ESPE NEWS

BRINGING THE LATEST IN PAEDIATRIC ENDOCRINOLOGY TO YOU

ESPE
European Society for Paediatric Endocrinology
Improving care of children with endocrine diseases by promoting knowledge and research

ISSUE 50 / *WINTER 2020*
ISSN 2045-5003 (ONLINE)

Addressing childhood obesity

Special issue
P8–11 >

ESPE 2021 Awards – submit your nominations by 10 December!

Welcome

As paediatric endocrinologists, we are well aware that COVID-19 is not the only pandemic in our clinics. Childhood obesity has been of growing concern in recent decades. According to the World Health Organization (WHO), one in three 11-year-olds in the WHO European Region is either overweight or obese.

This issue of *ESPE News* takes the opportunity to look at several initiatives in this area of our specialty. On **page 8**, Thomas Reinehr examines the implications of adolescent obesity for both individuals and society, as well as potential treatment options for this group. The EuRRECa (European Registries for Rare Endocrine Conditions) project launched in 2018. It has already made progress in identifying rare obesity syndromes, as you will discover on **page 9**.

Periconception is the period covering the final maturation of male and female gametes, fertilisation and early development of the embryo. On **page 10**, Tom Fleming explains how parental lifestyle factors during this critical window can influence the offspring's health over an entire lifetime. The ESPE Obesity Working Group has been examining how insulin resistance is evaluated in young people, given its relevance to multiple obesity-related comorbidities. You can read about their work on **page 11**.

Meanwhile, the impact of SARS-CoV-2 on us all remains enormous, both personally and professionally. I hope you and those close to you remain well. On **page 6**, we hear the first-hand experiences of two clinicians whose daily lives in 2020 have been hugely affected by the virus. In the next issue, researchers in paediatric endocrinology will give us their perspectives. Our thoughts are with everyone working in our field at this time – thank you for the enormous contributions you are making.

On **pages 4–5**, we celebrate the achievements of our ESPE Award winners, each of whom has made a fantastic contribution to paediatric endocrinology. Please send your nominations for the 2021 ESPE Awards by 10 December (see the next column). **Page 12** reflects on the success of the recent ESPE Connect Online meeting, which brought us all together virtually at a time when collaboration is more important than ever. As always, this issue also provides information about grants to support your work, and dates and deadlines.

Keep well, stay safe, and let us hope for a more normal 2021.

Sarah Ehtisham
Editor, *ESPE News*
Sarah.Ehtisham@mediclinic.ae

Cover image: *Viktoriia Novokhatska/iStock*

Follow ESPE online...

Keep an eye on the latest ESPE news and activities at **www.eurospe.org**

You can also follow ESPE on Facebook and Twitter

/EuroSPE

/EuroSPE

Editorial Board:
Meghna Chawla
Antje Garten
Rakesh Kumar
María Salomón Estébanez

AWARDS

2021 ESPE Awards

We welcome your nominations for the 2021 ESPE Awards. These celebrate and recognise the achievements of ESPE members at all stages of their research and clinical careers, wherever they are in the world.

Nominate your colleagues by **10 December 2020**

www.eurospe.org/grants-awards/awards

OPPORTUNITIES

Translators needed!

Could you translate ESPE's patient information?

We are seeking help from ESPE members to translate ESPE patient information booklets into Dutch, French, German and Spanish.

The booklets were all reviewed and updated in 2019 by the ESPE Clinical Practice Committee and are currently available in English, at two readability levels. They are a useful resource for clinicians to share with patients, and we want to make them available to as many patients, parents and carers as possible.

Find out more at **www.eurospe.org/news/item/14203/Could-you-translate-ESPE's-patient-information**

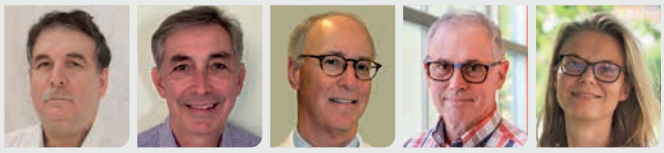
EVENTS

ESPE Liverpool

With the COVID-19 global pandemic still at the forefront of everyone's minds, the ESPE Liverpool Programme Organising Committee is maintaining a close eye on preparations for next year's ESPE Annual Meeting.

While it is still our hope to be together again in person next May, we understand that this may not be possible, and are investigating all potential options for delivering a safe ESPE Meeting in 2021. It is still our intention for a physical event to take place in Liverpool next year, but we are preparing for all eventualities.

For the latest information see **www.eurospe.org/espe-liverpool**



See our 2020 award winners on pages 4–5

GRANTS

Visiting Professorship of Rare Diseases

The Visiting Professorship provides up to €15 000 to enable mid-career paediatric endocrinologists to make multiple short visits to other centres for collaboration and scientific renewal. Up to four grants are available in 2021.

Apply by **15 January 2021**

www.eurospe.org/grants-awards/grants/visiting-professorship

IFCAH-ESPE Grants

ESPE is pleased to support IFCAH (the International Fund for Congenital Adrenal Hyperplasia). This private fundraising organisation promotes academic research, to improve understanding and management of CAH.

ESPE-IFCAH Grants totalling €350 000 will be available in 2021, with selected research projects receiving up to €150 000.

Submit letters of intent by **15 January 2021**

Find out more at **www.eurospe.org/grants-awards/grants/ifcah-espe-grant**

Early Career Scientific Development Grant

This grant normally finances a short visit to an external institution or a visit by an outside expert to your home institution. While COVID-related travel restrictions are in place, it can also be used for a research period of up to 3 months at your home institution.

Apply by **31 January 2021**

See **www.eurospe.org/grants-awards/grants/early-career-scientific-development-grant**

ESPE Research Unit Grant

This grant supports collaborative high quality research in paediatric endocrinology, for both physicians and scientists. One grant of €100 000 is available to ESPE members and their co-investigators. International collaboration is encouraged.

Preliminary application deadline **15 February 2021**

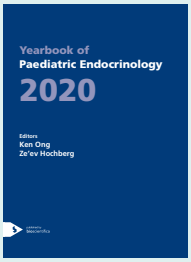
Find out more at **www.eurospe.org/grants-awards/grants/research-unit**

RESOURCES

ESPE COVID-19 hub

ESPE has a regularly updated web page dedicated to information related to coronavirus and its impact on paediatric endocrinology. You will find links to ESPE's own guidance, material from patient support groups, third party published research and ways in which you can contribute to ongoing studies.

www.eurospe.org/patients/espe-covid-19-hub



Yearbook of Paediatric Endocrinology 2020

This valuable reference tool provides a collection of abstracts summarising the highlights of publications in paediatric endocrinology from the past year.

The latest *Yearbook of Paediatric Endocrinology*, edited by Ken Ong and Ze'ev Hochberg, is now freely available online.

