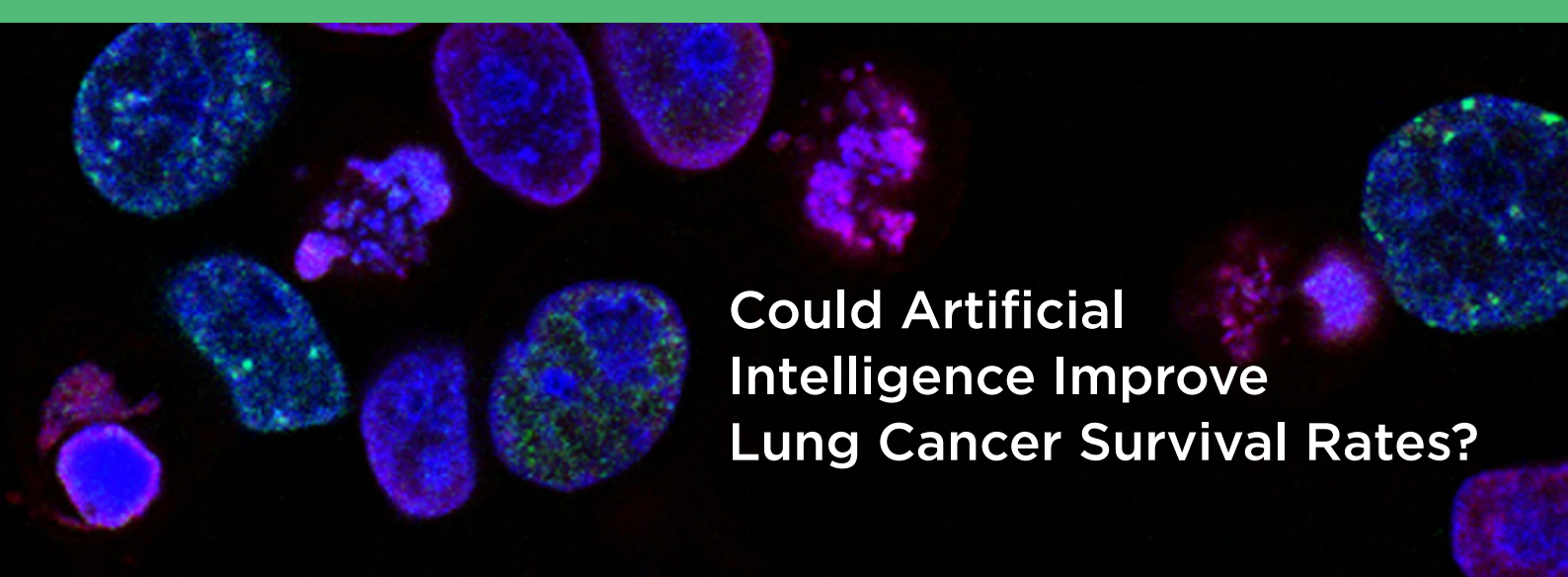
The 17,996 participants were all individuals who had worked at the World Trade Centre site. Participants each took part in spirometry tests to measure lung health at least twice between 2002 and 2018. Data on the time each person arrived at the site was considered alongside

other health factors such as age, smoking status, and weight.

The results demonstrated that arrival at the site within the first day or two, when the smoke and dust were at their worst, was associated with poorer lung function. Of the study group, 586 had developed COPD so far, with those who arrived early at the site at an approximately 30% higher risk than those who arrived later. The study further showed that COPD diagnosis often followed an earlier diagnosis of asthma, and approximately 40% of those diagnosed with COPD had features of both diseases.

De la Hoz stated: "Many of these workers were non-smokers and in their early 40s in 2001, and COPD is rare in that age group."

Researchers have described this as one of the largest and most detailed prospective studies on a group of workers exposed to such high levels of dust and smoke. The findings demonstrate the importance of monitoring health workers and can contribute to understanding the best way to care for emergency workers operating in dangerous conditions. ■



Could Artificial Intelligence Improve Lung Cancer Survival Rates?

ARTIFICIAL intelligence (AI) is a surging innovation in many fields of healthcare, with new technologies transforming many aspects of patient diagnosis and care. New evidence has surfaced suggesting that the use of AI could aid diagnosis of lung cancer up to a year earlier than with current methods. Presented at the ERS International Congress on 8th September 2021, this research focuses on the use of a specific AI programme to identify signs of lung cancer on CT scans.

