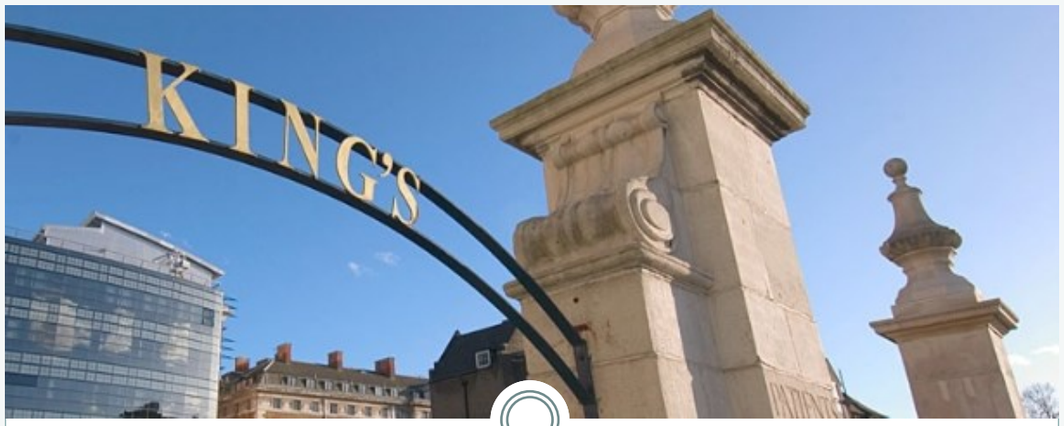


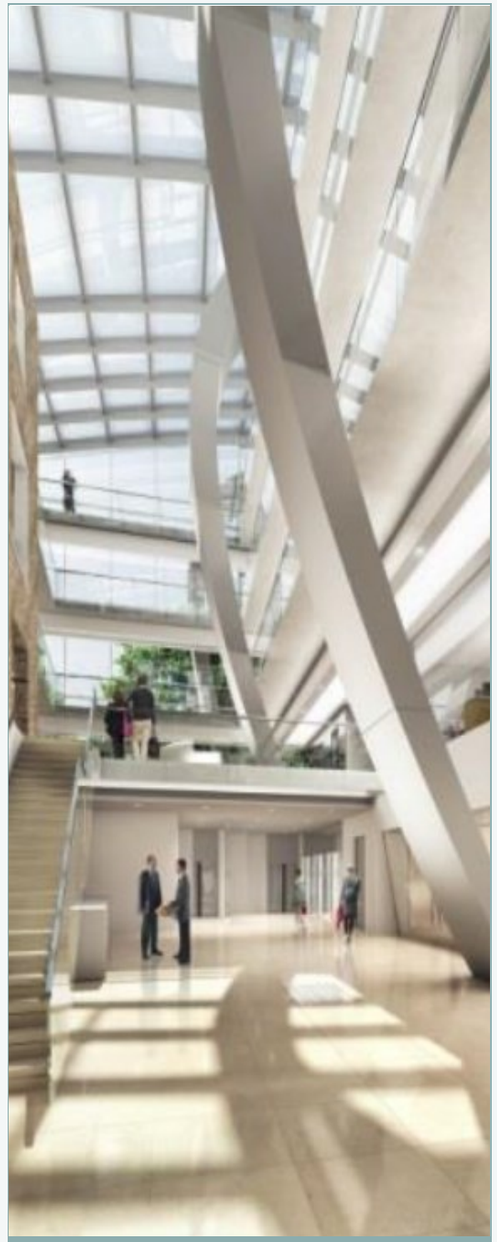
2nd John Price
Paediatric Respiratory Conference

Pre-conference Workshops & Masterclass 14th March:
Weston Education Centre, Cutcombe Rd.
London SE5 9RJ

Conference 15th & 16th March:
Fetal Medicine Research Institute, 16-20 Windsor Walk,
London SE5 8BB

Contents

King's College Hospital NHS
NHS Foundation Trust



Welcome

The Paediatric Respiratory team at King's College Hospital London are delighted to welcome you to the Second John Price Paediatric Respiratory Conference.

Following the success of last year's event and your invaluable feedback we have made a few changes to the structure of the programme:

- The workshops and masterclass are now taking place on a separate day and each workshop is limited to a maximum of 15 participants to maximise the educational benefit.
- All our registration and feedback is now on-line, with the aim of making these processes easier for the committee and for attendees.
- We have moved the second and third days of the conference to a beautiful new venue.
- Finally, we are delighted to introduce our first poster presentations and welcome contributions from around the world. We are extremely grateful to the Ella Roberta Family Foundation for their generous support in providing prizes for the best of these.