See **www.espeyearbook.org**

ESPE e-Learning

Supporting this issue's theme:

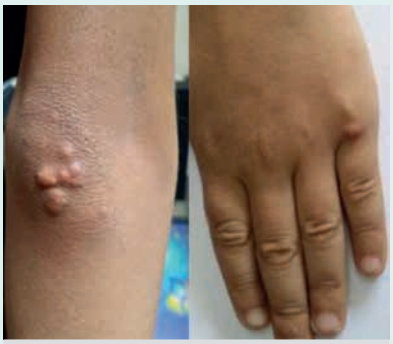
- 'Molecular-genetic evaluation in childhood obesity' is a chapter within **Obesity** in **General Content**. It includes descriptions of three problem-solving cases.
- 'Obesity in a resource-limited setting' can be found within **Obesity** under **Resource Limited Countries**. It is provided in five languages (English, French, Spanish, Chinese and Swahili).

In addition:

The following problem-solving cases have been added in **General Content**:

- 'A case of infantile hypercalcaemia with unusual findings' and 'A young boy with abnormal gait' under **Calcium and Bone Metabolism**.
- 'Addison's disease with ptosis of the eyes' under **Multiple Endocrine Deficits**.
- 'Ryan, a neonate with a low blood sugar' under **Pituitary**.

See **www.espe-elearning.org**. Registration is free of charge.



From the case 'A 9-year-old old boy with xanthomas' in General Content

ESPE Award Winners 2020

We congratulate our 2020 ESPE Award winners for their dedication and achievement in the field. Due to the postponement of ESPE Liverpool, we presented the Young Investigator Awards and *Hormone Research in Paediatrics* Prizes during ESPE Connect Online in November 2020. We will make presentations to our other 2020 award winners, either virtually or in person, in 2021.

Learn more about our winners here **www.eurospe.org/2020-award-winners**

ESPE Andrea Prader Prize

Moshe Phillip (Petah Tikva, Israel) receives the ESPE Andrea Prader Prize, in recognition of his lifetime achievement in teaching and research, outstanding leadership and overall contribution to the field of paediatric endocrinology.

ESPE Outstanding Clinician Award

Gary Butler (London, UK) will be presented with the ESPE Outstanding Clinician Award, in recognition of his outstanding clinical contribution to the practice of paediatric endocrinology.

ESPE International Award

Michael Levine (Philadelphia, PA, USA) is the recipient of the ESPE International Award. This is presented to an outstanding paediatric endocrinologist from a country outside Europe and the Mediterranean basin.

ESPE International Outstanding Clinician Award

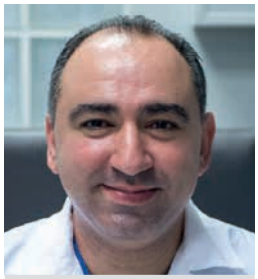
Jean-Pierre Chanoine (Vancouver, Canada) receives this award, in recognition of his contribution and commitment to clinical paediatric endocrinology in a country outside Europe and the Mediterranean basin.

ESPE Research Award

Antje Körner (Leipzig, Germany) will be presented with the ESPE Research Award, in recognition of research achievements of outstanding quality in basic endocrine science or clinical paediatric endocrinology.

ESPE Young Investigator Awards

View their lectures at **www.vimeo.com/458163858/55ed56c394**



Nicholas

Tero

This award for paediatricians who are still in training or have been no more than 5 years in a senior (principal investigator) role was presented to the following, in recognition of their scientific publications:

- **Nicholas Nicolaides** (Athens, Greece), whose award lecture was entitled 'Research into glucocorticoid signalling pathway: an endless journey'
- **Tero Varimo** (Helsinki, Finland), whose award lecture was entitled 'Delayed puberty in boys: diagnosis and treatment'.

Nominations are now open for our 2021 Awards

Nominate your colleagues by **10 December 2020**

www.eurospe.org/grants-awards/awards

ESPE awards

IFCAH-ESPE Grants

The following awards have been made for research into congenital adrenal hyperplasia (CAH):

- **Hedi Claahsen-van der Grinten & Antonius van Herwaarden** (Nijmegen, The Netherlands) for 'The risk of developing clinical signs of cortisol deficiency in CAH and acquired adrenal insufficiency – what makes the difference?' (€75 000)
- **Alaa El Ghoneimi** (Paris, France) for 'New standardized method for objective short and long term functional and morphological evaluation of operated CAH genitalia in children and adolescents: the EvaSurg study' (€50 000)
- **Gary Hammer** (Ann Arbor, MI, USA) for 'Transcriptional programs involved in ACTH-induced hyperplasia – implication of the transcription factor Hhex in adrenal differentiation and response to chronic hormonal challenges' (€125 000)
- **Gerard Ruiz Babot** (Boston, MA, USA) for 'Generation of human steroid-producing organoids: a new approach towards a treatment for CAH' (renewal) (€100 000)
- **Andreas Schedl** (Nice, France) for 'Differentiation of stem cells into adrenal organoids' (€50 000).

ESPE Research Unit Grant

Outi Mäkitie (Stockholm, Sweden) has been awarded this grant, which facilitates collaborative research in paediatric endocrinology, for her project entitled 'Clinical, genetic and molecular characteristics of childhood-onset osteoporosis' (€100 000).

ESPE *Hormone Research in Paediatrics* Prizes

Prizes for papers published in *Hormone Research in Paediatrics* were presented to the following:

- **Juraj Stanik** *et al*. (Germany/Slovakia) for 'The bone markers sclerostin, osteoprotegerin and bone-specific alkaline phosphatase are related to insulin resistance in children and adolescents, independent of their association with growth and obesity' *Hormone Research in Paediatrics* 2019 **91** 1–8 (best original paper)
- **Rathi Prasad** *et al*. (UK) for 'Haploinsufficiency of *NKX2-1* in brain-lung-thyroid syndrome with additional multiple pituitary dysfunction' *Hormone Research in Paediatrics* 2019 **92** 340–344 (best 'Novel Insights from Clinical Practice' paper).

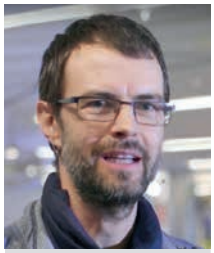
View their presentations at **www.vimeo.com/458174118/5e546f3f0f**

ESPE Research Fellowship

Tim Roman Jürg Aeppli (Stockholm, Sweden) has been awarded the ESPE Research Fellowship, which enables talented young scientists, investigators and paediatric endocrinologists to conduct research at leading institutions worldwide. He received it for his project entitled 'The positive effect of mechanical stress on bone growth: a novel method to treat leg length discrepancy?' (€140 000).

ESPE Clinical Fellowships will be selected in 2021.