Being the most common cause of cancer death due to its often late-stage diagnosis, early identification of lung cancer is essential to increase the likelihood of successful treatment, and, therefore, survival. Current diagnostic strategies uses CT scans, which are examined by radiologists to identify signs of lung cancer, followed by a surgical procedure or biopsy to confirm tumour malignancy. Although effective, this strategy is time-consuming and can lead to delayed diagnosis given the volume of images each radiologist must analyse.

Benoît Audelan, a researcher of the Epione project from the Inria centre, Université Côte d'Azur, Nice, France, presented a new study, on which he collaborated with colleagues from Université Côte d'Azur, Therapixel, and the University Hospital of Nice. Audelan and colleagues used a series of CT scans from 888 patients with suspicious growths to train their AI programme. The programme was then tested on 1,179 patients involved in a lung screening trial with a 3-year follow-up, which included 177 patients that had a confirmed lung cancer diagnosis.

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The AI program had a 97% success rate in malignant tumour detection, with the five tumours that were unidentified being at the centre of the chest, which made them more difficult to distinguish. The programme was also able to identify 152 suspicious areas from scans taken a year before cancer diagnosis in the same patient set. Although these results show promise, Audelan and colleagues explained that the programme also has a high rate of identifying false positives, an area which requires improvement before clinical use.

Audelan explained: "Screening for lung cancer would mean many more CT scans being taken and we do not have enough radiologists to review them all. That's why we need to develop computer programs that can help. Our study shows that this program can find possible signs of lung cancer up to a year earlier." He added: "The objective of our research is not to replace radiologists but to assist them by giving them a tool that can spot the earliest signs of lung cancer." Scientists involved in this exciting study intend to progress their research into developing a program to successfully differentiate between malignant and non-malignant tissue. ■

Warmer Weather Linked to Increase in COPD Exacerbations

GLOBAL average temperatures slowly but dangerously increase each year due to climate change. As the Earth gets hotter, the ice caps melt and ecosystems are disturbed; however, it is not only rising sea levels is not the only thing to worry about. Increase in temperature could also affect respiratory conditions such as chronic obstructive pulmonary disease (COPD). A unique study aimed to discover whether an increase in ambient temperatures resulted in an increase in COPD exacerbations.

The study took place in the US and involved analysing data from 1,177 individuals that were the average age of 64 years with COPD who either currently smoke or used to smoke. These participants had enrolled in studies previously namely, 'SubPopulations', and 'Intermediate Outcome Measures in COPD Study (SPIROMICS)' from as early as 2010 and had at least one COPD exacerbation.

Supaksh Gupta, pulmonary and critical care fellow, University of Washington, USA, and colleagues analysed the local ambient temperatures recorded on the day of the COPD exacerbation and the preceding week to determine whether hotter temperatures were linked to increase in COPD exacerbations.

Interestingly, the results showed that the risk and likelihood of COPD exacerbations increased with rising temperatures prior to the next 6 days. An increase in just 1 °C resulted in a 2% increase in the risk of COPD exacerbation 2 days after temperatures increased. The highest risk occurring 2 days after temperatures increased.

The findings from this study highlight how the ongoing climate crisis have a negative effect on conditions that scientists may not have even previously realised. A possible solution for patients with COPD would be to avoid hotter temperatures by staying indoors when it is too hot outside. Although this might not be ideal, it might be a preventive measure in times when temperatures soar way above normal.

To conclude, Gupta shared their teams' ambitions for the future, "I hope our research will help guide public policy recommendations and promote health precaution guidelines for people with COPD during periods of increased ambient temperature." ■

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COVID-19 Infection Does Not Affect Lung Function in Young Adults, Research Finds

“Our analysis showed similar lung function irrespective of COVID-19 history.”

LATE-BREAKING research presented at the ERS International Congress on 7th September 2021 has demonstrated that infection with COVID-19 does not appear to affect young adults’ lung function.

Ida Mogensen, Karolinska Institute, Stockholm, Sweden, led the first study presented, which demonstrated that even patients with asthma did not show a statistically significant deterioration in lung function after infection. However, there was a trend towards slightly lower measurements of forced expiratory air volume (FEV₁).