The theme for the second day of the conference this year will be "**Recognising Dogma and Thinking Outside the Paradigm**". Covering a broad range of paediatric respiratory problems we aim to discuss not only the latest evidence, but also to consider what remains unknown and how our knowledge might change in the future.

On the final day our programme "**Current Practice and Future Perspectives"** aims to offer you a practical framework to help with your approach to common presentations, investigations and therapies.

We would like to take this opportunity to thank our speakers for their participation and sharing their knowledge and our sponsors for helping us to provide this opportunity for strengthening our networks and communities of practice.

We hope you enjoy the event and take away valuable learning experiences that you can apply in your practice.

For any further information and future events, please visit our website www.paediatricrespiratory.com. Links to our feedback forms can be found in your printed programme, on our screensaver and have been emailed to you. Please complete a form at the end of each day so that we can strive to make next year's conference even better! Attendance and CPD certificates will be issued by email after the conference has finished.

Very warm regards,

Dr Atul Gupta
Conference Director

Prof John Price
Professor in Paediatric Respiratory Medicine

Rebecca Barnes Cait Kielty-Adey Dr Meredith Robertson
Organising Faculty

2nd King's John Price Paediatric Respiratory Conference

Preconference Workshops/Masterclass 14th March 2016

Venue: Weston Education Centre, King's College Hospital, Cutcombe Road, London SE5 9RJ

11:30 am - 12:20pm : Registration, Lunch

12:30pm - 14:30pm : 1st Workshop

14:30pm - 14:50pm : Tea, Coffee

15:00pm - 17:00pm : 2nd Workshop

01

Improving Asthma and Allergy Care

Facilitators: Ms Sarah Latham, Dr Meredith Robertson, Dr Atul Gupta

This session focuses on asthma diagnosis, monitoring, investigations, management and case based discussions.

02

Management of Respiratory problems/emergencies in HDU setting/ambulatory care

Facilitators: Dr Omowunmi Akindolie, Dr Simon Broughton

This session focuses on the management of acute respiratory deterioration in a DGH setting and focuses on patient assessment and escalation of interventions up to and including those used in an HDU setting.

03

Sleep studies

Facilitators: Dr Michael Farquhar, Dr Cara Bossley

This session focuses on physiology and function of sleep, investigations and long term consequences of sleep disordered breathing. The session will also discuss interpretation of home oximetry and case based discussions.

04

Non-invasive Ventilation

Facilitators: Dr Wanda Kozlowska, Ms Emily Downing

This session focuses indications, monitoring, discharge pathway and case based discussions. This session will also offer practical guide to interfaces, mask fitting, equipment.

With many thanks to our Sponsors:

AstraZeneca · ResMed · LogixX Pharma · Novartis · abbvie · Radiometer · Fisher & Paykel Healthcare · Nutricia Advanced Medical Nutrition · Airsonett · adherium

2nd King's John Price Paediatric Respiratory Conference

Recognising Dogma and Thinking Outside the Paradigm — 15th March 2016

Venue: Fetal Medicine Research Institute, King's College Hospital, 16-20 Windsor Walk, London, SE5 8BB

8:30	Registration, Poster viewing, Tea and Coffee
9:15	Overview and Introduction to the Day – Dr Atul Gupta, King's College Hospital
9:20	Welcome speech – Lord Bob Kerslake, Chairman, King's College Hospital & Prof Anil Dhawan, King's College Hospital
9:25	Welcome speech – Lord Bob Kerslake, Chairman, King's College Hospital
9:30	Aspiration Lung Disease: Controversies, Conundrums and Realities – Dr Colin Wallis, Great Ormond Street Hospital
10:00	Using Digital Technology to Improve Respiratory Patient Care – Prof Jane Davies, Imperial College London
10:30	Targeting Airway Nerves to Treat Cough – Dr Surinder Birring, King's College London
10:55	Tea and Coffee/Poster viewing/Exhibition viewing
11:30	Chronic Lung Disease: Myths, Controversies and Dogma – Professor Anne Greenough, King's College London
12:00	Asthma: Myths, Mistakes, Controversies and Dogma – Dr James Paton, University of Glasgow
12:35	Lunch/Poster viewing/Exhibition viewing
13:45	Key note lecture : Exercise, Asthma and the Athlete – Prof Kai-Håkon Carlsen, University of Oslo
14:30	The Adverse Effects of Air Pollution on Children – Prof Jonathan Grigg, Barts and The London School of Medicine
15:00	Tea and Coffee/Poster viewing/Exhibition viewing
15:30	Non-CF Bronchiectasis: Controversies and Practicalities – Dr Gary Ruiz, King's College Hospital
16:00	Year In Review: The Year's Best Respiratory Research – Professor Alan Smyth, University of Nottingham
16:50	Ella Roberta Family Foundation Awards for the Best Poster Prize Presentation – First Prize: £1,000.00; Second Prize: £250.00
17:00	Networking/Exhibition viewing/Drinks Reception
18:00	End