Success supported by ESPE



Juraj Stanik

Juraj Stanik, winner of this year's *Hormone Research in Paediatrics* Prize for best original paper, was funded by the ESPE Research Fellowship, which he received in 2015. We are delighted to include a summary of his research here (see panel, right).

Details of the application deadline for the 2021 Research Fellowship will be in the next issue of *ESPE News*. You can watch an interview with Juraj on the ESPE website.

See **www.eurospe.org/grants-awards/grants/research-fellowship**

"The process of grant application in ESPE has really surprised me. It was quite straightforward and easy. The time for the decision was quite short. It was a very nice period of time I spent in Leipzig. I have learnt a lot. I would definitely apply for an ESPE grant again.'

Bone markers and insulin resistance in children and adolescents

Little is known about the link between bones and insulin resistance in children. Stanik *et al.* assessed sclerostin, osteoprotegerin and bone-specific alkaline phosphatase (B-ALP) levels in fasting and oral glucose tolerance test (oGTT) serum samples of 1325 children and adolescents, and during 24-h profiles and after exercise and glucose exposure in young adults.

All three bone markers were associated with height standard deviation scores (SDS) and body mass index SDS. B-ALP correlated with fasting and oGTT-derived indices of insulin resistance. In 24-h profiles, B-ALP and osteoprotegerin had lower night-time levels. Exercise transiently increased B-ALP and osteoprotegerin levels, whereas glucose ingestion had no effect.

The findings highlight the link between bone, growth and insulin resistance in children.

Read the full article at Stanik *et al.* 2019 *Hormone Research in Paediatrics* 91 1–8

Colleagues during COVID

COVID-19 has affected all our lives, both professionally and personally. Here, we talk to clinical colleagues working in Spain and the UK, to gain an insight into their experience of the pandemic. In the next issue, we will examine COVID's impact on research scientists.

Abel López Bermejo

Mars Skae

Abel López-Bermejo is Co-ordinator in Paediatric Endocrinology at the Hospital de Girona Dr Josep Trueta, Principal Investigator at Girona Biomedical Research Institute and Associate Professor at the University of Girona, Spain.

Mars Skae is Consultant Paediatric Endocrinologist and Diabetologist at the Royal Manchester Children's Hospital, UK.

What impact has the pandemic had on your day-to-day role?

Abel: I took over the responsibilities of two colleagues who were on sick leave (one because of coronavirus). That meant working overtime. During the confinement, many patients could not be seen, which also meant working overtime to catch up on those postponed appointments.

Mars: Our junior doctors were redeployed to support adult teams working with COVID patients and intensive care. Senior consultants, such as myself, stepped up and relearnt processes that junior doctors undertake on a daily basis. I enjoyed being closer to patients and ward nurses, and reliving my junior doctor days. I have now managed to re-establish most of my regular patient service provision through the use of IT and phone clinics and, gradually, face-to-face reviews.

> *"It was very difficult to watch certain colleagues, who are normally naturally calm, struggle with levels of anxiety for their health and well-being, due to being on the front line"*

How do you feel patient care and research activities have been affected?

Abel: The families of patients with precocious puberty experienced psychological distress because we were unable to see their children. Several short patients taking growth hormone did not comply with medication due to lack of regular monitoring or psychological distress. As for research, all techniques in my lab were discontinued. This will mean a delay in getting our results published. At the university, problem-based learning methodologies, which require close interaction between students, have been a challenge with the online format. Student internships at the hospital have been kept to a minimum.

Mars: My team and I are gradually addressing the backlog of patient reviews. Remote phone consultation led to suboptimal auxology measurement, particularly in those on growth hormone, and I fear that important clinical findings may have been missed in a few patients. Diabetes patients may not have had adequate HbA1C monitoring. A significant number of children and families have increased their levels of unhealthy overweight due to lack of activity and excessive eating, thus frustrating some of the earlier achievements in our weight management clinics. Concerns surround the potential loss of some patients to follow up, as appointments are rebooked after earlier cancellation. In particular, non-English speaking families may not understand letters and procedures.

The pandemic has obviously led to a lot of COVID-19-related research, which is positive, but has halted several studies for which I am principal investigator, leading to protocol deviations. With research staff now occasionally self-isolating due to COVID-19, the struggle to get up to full research capacity continues.

What has been the hardest thing to cope with?

Abel: Coping with the threat of contagion remains difficult. We all know colleagues, friends and relatives who have died or have long term consequences from the coronavirus. The deterioration of the economy is undermining the health of many people in my country. I miss having a coronavirus-free life.

Mars: During the peak, the hardest thing was coping with the rapidly changing working practice on a daily basis, from instructions on what personal protective equipment (PPE) was to be used to what patient contact was allowed. It was very difficult to watch certain colleagues, who are normally naturally calm, struggle with levels of anxiety for their health and well-being, due to being on the front line. Working from the hospital has provided me with a routine and day-to-day human contact, but I miss seeing colleagues in multidisciplinary team meetings, clinics and socially. Some of this can be preserved virtually, but it does not replace seeing people in person.

What, if any, benefits are associated with the new ways of working?

Abel: I can work from home, where I feel safe and comfortable. But that means that sometimes it is more difficult to separate work from personal life.

Mars: Without a doubt, the pandemic has prompted a long overdue IT revolution in healthcare. Being able to participate in a clinic 40 miles away without having to commute for 3 hours has been a blessing, as has the opportunity to work from home occasionally. The biggest benefit has been the ability to attend webinars and teaching/learning events, with less inconvenience and cost.

What gives you hope?

Abel: Feeling useful in the midst of this chaos gives me hope. I also hope that we can learn from experience and be better prepared next time we have a new global threat.

Mars: The human spirit gives me hope! During lockdown, my community has come together to contribute to a weekly food-bank collection, assist elderly people locally and interact more through a street WhatsApp group, which has been heart-warming. I am proud to work for the National Health Service (NHS) in England. For 2 months, every Thursday evening at 8.00pm, I could hear neighbours cheering for NHS and emergency service workers from their doorsteps.

Bringing you recent highlights from the world of research

Diagnosis and management of pseudohypoparathyroidism

New consensus guidelines on pseudohypoparathyroidism (PHP) cover the initial presentation, clinical features and genetic heterogeneity, and have an algorithm for genetic diagnosis. The statement was written by the European Network on Pseudohypoparathyroidism (Euro-PHPnet), which was funded by an ESPE grant.

Major features include: parathyroid hormone (PTH) resistance and/or ectopic ossifications and/or early-onset (before 2 years of age) obesity associated with thyrotrophin resistance and/or Albright's hereditary osteodystrophy.

Minor features include: unexplained primary hypothyroidism, hypercalcitoninaemia, hypogonadism, growth hormone (GH) deficiency, cognitive impairment, hearing impairment, craniosynostosis and neurosurgical features, tooth ankylosis, oligodontia, cataract and/or central nervous system calcifications, sleep apnoea, ear infections, asthma and restricted fetal growth.