Researchers collected data from 661 adolescents and young adults, with an average age of 22 years. Data that was collected for analysis included measurements of lung function, inflammation, and eosinophils. All participants had been involved in previous study and, therefore, had data points collected pre-pandemic. Mogensen and her colleagues selected 178 individuals who had severe acute respiratory syndrome coronavirus 2 antibodies, indicating they had been infected. Measurements were taken of FEV₁, forced vital capacity, and FEV₁/forced vital capacity ratio (an indicator of narrowed airways). Changes in lung function over the pandemic were calculated and compared to participants who had not experienced COVID-19 infection.

No significant differences in lung function were identified between patients who had or had not been infected with respect to eosinophils, inflammation indicators, or allergy responses.

“Our analysis showed similar lung function irrespective of COVID-19 history,” stated Mogensen.

The second study presented at congress by Anne Schlegtendal, University Children’s Hospital, Ruhr-University of Bochum, Germany, expanded on this research by investigating children and adolescents between the ages of 5 and 18 years.

Researchers monitored lung function between 2 and 6 months following COVID-19 infection and compared results to a control group of children who had not been infected. In the follow-up, only two children were found to have presented with abnormal lung function. When the patients with COVID-19 were compared to the control group, no significant differences in frequency of abnormal lung function were found. Abnormal function occurred in 16% of the COVID-19 group and 28% of the control group.

Schlegtendal emphasised the importance of the research: “These findings should offer some reassurance to children, adolescents and their families.” ■

Electronic Nose Could Be Key to the Early Detection of Lung Transplant Failure

According to new research, presented on 7th September 2021 at the ERS International Congress, an electronic nose could ‘sniff out’ lung transplant failure. According to the current research, it could take several months to diagnose lung transplant failure known as chronic allograft dysfunction (CLAD). The study presented by Nynke Wijbenga, PhD student and Technical Physician at Erasmus University Medical Center, Rotterdam, the Netherlands, stated that an eNose could be useful in the early diagnosis of CLAD, allowing doctors to intervene and provide treatments sooner before the condition gets worse.

Wijbenga stated that approximately 50% of patients who have undergone a lung transplant are diagnosed with chronic rejection or CLAD within 5 years after the lung transplant. There is currently no treatment available to reverse chronic rejection despite the fact that it is one of greatest cause of death following lung transplantation. The innovative eNose is a device that has sensors capable of detecting chemicals called volatile organic compounds (VOCs). These VOCs vary depending on different metabolic processes occurring within the body, including the lungs. The VOCs are available in 1% of exhaled breath and, therefore, the eNose can be used to spot the VOCs pattern. The results from the eNose are analysed using machine learning algorithms and therefore could be useful in detecting several lung diseases.

The study team recruited 91 patients who had a lung transplant who visited the institution between July and November 2020. The patients were between 35 and 73 years old, with a median age since lung transplantation of 3.6 years. With one eNose measurement from each study participant, the researchers compared the data with the prior results of the diagnoses each patient received from their consultants. The results showed that in 86% of the cases, the eNose detected and distinguished that 68 patients had stable lung transplants, whilst 23 patients were diagnosed with CLAD.

“These results suggest that the eNose is a promising tool for detection of CLAD,” said Wijbenga. “However, more research is required before it can be used in the clinic. We need to assess whether repeated measurements in the same patients can provide more accurate diagnoses and even predict CLAD before it occurs. Also, we need to confirm our results in other groups of patients. Nonetheless, we aim to develop this as a technique for wide use across Europe.” ■

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Could E-cigarettes Containing Nicotine Cause Blood Clotting?

E-CIGARETTES were first introduced in the UK over a decade ago from China. Since then, e-cigarettes have become a worldwide trend, with almost three million

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people using these smoking devices in the UK alone. Many people believe that e-cigarettes are less toxic than smoking traditional cigarettes due to the lack of harmful chemicals found in tobacco smoke. Although, in recent years, new research has come to light to suggest the opposite is true and that smoking e-cigarettes with nicotine can be just as fatal.

A recent study presented at the ERS International Congress showed the effects of using e-cigarettes on the blood vessels and heart. The researchers recruited a group of 22 healthy participants aged 18–45 years old who occasionally smoked. Two tests were carried out on these individuals with a 1-week gap in between. The first test involved the participants taking 30 puffs from an e-cigarette containing nicotine and the second test involved taking 30 puffs from an e-cigarette without nicotine. Individuals' heart rate and blood pressure were measured before and after taking the 30 puffs as well as blood sample tests at the following intervals: before using an e-cigarette, 15 minutes after using an e-cigarette, and, finally, 60 minutes after use.