2nd King's John Price Paediatric Respiratory Conference

Current Practice and Future Perspectives — 16th March 2016

Venue: Fetal Medicine Research Institute, King's College Hospital, 16-20 Windsor Walk, London, SE5 8BB

8:45	Registration, Tea and Coffee
9:25	Overview and Introduction to the Day
9:30	Practical Approach to the Management of Chest Pain – Dr Cara Bossley, King's College Hospital
9:50	Practical Approach to the Management of Chronic Cough – Dr Atul Gupta, King's College Hospital
10:10	Breathlessness in Children and Young Adults: Respiratory, Cardiac or Something Else? – Dr Robert Ross Russell, Addenbrooke's Hospital
10:30	Tea and Coffee/Poster viewing/Exhibition viewing
11:00	Environmental Control in the Management of Asthma: Controversies, Conundrums and Pearls of Wisdom – Prof Adnan Custovic, Imperial College
11:30	Tachypnoea in a Well Baby: What to do Next? – Dr Ian Balfour-Lynn, Royal Brompton Hospital
12:00	Practical Management of Dysfunctional Breathing – Dr Nicki Barker, Sheffield Children Hospital
12:30	Lunch/Poster viewing/Exhibition viewing
13:30	Key note lecture: Preschool Wheeze: New Insights – Prof Paul Brand, University of Groningen, Netherlands
14:20	Viral Induced Asthma Exacerbations: Future Perspective – Prof Sebastian L Johnston, Imperial College
14:50	Top tips in Managing Allergic Rhinitis
15:05	Tea and Coffee/Poster viewing/Exhibition viewing
15:40	Immunology and Lung: A Practical Primer – Prof Graham Davies, UCL Institute of Child Health
16:10	Practical Approach to Respiratory Problems in Children with Neurological Impairment – Dr Meredith Robertson, King's College Hospital
16:30	The Science and Practice of Aerosol Therapy – Prof Chris O'Callaghan, UCL Institute of Child Health
17:00	Networking/Exhibition viewing/Drinks Reception
18:00	End

Feedback

The conference organisers and our speakers really appreciate your feedback. Many of the suggestions made last year have been incorporated into this year's programme.

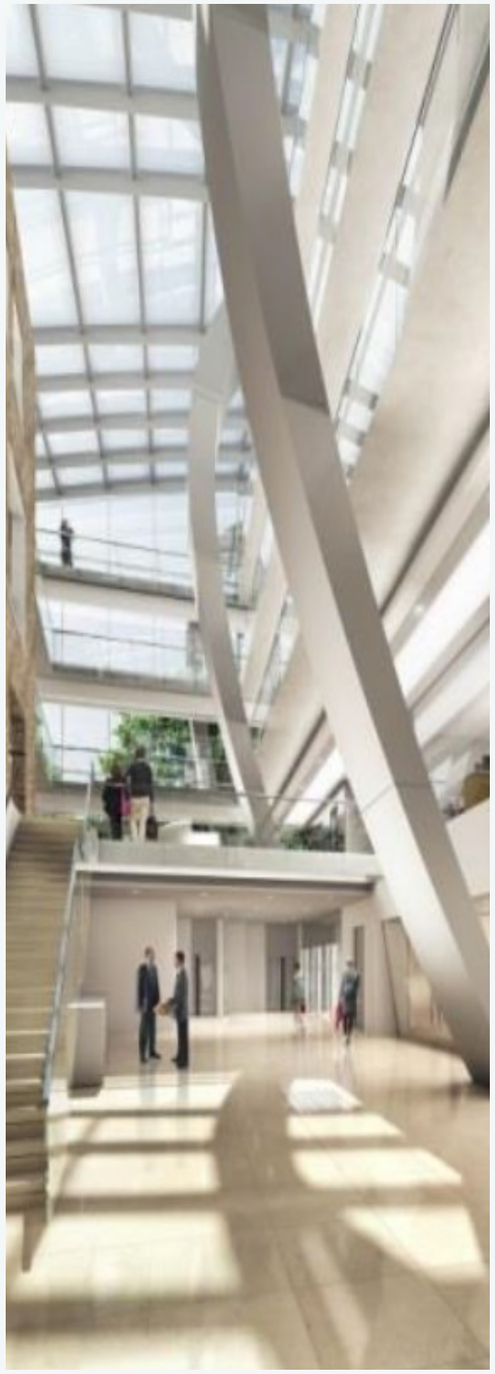
Feedback this year is being collected electronically (links below) will be mainly in the form of free-text rather than rating scales, so please try to be descriptive about what you liked and what could be improved upon. Unfortunately **you can't save the forms and come back to them later,** so you may want to jot down some ideas throughout each session to make it easier to fill in the forms at the end of each day (we will try and sort this out for next year!).