The guidelines cover management of PTH resistance and hypocalcaemia, which is more problematic during rapid growth, ectopic ossification, skeletal abnormalities, growth and GH deficiency, obesity and metabolic syndrome, and cognitive aspects of PHP, as well as other hormone resistances. They emphasise the need for a life-long multidisciplinary approach with appropriate genetic evaluation. The paucity of strong evidence-based data is highlighted. There is a need for registries to collect the longitudinal data, which is key to development of disease-specific therapies.

Read the full article at Mantovani *et al.* 2020 *Hormone Research in Paediatrics* 93 182–196

Non-invasive Synacthen test

Elder *et al.* tested six nasal formulations of synacthen in dexamethasone-suppressed healthy volunteers and compared the plasma cortisol levels following the nasal and i.v. formulations.

They found one of the formulations (Nasacthin003, 500µg) to demonstrate an equivalent plasma cortisol response to 250µg i.v. synacthen at 60min. Furthermore, it was well tolerated: in 70 doses administered to 22 adults and 24 children, only minor adverse events were described. Paired blood and saliva samples for plasma cortisol and salivary cortisol and cortisone were analysed. The salivary cortisol and cortisone responses in children were similar following administration of Nasacthin003 and i.v. synacthen, but slightly lower in adults.

The authors conclude that this test could represent a non-invasive alternative to the i.v. synacthen test that would offer the potential for cost savings and a reduced healthcare burden for patients.

Read the full article at Elder *et al.* 2020 *Journal of Clinical Endocrinology & Metabolism* 105 dgaa323

Long term mortality after childhood GH treatment

This study examined a cohort comprising 24 232 patients from eight European countries in the SAGhE (Safety and Appropriateness of Growth Hormone Treatments in Europe) Consortium, who were treated with recombinant human growth hormone (r-hGH) during childhood. There were more than 400 000 patient-years of follow-up for the cohort.

The authors stated that 'In low risk patients with isolated GH deficiency or idiopathic short stature, all-cause mortality was not significantly increased (SMR 1.1, 95% CI 0.9–1.3). In children born small for gestational age, all-cause mortality was significantly increased when analysed for all countries (SMR 1.5, CI 1.1–1.9), but this result was driven by the French subcohort. In patients at moderate or high risk, mortality was increased (SMR 3.8, CI 3.3–4.4 and SMR 17.1, CI 15.6–18.7, respectively).' Mortality was not associated with mean daily or cumulative doses of r-hGH. The authors concluded that all-cause mortality was associated with underlying diagnosis.

This is the largest long term mortality follow-up study to date for children treated with r-hGH. One major limitation of the study was the lack of control group.

Read the full article at Sävendahl *et al.* 2020 *Lancet Diabetes & Endocrinology* 8 683–692

Hepatic NADH reductive stress and variation in metabolic traits

There is no doubt about the importance of the redox cofactor couple NADH/NAD+ for cellular energy metabolism. Less is known, however, about the causality of changes in NADH/NAD+. Does an altered NADH/NAD+ ratio cause changes in energy metabolism or is it a consequence of metabolic changes?

To answer this question, Goodman *et al.* used a bacterial NAD oxidase that selectively lowers NADH/NAD+ in the cytosol. Circulating α-hydroxybutyrate (αHB), previously linked to insulin resistance and mitochondrial disease, was identified as directly depending on hepatic NADH/NAD+. The strongest genetic determinant in a genetic association study for circulating αHB levels was single nucleotide polymorphisms in the *GCKR* gene. This encodes glucokinase regulatory protein, which sequesters glucokinase and attenuates hepatic glycolytic flux. The authors found that glucokinase regulatory protein directly influences free cytosolic NADH/NAD+ in the liver.

They conclude that increased hepatic NADH/NAD+ or reductive stress is an effector of *GCKR*, linking genetic variation in *GCKR* to several metabolic traits, such as circulating triglycerides and fibroblast growth factor 21 levels.

Read the full article at Goodman *et al.* 2020 *Nature* 583 122–126

Long term effects of adolescent obesity

Thomas Reinehr considers the implications for health and society of obesity amongst adolescents, along with potential treatment options.

Thomas Reinehr

> *"Obesity in adolescence has major implications not only for the affected adolescents but also for society"*

Adolescent obesity carries an immense burden of disease, and results in premature death by several mechanisms (see Table). The classic cardiovascular risk factors associated with obesity (e.g. hypertension, dyslipidaemia and type 2 diabetes mellitus) lead to disease and early death.[1] Furthermore, adolescent obesity is associated with many life-limiting types of cancer 10–20 years later, replacing smoking as the leading modifiable cause for cancer.[2]

However, obesity in adolescence has major implications not only for the affected adolescents but also for society. It is associated with a range of social problems, including difficulties securing an apprenticeship or a job, or finding a partner. Adolescents with obesity are also at increased risk of having children with obesity later in life.

Costly consequences

All these consequences lead to high costs for the healthcare system. It is clear that obesity in adolescence is associated with increased healthcare use (direct cost). There is an estimated cost per year of approximately US$1400 per additional BMI (body mass index) unit.[3] The difference in direct and indirect costs between adults who were normal weight and those who were obese as adolescents has been estimated at ~€9000 annually.

Indirect costs are incurred owing to productivity losses, including sick-leave days, long term incapacity, early retirement and premature death. Additionally, adolescents with obesity might be less able to contribute to financing our social system when they are adults, since they are likely to have problems in securing employment.

Treatment options

Today, we have no approved, effective drugs for adolescents with obesity. In the near future, we will probably not be able to develop such drugs. Body weight is not regulated by one system and is therefore difficult to modify.

Additionally, the regulation of body weight interferes with many other cerebral functions. Centrally active drugs for weight loss, such as rimonabant, have been rejected from the market owing to severe adverse effects such as depression and suicide.

Peripherally active drugs in the pipeline focus on gastrointestinal hormones, sympathetic nervous system activity and adipocyte hormones. However, most changes in adipokines and gastrointestinal hormones normalise with weight loss and are characterised by receptor down-regulation (as demonstrated for leptin), limiting the effect of such drugs.[4]

Efficient treatment options are available that have been proven in randomised controlled trials, such as lifestyle interventions for adolescents with obesity and bariatric surgery for adolescents with severe obesity. However, these interventions fail frequently in clinical practice, as most adolescents with obesity do not seek medical care.[5] Identifying barriers to treatment is urgently needed.