Further to this, the researchers used a laser to observe the ability of the blood vessels to dilate and supply blood to organs around the body before and after using e-cigarettes. The results showed that individuals using e-cigarettes had a 23% increase in blood clots 15 minutes after using e-cigarettes with nicotine, which eventually went back to normal after an hour. Other findings included an increase in heart rate by 7 beats per minute and narrower blood vessels in participants smoking e-cigarettes containing nicotine. These results suggest that the long-term effects of smoking with e-cigarettes containing nicotine could be deadly as more blood clots increases the chance of heart attacks and strokes.

The next steps could be to replicate this study on a larger scale and to make people fully aware of the dangers of smoking e-cigarettes. The speaker that presented this study, Gustaf Lyytinen, Clinician at Helsingborg Hospital and Researcher at the Karolinska Institute in Stockholm, Sweden, shared his concluding remarks: "Some people may use e-cigarettes when attempting to quit smoking because they are marketed as being safe, but this study adds to the growing evidence on the harmful effects of e-cigarettes." ■

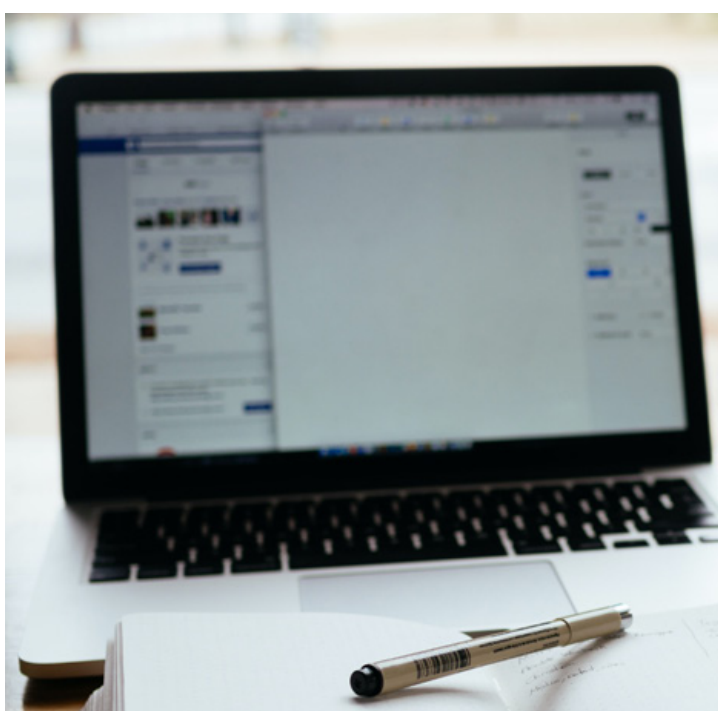
Could Office Environments Be The Reason For Occupational Asthma?

NOVEL study, presented on 6th September 2021 at the ERS International Congress, stated that seemingly safe office environments may lead to the development of asthma in some employees. According to the study, there are several environmental triggers such as printer toners, poor ventilation, cleaning products, and even air conditioning. Furthermore, the study discovered that employees who experienced occupational asthma eventually left their jobs, especially if the employer did not resolve the issue.

The study was presented by Christopher Huntley, Birmingham Regional Occupational Lung Disease Service, University Hospitals Birmingham NHS Foundation Trust, UK. His team investigated 47 cases of office employees, reported to Birmingham Regional Occupational Lung Disease Service, UK, who had been diagnosed with occupational asthma. Using a serial peak flow monitoring, which is the fastest rate in which patients breathe air out, the majority of patients were confirmed to have asthma. The results showed that 17 patients had lungs that reacted vigorously to sensitive airways. The researchers

also recognised three main categories as the causes of occupational asthma in employees within an office environment: triggers within the office such as toners, mould, and cleaning products; triggers within the air ventilation system such as mould; and the office's surrounding environment such as paint and vehicle fumes.

Additionally, the researchers also explored a situation in which the employers adjusted to accommodate office workers with occupational asthma. The results showed that in situations where the employers did not make any adjustments, the employees were 100-times more likely to quit their jobs. According to Huntley, there were fewer referrals for new patients with occupational-related asthma during the COVID-19 pandemic restrictions and, furthermore, the currently diagnosed patients have exhibited improvements during the period of working from home. He added: "Working from home has been useful for patients in both establishing their diagnosis and as a form of non-pharmacological treatment. Allowing workers with occupational asthma to continue working from home may help keep office workers in their jobs as they require fewer sick days." ■



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Exercise During Pregnancy Linked to Lung Function in Offspring

SCANDANAVIAN study has uncovered evidence that there is a link between lung function in babies and the physical activity level of their mother. Hrefna Gudmundsdottir, who presented this discovery, summarised the findings: “In our study, we found that babies born to inactive mothers were more likely to be in the group with the lowest lung function compared to babies born to active mothers.”