Thanks in advance for all your comments.

Workshops & Masterclass, 14th March 2016
https://johnpriceconference.typeform.com/to/sOoab6

Recognising Dogma and Thinking Outside the Paradigm, 15th March 2016
https://johnpriceconference.typeform.com/to/fO77B2

Current Practice and Future Perspectives, 16th March 2016
https://johnpriceconference.typeform.com/to/sm6hhu



Speakers and Facilitators Biographies

MO AKINDOLIE

Dr Mo Akindolie is a Consultant in Ambulatory Paediatrics at King's College Hospital in London. She is a graduate of the University of Newcastle upon Tyne and has been in her current role since 2009.

In this post, she has led on several significant service redesign projects shaping paediatric services at King's to suit the needs of local children and their families. Over the past year, this has included the opening of a paediatric short stay unit and a paediatric hospital at home service.

Her additional areas of special interest include education and training, with a specific emphasis on educating GPs in paediatrics. This serves to bridge the gap between primary and secondary care and thereby optimise healthcare delivery for children and young people.

Dr Ian Balfour-Lynn is a consultant in Paediatric Respiratory Medicine, Co-Director of Children's Services and Director of Paediatric Cystic Fibrosis at the Royal Brompton Hospital, London.

He specialises in all aspects of paediatric respiratory medicine including both tertiary and secondary care. He is Chair of the Cystic Fibrosis CRG, and Chair of the Cystic Fibrosis group (Paediatric assembly) of the European Respiratory Society.

He is a past-president of the British Paediatric Respiratory Society. He is an Adjunct Reader at Imperial College School of Medicine.

IAN BALFOUR-LYN

NICKI BARKER

Nicki is a Clinical Research Fellow and Advanced Physiotherapist at Sheffield Childrens' Hospital.

She is an expert on Dysfunctional Breathing (DB) and the creator of BreathWorks, the UK's first clinic for paediatric patients with DB. Nicki is also the driving force behind the Sheffield Dysfunctional Breathing Conferences, and regularly presents on DB at events in the UK and Europe.

Her other responsibilities include positions on the Scientific Advisory Committee for The Childrens' Hospital Charity, and the Clinical Research Steering Group at SCH. Nicki is also a sought-after undergraduate and postgraduate lecturer in Physiotherapy.

Nicki's current research priorities are into the efficacy of physiotherapy for children with DB, developing a tool for the early identification of DB and the development of medical technology to aid diagnosis and treatment of respiratory conditions.

Dr Surinder Birring is a Consultant Respiratory Physician at King's College Hospital and Guy's Hospital and Honorary Reader at King's College London.

His research interests are the assessment, pathogenesis and treatment of cough. Dr Birring and colleagues developed the Leicester Cough (LCQ), King's Brief ILD (KBILD), King's Sarcoidosis (KSQ), and Bronchiectasis Health Questionnaires (BHQ) and the Leicester Cough Monitor.

He has co-authored BTS, ERS and ACCP cough guidelines. Dr Birring has been chief investigator of several multi-centre clinical trials of antitussive therapies.

SURINDER BIRRING

CARA BOSSLEY

Dr Cara Bossley qualified from the University of Manchester in 1998. She trained in Respiratory Paediatrics at the Royal Brompton, Great Ormond Street and King's College Hospitals.

Dr Bossley embarked on a research degree at the Royal Brompton Hospital in 2007, investigating airway inflammation and remodelling in children with severe asthma. She was awarded MD(res) at Imperial College in October 2012. Dr Bossley has presented at international conferences, and has over 20 scientific publications.

Dr Bossley was appointed as consultant in Paediatric Respiratory Medicine at King's in 2013, and is the lead for non-invasive ventilation and sleep. She offers expertise in specialist clinics in difficult asthma, non-invasive ventilation, non-CF bronchiectasis and Cystic fibrosis.

Dr Bossley is an active reviewer for a number of paediatric journals including Pediatrics, Archives of Disease in Childhood & PLOS one. Cara is lead investigator in a number of ongoing research projects at King's College Hospital.

Professor Paul Brand is consultant paediatrician for respiratory and allergic diseases at the Princess Amalia Children's Centre of Isala Hospital, one of the largest teaching hospitals in the Netherlands, the Dean of Medical Education and Research at the same hospital, and an honorary professor of Clinical Medical Education at the University Medical Centre in Groningen, the Netherlands.

Paul's research interests include (adherence to) asthma treatment in children and the diagnosis and management of food allergy. He also teaches and researches educational skills in postgraduate education.