Table Comorbidities of adolescent obesity

Medical	Psychological
Dyslipidaemia	Negative mood
Hypertension	Attention deficit hyperactivity disorder
Type 2 diabetes mellitus	Depression
Steatohepatitis and/or non-alcoholic fatty liver disease	Poor self-esteem
Polycystic ovary syndrome	Eating disorders
Gastro-oesophageal reflux disease	Internet addiction
Obstructive sleep apnoea	Conduct issues or disorders
Weight-related joint disease	
Benign intracranial hypertension	
Cancer: • colon, oesophageal, hepatocellular, pancreatic and kidney cancers in males • colon, oesophageal, liver and biliary, and ovarian cancers in females	

Adherence to treatment

Even if we can develop an ideal lifestyle intervention or drug to treat obesity and motivate adolescents, we will have to solve an additional major problem: treatment outcome clearly depends on treatment adherence. Adolescent patients are characterised by low treatment adherence because of their unique developmental, psychosocial and lifestyle issues.[6]

Adherence generally drops after the first months of therapy. Maintaining adherence to a chronic lifestyle treatment is difficult, as the short term burden of lifestyle change is often more apparent than the long term benefits of therapy. Poor adherence could also be a result of poor education, psychological and emotional problems, or social problems, frequently observed in obese adolescents. Non-adherence to treatment also suggests that contact with healthcare professionals has been inadequate.

Useful techniques to improve treatment adherence are positive attitude of therapists by avoidance of blaming, focusing on strengths and not on failures, allowing patients to express their concerns and supporting self-efficacy as well as using an empathic and non-directive communication style. However, these are time- and staff-consuming and require special education, so it is unsurprising that they are not comprehensively available. Involving peer groups in interventions and use of new media seem promising, but their effectiveness has not been studied in detail.

Since adolescent obesity leads to reduced quality of life, many social problems, premature death and immense costs, we must identify and overcome treatment barriers and optimise approaches, even if our current attempts frequently fail.

Thomas Reinehr
Vestische Hospital for Children and Adolescents, University of Witten/Herdecke, Datteln, Germany

References
1. Twig *et al.* 2016 *New England Journal of Medicine* **374** 2430–2440.
2. Furer *et al.* 2020 *Lancet Diabetes & Endocrinology* **8** 216–225.
3. Sonntag *et al.* 2016 *Obesity (Silver Spring)* **24** 200–206.
4. Roth & Reinehr 2010 *Archives of Pediatric & Adolescent Medicine* **164** 131–138.
5. Finne et al. 2009 *International Journal of Public Health* **54** 112–116.
6. Osterberg & Blaschke 2005 *New England Journal of Medicine* **353** 487–497.

Identifying rare obesity syndromes with EuRRECa

Members of the EuRRECa Project Team and Rare Obesity Study Group discuss the registries' uses.

By creating a secure, virtual environment for multicentre collaboration, registries allow pooling of data for research and are particularly useful for studying conditions that are rare or have a low prevalence.

The endocrine community has a long record of using rare disease registries. A mapping exercise 4 years ago showed that a cross-border registry existed in Europe for about 75% of rare endocrine conditions.[1] However, it also highlighted the gaps that existed in coverage of rare endocrine conditions, as well as in awareness of existing registries. The case for the EuRRECa (European Registries for Rare Endocrine Conditions) project was built on these findings.

> *"Participate in EuRRECa activities and use the data to improve the quality of research and healthcare in rare conditions"*

EuRRECa

The EuRRECa project (**www.eurreca.net**) is funded by the EU's 3rd Health Programme. It launched in 2018 with the primary aim of maximising the opportunity for patients, healthcare professionals and researchers to participate in and use high quality registries. The project includes an e-reporting registry and a core registry that collects a common dataset and clinician- and patient-reported outcomes.

EuRRECa works closely with Endo-ERN, ESPE and the European Society of Endocrinology (ESE). The platforms it has developed have also been recently adopted by ERN-BOND (the ERN on Rare Bone Diseases; **www.ernbond.eu**) and its related registry, EuRR-Bone (**www.eurr-bone.com**). More recently, EuRRECa also started working with the ESE Rare Disease Committee to map and quantify COVID-19-related morbidity in people with rare endocrine conditions.

e-REC

e-Reporting of Rare Conditions (e-REC) is an electronic reporting platform designed to allow a better understanding of the occurrence of a wide range of rare endocrine conditions. The platform is open to all centres that work within a clinical or research network. With approximately 5000 new encounters reported by 50 centres from 20 countries since July 2018, the e-REC platform is quickly showing its acceptability within its current user community.

For selected conditions, e-REC notification can also be followed by a short secondary survey (**www.eurreca.net/secondary-surveys**) that collects clinical data for quality assurance and to understand the clinical presentation of the reported condition.

As e-REC and its related secondary surveys do not collect any personally identifiable information, the ethics and information governance approvals granted to this platform allow users to participate without obtaining patient consent. All data collected by e-REC are only shared with investigators following approval by EuRRECa's Data Access Committee (DAC) (**www.eurreca.net/data-access-committee**).

Core Registry

The EuRRECa Core Registry has been operational since June 2019 and is approved for collection of data that are gathered during routine clinical care, which may be shared with approved users to perform or develop new studies. The Core Registry does not collect names, addresses and local hospital numbers, but does collect date of birth. Patients can also alter their preferences, including consent; they can access their own information and can complete generic or condition-specific outcomes.

Given the potential to collect a greater amount of information, including some which is personally identifiable, participation in the EuRRECa Core Registry requires patient consent. Patient consent also allows the transfer of data to other disease registries that are approved and recognised as affiliates by EuRRECa. Like e-REC, EuRRECa's Core Registry is available for use by any endocrine centre, and data supply for research requires approval by the DAC.

Rare obesity syndromes

Between July 2018 and June 2020 inclusive, 13 centres from 8 countries who have opted to report on rare obesity syndromes on the e-REC platform have reported 47 new cases of Prader–Willi syndrome and Prader–Willi-like syndrome, and 21 cases of other forms of rare obesity syndrome, in children less than 18 years of age. A further 16 cases of Prader–Willi syndrome and Prader–Willi-like syndrome and 2 cases of other forms of rare obesity syndrome have been also been reported at these centres in adults.

A study group has formed to look at the initial presentation of these cases through an e-REC secondary survey. This group is also assisting the EuRRECa project by advising on the more detailed disease classification for rare obesity syndromes that are being included in the EuRRECa Core Registry. You can see this classification at **www.eurreca.net/data-elements**.

In summary

EuRRECa's registry platforms are gaining wide acceptability. e-REC is ideally suited for surveillance and feasibility studies; it is agile, versatile and responsive to the needs of the endocrine community. Please participate in EuRRECa activities and use the data to improve the quality of research and healthcare in rare conditions.

S Faisal Ahmed, Salma R Ali, Jillian Bryce and I Netchine
EuRRECa Project Team

Erica LT van den Akker, Hoong W Gan and M Guftar Shaikh
EuRRECa Rare Obesity Study Group

Reference
1. Ali *et al.* 2019 *European Journal of Endocrinology* **180** 89–98.