In total, 814 healthy babies born to women in Oslo, Norway, and Stockholm, Sweden, were included in this study, as a part of the larger Prevent ADALL study from 2014–2016, conducted at the Oslo University Hospital in Norway and Karolinska University Hospital in Stockholm. Mothers completed questionnaires at 18 weeks and 34 weeks of pregnancy about their health, lifestyle, socioeconomic factors, and nutrition. This included a report of how often they exercised, for how long, and at what intensity, to aid classification as inactive, fairly active, or very active. Lung function was measured on 3-month-old babies by assessing normal breathing in calm and awake infants, done by holding a face mask over the baby’s nose and mouth and recording the flow and volume of air inhaled and exhaled.

Of the 290 babies with inactive mothers, 8.6% (25) were in the group with lowest lung function. Moreover, 4.2% (22) of the 524 babies with active mothers were also in this group with low lung function, combining to a total of 47 babies. Overall, 5.8% of the 814 infants had low lung function, and average lung function was slightly higher among babies of active versus inactive mothers. The major measurement for this research was the ratio between time to peak

tidal expiratory flow and expiratory time (tPTEF/tE), which represents limitation to the flow of exhaled breath. Average tPTEF/tE measurement for all infants was 0.391, where 290 babies of inactive mothers exhibited the lowest average of 0.387 and 299 babies of very active mothers had the highest at 0.394. Researchers also took into account mother age, education, pre-pregnancy BMI, nicotine use during pregnancy, asthma, allergy-related illnesses in either parent, and if the mother had given birth previously.

The observation of this link is a novelty, and provokes change to the future direction of research in this field. Gudmundsdottir described the path forward expected as a result of this discovery: “Exploring factors that can be associated with lung function in infants is important. If being physically active during pregnancy could reduce the risk of impaired infant lung function, it would be a simple, low-cost way to improve the respiratory health of offspring.” Further guidance and emphasis on the usefulness and limitations of this study can be seen in Gudmundsdottir’s statement that “we observed a trend that adds to the importance of advising women of child-bearing age and pregnant women about physical activity. However, there may be factors that affect both maternal physical activity and lung function in offspring that we have not accounted for and could affect the results and so more research is needed.” The researchers will follow the babies as they grow to see how lung function progresses and how it related to development of respiratory diseases, such as asthma. ■

Lower Lung Function Could Predict Risk of Sudden Cardiac Death

SUDDEN cardiac death (SCD) is the abrupt loss of heart function, affecting approximately 20% of individuals in Europe. Risk factors for SCD include coronary heart disease, family history, and lifestyle choices such as smoking. In a study presented at this year's ERS International Congress, researchers aimed to find a way to detect individuals at risk of SCD to prevent further deaths.

The research involved 28,584 middle-aged participants from Malmö, Sweden, with no known cardiac issues. Each participant had a spirometry test, which is commonly used to assess lung function and involves blowing into a tube as hard as one can. Over the course of four decades, the researchers recorded any SCDs or non-fatal coronary events.

Fascinatingly, the results showed that the middle-aged participants who had measurably lower lung function had a 23% increase in risk of having a SCD. Further to this, those with lower lung function also had an 8% increased risk in having a non-fatal coronary event.

The speaker, Suneela Zaigham, a researcher from the Department of Clinical Sciences,

Cardiovascular Epidemiology at Lund University, Sweden, shared her thoughts about these interesting results: "We believe this is the first study to directly compare the risk of sudden cardiac death and non-fatal coronary events and their links with lung function in the general population."

The findings indicate that testing lung function of healthy middle-aged individuals might help spot individuals at risk of potentially having a SCD in the future and consequently save lives. The speakers were aware that the limiting factor of their study was that all the tests took part at the start of their study and risk factors could have changed over the 40 years.

Future work could involve testing lung function of individuals at intervals over the course of 40 years and for scientists to do more research into how lung function affects cardiac function. Understanding this link could help with early intervention, which is what the researchers from this study aim to do. Perhaps, one day in the future, measuring lung function could be used as a screening tool for SCD. ■

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