Paul has contributed to more than 200 articles in peer-reviewed journals, and has edited acclaimed textbooks on medical education and paediatrics in Dutch. He published two novels in the Dutch language. He is married with five children. His hobbies include running and soccer.

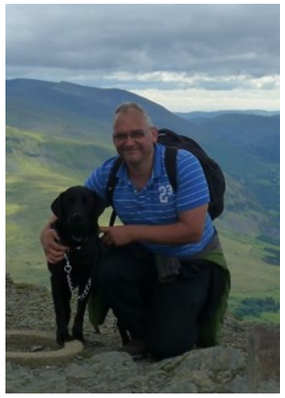
PAUL BRAND

SIMON BROUGHTON

Simon is a General Paediatrician with an interest in systems of care to maximise patient safety.

Simon course directs the KCL MSc in Advanced Paediatrics, which is now entering its fifth year. He also co-leads for Simulation training at Kings College Hospital. His PhD was on the long term consequences of bronchiolitis on prematurely born infants and he has over 30 publications.

Simon is the South Thames Paediatric Training Programme Director lead for ST 1-5 and aims to improve the Paediatric trainee experience across South Thames and to maximise the GP training opportunities in South London. As such, he is delighted to be helping to deliver the second South Thames Paediatric Regional Training day in Woolwich and hopes to build on the successes of the year by highlighting trainee achievements.



Kai-Håkon Carlsen is Professor of Paediatrics (Paediatric respirology and allergology) at University of Oslo; Oslo University Hospital, Dept of Paediatrics, Rikshospitalet and Professor of Sportsmedicine, Norwegian School of Sport Sciences.

He has served as Head of Paediatric Assembly within European Respiratory Society, as Chair of the European Respiratory Society School and as Chair of European Lung Foundation. He has been Assoc. Editor of European Respiratory Journal, Clinical Respiratory Journal, Acta Paediatrica and been member of the Editorial Board of Allergy, Pediatric Allergy and Immunology and Pediatric Pulmonology. He has written more than 260 scientific articles (Pubmed), and more than 30 books or book chapters.

His research has concentrated on childhood asthma, allergy and bronchiolitis, as well as asthma and bronchial hyperresponsiveness in elite athletes. He has been center coordinator in Oslo with the GA2LEN network of centers of Excellence (EU FP6) and with the MeDALL project (EU FP7).

KAI-HÅKON CARLSEN

ADNAN CUSTOVIC

Adnan Custovic is Clinical Professor of Paediatric Allergy at Imperial College London. His research has focused on the origins and natural history of asthma and allergy. His current research programme combines world-leading expertise in birth cohorts and statistical machine learning, and capitalises on the recent developments in the field of computer sciences to provide powerful new tools that are well suited to the challenge of integration of different scales of data.

In 2015 he was awarded European Respiratory Society Gold Medal for research in asthma. In 2013 he received the BSACI William Frankland Medal for outstanding contributions to clinical allergy, and the CIPP President's award for the distinguished achievements in childhood asthma.

He has delivered numerous prestigious lectures, around the world. He has supervised 17 PhD/MD students to completion, was an Associate Editor of Thorax, and serves on 13 journal editorial boards. He has served as a Secretary of the BSACI for two terms, and as President of Asthma section of the EAACI.

Jane Davies is Professor of Paediatric Respirology & Experimental Medicine at Imperial College London and Honorary Consultant, Royal Brompton Hospital.

Her research interests focus on CF, specifically early airway changes, bacterial infections, biomarkers/ outcome measures and novel treatments.

She is currently involved in exploring the feasibility of home monitoring for children with CF and will, at this meeting, provide an update of the field and highlight some of the likely challenges.

JANE DAVIES

GRAHAM DAVIES

Graham Davies trained in medicine, specialising in Paediatric Immunology in Cambridge and London UK. He held an Action Research Training Fellowship at University College London .

He has been a consultant Paediatric Immunologist at Great Ormond Street Hospital, London since 1997 and honorary Professor of Clinical Immunology at University College , London since 2014.

His publications are in the field of primary immunodeficiency and its management. His current research is in the field of thymus disorders and their correction and he is director of the thymus transplant programme in London.

Emily Downing graduated from The University of Nottingham with a Masters in Nursing Science. She worked at Great Ormond Street Children's Hospital on a busy Specialist Respiratory Ward including High Dependency and the Transitional Care Unit for Long Term Ventilated Children.

Following on from GOSH, Emily joined King's College Hospital team as a Nurse Educator co-ordinating the roll out of the Bedside Paediatric Early Warning System. Emily has presented studies of Bedside-PEWS at national and international meetings and was awarded Paediatric Nurse of the Year 2014 at King's College Hospital for her work in rolling out Bedside-PEWS across Child Health and integrating this into the Culture of King's College Hospital.