Lifestyle at conception and disease risk in offspring

Tom Fleming explains how many diseases can be traced back to an adverse environment at conception, leading to altered embryonic development.

Tom Fleming

> *We can now pinpoint the time around conception as possibly the most critical window for environment to influence development and health over a lifetime"*

It is commonly thought that the origin of non-communicable disease in later life lies either in our unhealthy adult lifestyle or in inheriting a defective parental gene. However, disease risk can be traced back to gestation and, for example, the quality of nutrition provided by mothers. Thus, lower birthweight across the normal range increases cardiometabolic disease susceptibility in adulthood. This concept is known as the developmental origins of health and disease (DOHaD).[1]

We can now pinpoint the time around conception as possibly the most critical window for environment to influence development and health over a lifetime. This was seen, for example, in the descendants of the Dutch Hunger Winter of the Second World War.[2,3]

Periconception

The period around conception, or periconception (PC), broadly covers the final maturation of male and female gametes, fertilisation and early development of the embryo up to implantation into the endometrium: a few weeks in our lives. Whilst PC is recognised for its reproductive importance and establishment of a viable embryo, it is also when external stimuli can modulate this progression, with enduring consequences.

Diverse conditions across mammalian species, including humans, such as poor or over-rich maternal diet or alcohol consumption, similar lifestyle factors in fathers, and the altered *in vitro* environment experienced by assisted reproduction treatments (ARTs), can all affect PC in a DOHaD context. Adverse environments can change the developmental programme, altering growth, metabolism, gene expression and physiology with remarkable long term outcomes, leading to increased cardiovascular and metabolic syndrome risks and neurological ill-health in adulthood.[2–4]

Maternal obesity effects

Mechanistic understanding of this phenomenon has come largely from controlled animal models, but is supported by evidence from clinical studies. Adverse programming may derive by means of early perturbations to reproductive tissues. Thus, fatty acids and hyperglycaemic metabolites accumulate within ovarian follicular fluid as a result of maternal obesity and high fat diet. These rich nutrients seep into the oocyte and persist in the early embryo, causing metabolic oxidative stress and reducing mitochondrial function and energy production.[5,6]

Whilst maternal obesity is known to reduce fertility, these cellular consequences also change the metabolic homeostasis of the fetus and offspring, altering the growth trajectory and conferring increased adiposity risk in offspring.[7,8]

Maternal undernutrition

The PC environment can also induce an adaptive capacity in the embryo to optimise development dependent upon maternal nutrition. Such a strategy permits morphogenesis over the duration of pregnancy to be co-ordinated by local conditions.

The converse of obesity, that of maternal protein restriction (a status more commonplace in evolution), acts accordingly. Thus, maternal protein deprivation reduces amino acid availability systemically but also within the uterine lumen, where early developing embryos are bathed before implantation. Here, the embryo has sensing mechanisms to detect selected amino acid levels. It responds to deficiency by activating signalling pathways, driving compensatory processes to form a more efficient placenta and yolk sac, thereby protecting nutrient supply from the mother.[9]

Health problems materialise if maternal nutrition changes in later pregnancy, causing early adaptations to become unnecessary, resulting in overgrowth, adiposity and increased adult disease risk.[2,3]

Importance of epigenetics

PC programming of an individual's phenotype requires a 'biological memory' of the early environment to persist across the lifespan. This is achieved through the global epigenetic restructuring that occurs soon after fertilisation, and concurrent with the activation of the new embryonic genome. DNA demethylation of paternally and maternally inherited alleles occurs during cleavage of the zygote. It is followed by remethylation of the genome, to co-ordinate the developmental programme, after blastocyst formation and during differentiation of embryonic and extra-embryonic lineages.[10]

Disturbance or compensatory modification of this delicate process has been demonstrated in response to several PC DOHaD models, leading to persistent (lifetime) change in the pattern and extent of gene expression. One illustration is the relative level of methylation of the rDNA genes, which inversely regulates transcription of rRNA for ribosome biogenesis, to fine-tune protein translation and growth. Here, PC maternal protein restriction activates this epigenetic mechanism to optimise growth across somatic tissues through to adulthood.[11]

Clinical implications

There are significant clinical implications to consider in this field. An ART randomised controlled trial has shown human birthweight varies dependent upon the selection of embryo culture medium some 9 months earlier.[12] Children conceived by ART also demonstrate increased cardiometabolic health risks and altered epigenetic status during their life, compared with the naturally conceived population.[2,3] Similar datasets using fertile animal models indicate these outcomes are not caused by patient infertility.

Clearly, pregnancy needs to be approached with a healthy lifestyle not just for reproductive success but for the well-being of the next generation – no pressure there then.

Tom P Fleming
School of Biological Sciences, University of Southampton, Southampton, UK

You can find the references for this article on ***page 12****.*

Obesity and insulin resistance

Data from the ESPE Obesity Working Group's Insulin Resistance Survey were presented at ESPE 2019, in a session entitled 'Insulin resistance in obese youth: from pathogenic aspects to practical considerations'. The results are currently under review for publication. Here, the Group discusses the background to its work.

Tetyana Chaychenko

Jesús Argente

Bessie E Spiliotis

Martin Wabitsch

Claude Marcus

The problem of paediatric obesity

The obesity epidemic has become one of the most important public health issues of modern times. The prevalence of overweight and obesity has increased globally from 32 million in 1990 to 41 million in 2016.[1] The World Obesity Federation (2019) predicted that the number of children aged 5–19 years with obesity in 2030 will be 254 million worldwide.[2]

Individuals who have obesity during their childhood have a three times higher risk of mortality in early adulthood compared with the general population[3] and a 20-fold increased risk of developing type 2 diabetes mellitus (T2DM) before the age of 30.[4] T2DM in the young is a devastating disease, with high morbidity and mortality.[5,6] Thus, the paediatric obesity epidemic will place a substantial burden on society in the future, contributing to increased morbidity and mortality in adulthood.[7]

Insulin sensitivity and obesity-related comorbidities

Impaired insulin sensitivity appears to be the cornerstone of multiple obesity-related comorbidities that are usually seen in metabolic syndrome clusters, such as dyslipidaemia, hypertension, dysglycaemia, hepatic steatosis and subclinical inflammation, in both adults[8] and children.[9]

It is well known that impaired insulin sensitivity predisposes to an increased risk of developing T2DM and cardiovascular disease,[10] and a link between insulin resistance, impaired adipocytokine concentrations and clinical symptoms in obese children has been well documented.[11,12] In adolescents and young adults with T2DM, diabetic nephropathy is more prevalent than among matched individuals with type 1 diabetes mellitus, despite lower glycosylated haemoglobin, which may indicate that insulin resistance also directly affects the development of diabetes comorbidities.[13]

Evaluation of insulin resistance

Because of the importance of the assessment of insulin resistance, multiple studies have been conducted in order to ascertain the best determinant of insulin sensitivity. For quantification of whole body insulin sensitivity, the euglycemic hyperinsulinaemic clamp technique has been advocated as the 'gold standard'.[14] Many surrogate measurements have since been proposed and have found favour, based on practicality and convenience.[15–19] One of the most popular measurements is the homeostatic model assessment of insulin resistance (HOMA-IR), which is particularly useful in adults and children.[20]

Despite this, criticism of the validity of such techniques for the measurement of insulin resistance in children persists.[21,22] The Insulin Resistance in Children Consensus Conference Group (2010) concluded that the assessment of insulin resistance in children, its risk factors and the effective strategy for prevention are unknown.[23] Furthermore, routine insulin measurement was not recommended by the Endocrine Society when evaluating children or adolescents for obesity.[24]

However, insulin secretion is affected well before blood glucose concentrations are within the range of prediabetes and diabetes. It is well established that abnormal β-cell function and peripheral insulin resistance are associated with elevated 2-h glucose levels, even within the normal glucose tolerance range, without meeting the criteria for impaired glucose tolerance and impaired fasting glucose.[25] Whilst elevated 2-h blood glucose is a strong predictor for the development of T2DM in adults,[26] it appears to be less so in paediatric cohorts.[27,28]

Fasting levels of insulin greater than 15μIU/ml, or insulin peak (post-oral glucose tolerance test, OGTT) levels of more than 150μIU/ml and/or more than 75μIU/ml at 120min of OGTT, are suggestive of insulin resistance in adults.[29] Whilst other reference values can be found in the literature, they are not entirely applicable to children. Some age- and sex-specific reference values of insulin, glucose, glycosylated haemoglobin and HOMA-IR for prepubertal children were presented by the IDEFICS (Identification and Prevention of Dietary- and Lifestyle-induced Health Effects in Children and Infants) consortium.[30] However, the fact that laboratories use different assays to assess insulin concentrations makes the assessment more challenging.

Ethnicity, pubertal development and family history contribute to insulin sensitivity in children.[27] However, despite evidence of strong genetic predisposition to the particular insulin sensitivity patterns[31] and T2DM,[32,33] it is difficult to explain why the incidence of T2DM and prediabetes varies so much between countries with the same ethnicity and epigenetic impact.[27,34]

ESPE Obesity Working Group activities

The ESPE Obesity Working Group initiated the Insulin Resistance Survey to understand how the diagnosis of hyperinsulinaemia and insulin resistance is made in different hospitals in several countries, and what the cut-offs for hyperinsulinemia and insulin resistance are for local practice (manuscript in revision). We thank all survey participants. It was revealed that there is no exact standard for evaluation of insulin resistance and OGTT in EU or non-EU centres.

We welcome further support of our Working Group activities. You can contact us via **tatyana.chaychenko@gmail.com**.

You can find out more about the ESPE Obesity Working Group at **www.eurospe.org/about/espe-working-groups/obesity**.

Tetyana Chaychenko, Jesús Argente, Bessie E Spiliotis, Martin Wabitsch and Claude Marcus
on behalf the ESPE Obesity Working Group

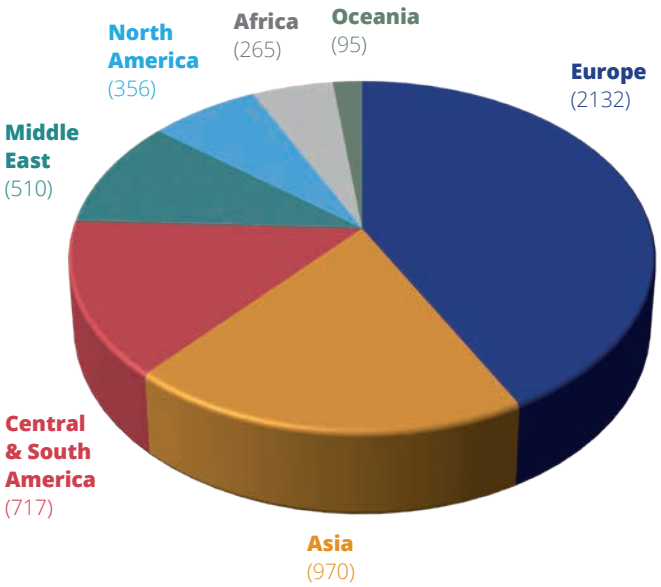
*You can find the references for this article on **page 12**.*

Success for ESPE Connect Online 2020

6–14 November 2020

ESPE Connect Online in November attracted more than 5000 attendees from over 120 countries across its 9 days. The virtual content proved hugely popular amongst all of you who joined us; we thank you for taking part.

Participants from around the globe



Attendees enjoyed 12 symposia on a wide range of topics, with live Q&A sessions. There were also plenty of Hot Topic, 'How Do I...?' and Yearbook sessions, as well as 2 Personal Opinion Future Research talks and 6 diverse industry-sponsored satellite symposia. The Hot Topic sessions included 2 from the winners of the *Hormone Research in Paediatrics* Prizes, and there were also presentations by the 2 Young Investigator Award recipients.

We are grateful to the delegates, speakers, Programme Organising Committee and corporate sponsors who helped to make ESPE Connect Online 2020 a resounding success. We hope you all found the scientific content as insightful and inspiring as we did.

Don't forget

Registered delegates can access all of the presentations free of charge until November 2021. This means you can revisit the talks you found useful or catch up on sessions you might have missed, at a time that suits you. What's more, you can still download the official ESPE Connect Online app from Google Play or the Apple Store, so you can make the most of all the scientific content on-the-go.

Access the content via your app or at
www.eurospe.org/espe-connect-online-2020

References for article by Fleming on ***page 10***
1. Barker & Thornburg 2013 *Clinical Obstetrics & Gynaecology* **56** 511–519.
2. Fleming *et al.* 2018 *Lancet* **391** 1842–1852.
3. Velazquez *et al.* 2019 *Journal of Endocrinology* **242** T33–T49.
4. Gould *et al.* 2018 *Proceedings of the National Academy of Sciences of the USA* **115** E7398–E7407.
5. Yang *et al.* 2012 *Fertility & Sterility* **97** 1438–1443.
6. Igosheva *et al.* 2010 *PLoS One* **5** e10074.
7. Luzzo *et al.* 2012 *PLoS One* **7** e49217.
8. Nicholas *et al.* 2016 *International Journal of Obesity* **40** 229–238.
9. Eckert *et al.* 2012 *PLoS One* **7** e52791.
10. Smallwood & Kelsey 2010 *Trends in Genetics* **28** 33–42.
11. Denisenko *et al.* 2016 *Biochimica & Biophysica Acta* **1859** 906–913.
12. Kleijkers *et al.* 2016 *Human Reproduction* **31** 2219–2230.