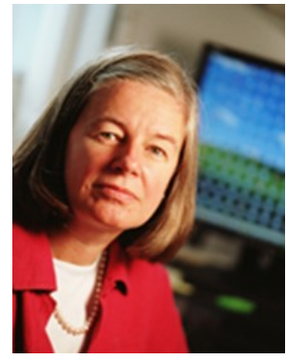
Emily is currently working at King's as a Respiratory Clinical Nurse Specialist for children.

EMILY DOWNING

MICHAEL FARQUHAR

Dr Michael Farquhar has been a consultant in paediatric sleep medicine at Evelina London Children's Hospital since 2012.

He trained in general children's medicine, children's respiratory medicine and children's sleep medicine at the Royal Hospital for Sick Children Glasgow, Nottingham Children's Hospital, The Children's Hospital at Westmead (Sydney), Sydney Children's Hospital and Great Ormond Street Hospital.



Anne Greenough is Professor of Neonatology and Clinical Respiratory Physiology, Director of Education and Training at King's Heath Partners Academic Health Science Centre and Board Member of the Higher Education Funding Council for England. She was Chair of the National Institute for Health Research (NIHR) Paediatrics (non medicines) Speciality Group and is now Vice President Science and Research, Royal College of Paediatrics and Child Health.

She is a member of the KCL Research Division of Asthma, Allergy and Lung Biology and the Medical Research Council Asthma UK Centre in Allergic Mechanisms of Asthma. Her research interests focus on the early origins of chronic respiratory disease and include factors affecting antenatal lung growth, optimisation of respiratory support, determinants of sudden infant death syndrome and prevention and treatment of chronic lung disease, particularly related to viral infections and sickle cell disease.

ANNE GREENOUGH

JONATHAN GRIGG

Professor Jonathan Grigg is the Professor of Pediatric Respiratory and Environmental Medicine at Barts and the London School of Medicine and Dentistry, Queen Mary University of London.

He was appointed as a Senior Lecturer in Paediatric Respiratory Medicine at the University of Leicester, and then moved to London in 2006.

Professor Grigg's current research interests include: the effects of air pollution on children's health, treatment of preschool wheeze and the management of difficult asthma in school age children.

Dr Gupta is a Consultant in Paediatric Respiratory Medicine at King's College Hospital and Honorary Senior Lecturer at King's College, London.

He trained in respiratory paediatrics at Newcastle, the Royal Brompton and Great Ormond Street. After his clinical training, he spent two years in full time research on vitamin D and Severe Asthma in children for his MD(Res) thesis at Imperial College, Royal Brompton and King's College.

He is lead for poorly controlled asthma. He has over 50 scientific publications, as well as national and international presentations in areas including asthma, cystic fibrosis, cough and sleep medicine.

He is a lead investigator in a number of ongoing research projects. Dr Gupta also acts as reviewer for a number of national and international journals and has delivered lectures at major international congresses.

ATUL GUPTA

SEBASTIAN L JOHNSTON

Sebastian L Johnston is Professor of Respiratory Medicine & Allergy at the National Heart and Lung Institute, Imperial College London, and Honorary Consultant Physician in Respiratory Medicine & Allergy at St Mary's Hospital, Imperial Healthcare NHS Trust, London.

He is an NIHR Senior Investigator, he holds the only Asthma UK Clinical Professorship, and is Director of the MRC & Asthma UK Centre in Allergic Mechanisms of Asthma.

Notable discoveries that have emerged from his work include establishing the viral aetiology of asthma exacerbations (BMJ x4, Lancet), demonstrating that asthmatics are more susceptible to rhinovirus infection than normal individuals (Lancet, PNAS, Sci TM), discovering novel mechanisms of susceptibility to virus infection in asthma (JEM, Nature Med and PNAS) and describing a novel and effective treatment approach for acute exacerbations of asthma (NEJM).

Sir Bob is the Chair for King's College Hospital NHS Foundation Trust in London.

He has had a long and wide-ranging career across the public sector. After training as an accountant, he went on to become Chief Executive for a number of high profile organisations, including Sheffield Council, before being appointed as Permanent Secretary of the Department for Communities and Local Government in 2010, and subsequently Head of the Civil Service.

BOB KERSLAKE

WANDA KOZLOWSKA

Wanda Kozlowska qualified from Barts medical school and completed her paediatric respiratory training in North Thames.

Post CCST she was the paediatric CF fellow at GOSH.

She has been a locum consultant in Paediatric Respiratory Medicine at the Royal London, GOSH and King's College Hospitals and is about to take up a substantive post at Addenbrooke's Hospital in Cambridge.

She undertook a period of research at the Institute of Child Health looking at longitudinal lung function in preschool children with CF.