References for article by Chaychenko et al. *on* ***page 11***
1. WHO 2016 *Report of the Commission on Ending Childhood Obesity* https://apps.who.int/iris/bitstream/handle/10665/204176/9789241510066_eng.pdf.
2. World Obesity Federation 2019 *Atlas of Childhood Obesity* https://www.worldobesity.org/nlsegmentation/global-atlas-on-childhood-obesity.
3. Lindberg *et al.* 2017 *European Journal of Public Health* **27** Suppl 3 400.
4. Hagman *et al.* 2016 *Nutrition & Diabetes* **6** e227.
5. Dabelea *et al.* 2017 *JAMA* **317** 825–835.
6. Constantino *et al.* 2013 *Diabetes Care* **36** 3863–3869.
7. Dietz 2004 *New England Journal of Medicine* **350** 855–857.
8. Reaven 1995 *Physiological Reviews* **75** 473–486.
9. Zimmet *et al.* 2007 *Pediatric Diabetes* **8** 299–306.
10. Bacha *et al.* 2006 *Diabetes Care* **29** 1599–1604.
11. Chiarelli & Marcovecchio 2008 *European Journal of Endocrinology* **159** Suppl 1 S67–S74.
12. Ighbariya & Weiss 2017 *Journal of Clinical Research in Pediatric Endocrinology* **9** Suppl 2 49–57.
13. Ek *et al.* 2020 *Pediatric Diabetes* doi: 10.1111/pedi.13074.
14. DeFronzo *et al.* 1979 *American Journal of Physiology Endocrinology & Metabolism* **237** E214–E223.
15. Matsuda & DeFronzo 1999 *Diabetes Care* **22** 1462–1470.
16. Katz *et al.* 2000 *Journal of Clinical Endocrinology & Metabolism* **85** 2402–2410.
17. Rabasa-Lhoret *et al.* 2003 *Journal of Clinical Endocrinology & Metabolism* **88** 4917–4923.
18. Mcauley *et al.* 2001 *Diabetes Care* **24** 460–464.
19. Gutt *et al.* 2000 *Diabetes Research in Clinical Practice* **47** 177–184.
20. Matthews *et al.* 1985 *Diabetologia* **28** 412–419.
21. Schwartz 2008 *Diabetes Care* **31** 783–788.
22. Rössner *et al.* 2008 *Diabetes Care* **31** 802–804.
23. Levy-Marchal *et al.* 2010 *Journal of Clinical Endocrinology & Metabolism* **95** 5189–5198.
24. Styne *et al.* 2017 *Journal of Clinical Endocrinology & Metabolism* **102** 709–757.
25. Giannini *et al.* 2012 *Diabetes* **61** 606–614.
26. Weiss *et al.* 2005 *Diabetes Care* **8** 902–909.
27. Galderisi *et al.* 2018 *Lancet Child & Adolescent Health* **2** P726–P735.
28. Kleber *et al.* 2011 *Experimental & Clinical Endocrinology & Diabetes* **119** 172–176.
29. Reaven *et al.* 1993 *Journal of Clinical Endocrinology & Metabolism* **76** 44–48.
30. Peplies *et al.* 2014 *International Journal of Obesity* **38** S39–S47.
31. Uwaifo *et al.* 2002 *Diabetes Care* **25** 2081–2087.
32. Florez 2008 *Journal of Clinical Endocrinology & Metabolism* **93** 4633–4642.
33. Elksnis *et al.* 2019 *Frontiers in Physiology* **10** 107
34. Hagman *et al.* 2014 *International Journal of Obesity* **38** 40–45.

Future meetings

See **www.eurospe.org/meetings** for details of all future meetings

59th Annual ESPE Meeting
7–9 May 2021
Liverpool, UK

60th Annual ESPE Meeting
September 2022
Rome, Italy

61st Annual ESPE Meeting
September 2023
The Hague, The Netherlands

62nd Annual ESPE Meeting
September 2024
Marseille, France

OTHER EVENTS

MARCH 2021

ESPE Winter School
Date and location to be confirmed

MAY 2021

ESPE Summer School
4–6 May 2021
Lake Windermere, UK

ESPE Diabetes, Obesity & Metabolism School
10–12 May 2021
Lake Windermere, UK

OCTOBER 2021

ESPE Caucasus & Central Asia School
6–9 October 2021
Tbilisi, Georgia

ESPE Science Symposium
29–30 October 2021
Nijmegen, The Netherlands

NOVEMBER 2021

ESPE Maghreb School
23–27 November 2021
Casablanca, Morocco

DEADLINES

DECEMBER

ESPE Awards 2021 nominations – 10 December 2020

JANUARY

IFCAH-ESPE Grants letters of intent submission – 15 January 2021

Visiting Professorship of Rare Diseases applications – 15 January 2021

Early Career Scientific Development Grant applications – 31 January 2021

FEBRUARY

ESPE Research Unit Grant preliminary applications – 15 February 2021

All dates, deadlines and plans for 2021 are being constantly reviewed in light of COVID-19

ESPE
European Society for Paediatric Endocrinology

Improving care of children with endocrine diseases by promoting knowledge and research

Secretary General
Professor Anita Hokken-Koelega
p.a. Stichting Kind en Groei
PO Box 23068
3001 KB Rotterdam
The Netherlands

ESPE Newsletter
© 2020 The European Society for Paediatric Endocrinology
The views expressed by the contributors are not necessarily those of ESPE
Editor:
Dr Sarah Ehtisham
Department of Paediatric Endocrinology
Mediclinic City Hospital
Dubai, UAE
E: Sarah.Ehtisham@mediclinic.ae

Editorial Board:
Dr Meghna Chawla
(Pune, India)
Dr Antje Garten
(Leipzig, Germany)
Dr Rakesh Kumar
(Chandigarh, India)
Dr María Salomón Estébanez
(Manchester, UK)

Sub-Editor:
Caroline Brewser

Designed by:
www.corbiculadesign.co.uk

Published by:
Bioscientifica Ltd
Starling House
1600 Bristol Parkway North
Bristol BS34 8YU, UK
W: www.bioscientifica.com
Bioscientifica is a subsidiary of the Society for Endocrinology

ESPE Office
Bioscientifica Ltd (address above) manages the ESPE Office.
It is also the Professional Congress Organiser (PCO) for ESPE's Annual Meetings.

ESPE Senior Operating Officers:
Joanne Fox-Evans and Hannah Bonnell

For ESPE enquiries, including membership:
T: +44 (0)1454 642246
F: +44 (0)1454 642222
E: espe@eurospe.org
W: www.eurospe.org

www.twitter.com/EuroSPE

www.facebook.com/EuroSPE

***ESPE News* archive**
You will find previous newsletters in the archive at **www.eurospe.org/news/newsletters**