Sarah Latham is a Senior Paediatric Respiratory Nurse Specialist at King's College Hospital. She has run a nurse-led respiratory clinic for over twenty years where she sees children and young people with asthma as well as children who have been admitted with acute asthma/viral wheeze and is a nurse-prescriber.

She also sees children and young people at the Difficult Asthma Clinic, alongside a Consultant Respiratory Paediatrician.

Sarah is a trainer at Education for Health in Warwick and teaches on Paediatric Asthma. She was chair of the RCN Paediatric Respiratory Nurses Group, a role she had for three years and was also a member of the Executive Committee of the British Paediatric Respiratory Society. Sarah is lecturing on the new MSc in Advanced Paediatrics, run by King's College and has also lectured both nationally and internationally on paediatric asthma.

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SARAH LATHAM

SUSAN LEECH

Dr Leech has been a consultant paediatric allergist and clinical lead for the paediatric allergy service at Kings College Hospital, London since 2001.

She chaired the paediatric group of the BSACI from 2010 - 2015 and is a member of the Standards of Care Committee.

She was the allergy training advisor on the Allergy, Immunology and Infection CSAC from 2003 - 2010 and is currently the UK delegate to the European Training Committee for paediatric Allergology.

Chris O'Callaghan is Professor of Respiratory and Paediatric Medicine and Head of Respiratory, Critical Care and Anaesthesia at the Institute of Child Health, UCL & consultant at Great Ormond Street Children's Hospital.

His research on the ciliated epithelium in both common and rare respiratory disease led to the establishment of the national diagnostic service for primary ciliary dyskinesia (PCD). Current work on respiratory bacterial and viral co infection discovered a novel antiviral approach to RSV and influenza that has been patented. He has a long standing interest in therapeutic and more recently biological aerosols including RSV transmission and bacteriophage therapy.

He recently founded a not for profit social enterprise http://worldmedicaleducation.org to develop multimedia training for health workers, with a particular focus on those in resource poor countries.

CHRIS O'CALLAGHAN

JAMES PATON

James Paton is a Clinical Reader in Paediatric Respiratory Medicine at the University of Glasgow and an Honorary Consultant at the Royal Hospital for Sick Children in Glasgow.

He qualified in Glasgow and also trained in Edinburgh and Leicester. He spent 15 months as an MRC Travelling Fellow in Los Angeles in 1987.

He is currently one of 5 specialist paediatric respiratory consultants in the West of Scotland based at the Royal Hospital for Sick Children in Glasgow. He is the lead clinician for children with severe asthma. He is also the current clinical lead for the West of Scotland Complex Paediatric Respiratory Network.

His current research interests are in health services in paediatric asthma care and in physical activity in young children. He has a long-standing interest in clinical audit and guidelines. He initiated the annual paediatric asthma audit run by the BTS. He is currently co-chair of the BTS/SIGN Asthma Guideline group.

Professor John Price was appointed Consultant Paediatrician at King's College Hospital in 1978 where he founded the Paediatric Respiratory and Cystic Fibrosis Service.

During his career he was Professor of Paediatric Respiratory Medicine, King's College London, Head of the Academic Department of Child Health and Director of Children's Services in the Variety Children's Hospital.

He is now semi-retired but continues to teach Paediatric Respiratory Medicine at King's College.

He is a past Chairman of the British Paediatric Respiratory Society, Asthma UK, the Specialist Advisory Committee in Paediatric Respiratory Medicine of the RCPCH and the Cystic Fibrosis Newborn Screening Programme Advisory Board. He has been Paediatric Editor of Respiratory Medicine, a member of the Editorial Board of the European Respiratory Journal, a member of the Council of the European Respiratory Society and the British Thoracic Society and a Trustee of the British Lung Foundation. He is currently a Vice President of Asthma UK and a Trustee at the Cystic Fibrosis Trust and Demelza Hospice Care for Children.

JOHN PRICE

MEREDITH ROBERTSON

Meredith is a Darzi Fellow in Paediatric Asthma at King's College Hospital. Her work focuses on increasing integration between asthma services in Primary, Secondary and Tertiary Care in order to improve outcomes for children in South London, including avoiding acute exacerbations and attendances to the Emergency Department.

She has a Philosophy degree from King's College, London and graduated from The University of Glasgow Medical School in 2003.

Her post-graduate training in General Paediatrics with a Special Interest in Paediatric Respiratory Medicine was primarily in the East of England.

She was the first UK Paediatrician to be awarded the HERMES diploma by the European Respiratory Society.

In her spare time she is learning to speak Swedish and is an amateur silversmith.

Having trained in Cambridge and London, Dr Ross Russell started work at Addenbrooke's Hospital as a consultant in 1992. He established the paediatric intensive care unit (PICU) and from 1995 he has also run the respiratory service, developing a regional Cystic Fibrosis network as well as other specialist respiratory clinics. Most recently he has set up a regional sleep service.

At national and International level Dr Ross Russell is an executive committee member of the British Paediatric Respiratory Society and of the Paediatric Section of the European Respiratory Society. He is also ERS representative to the European Academy of Paediatrics.

Dr Ross Russell has published around 70 peer-reviewed articles, including several book chapters and editorials. Current research interests include the non-invasive assessment of respiratory function, ethical aspects of care and outcome measurement.

ROB ROSS RUSSELL

GARY RUIZ

Dr Ruiz is a Consultant Respiratory Paediatrician and Head of Paediatric Respiratory at King's College Hospital, London.

Dr Ruiz qualified from King's College Hospital Medical School in 1982 and followed a career in paediatrics. He received specialist training in paediatric respiratory medicine in London and Birmingham and was a research fellow working with Professor John Price in asthma and allergy.

He was appointed consultant in 1994 on returning to King's, where he created the paediatric TB clinic and paediatric bronchoscopy and empyema services. He became head of Paediatric Respiratory Medicine in 2010 on Professor Price's retirement.

Dr Ruiz has wide interests in all aspects of respiratory disease in children, but particularly lung infection, including tuberculosis and mycobacterial disease in cystic fibrosis.

He has been the BPRS representative on the BTS tuberculosis SAG since December 2012. He is also a member of the ERS and ECFS and was a Trustee of the BLF.

Professor Alan Smyth is Professor of Child Health at the University of Nottingham and Honorary Consultant in Paediatric Respiratory Medicine at Nottingham University Hospitals NHS Trust.

Prof Smyth is Joint Editor in Chief of Thorax and Co-ordinating Editor of the Cochrane Cystic Fibrosis & Genetic Disorders Group.

His major research interests are in novel ways of treating infection in cystic fibrosis and strategies to detect and minimise the adverse effects of treatment. He has also highlighted the problem of delayed publication of clinical trial results and the consequent bias in the evidence base.

When not working, he is a keen cyclist and pilot.

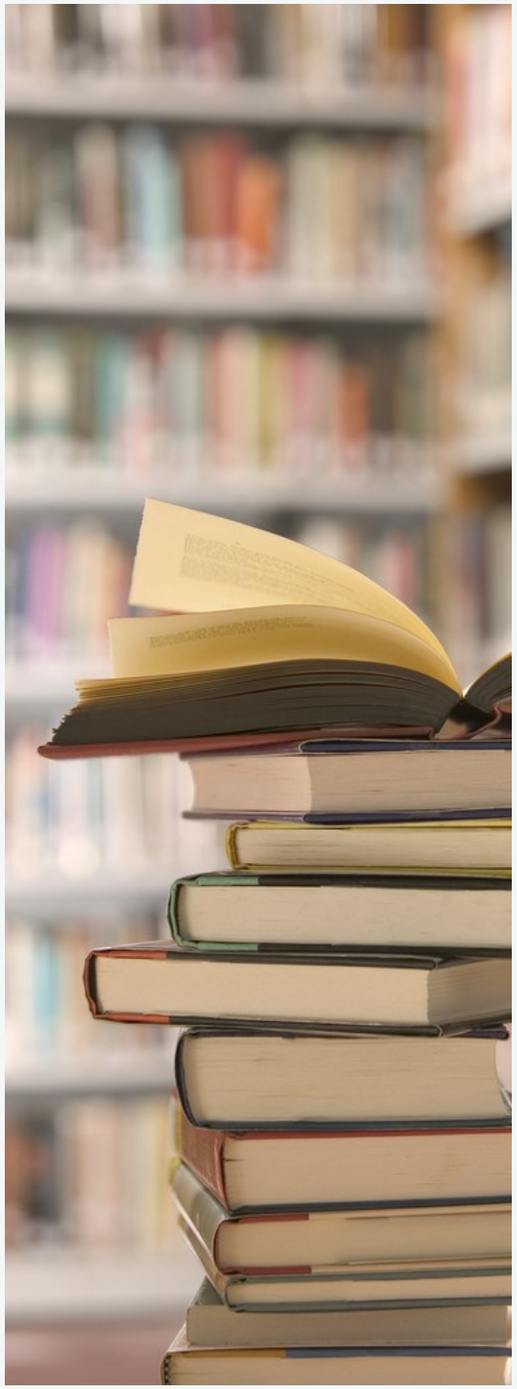
ALAN SMYTH

COLIN WALLIS

Colin Wallis is a consultant paediatrician in respiratory medicine at Great Ormond Street Hospital for Children NHS Trust. He received his undergraduate training at the University of Cape Town and after completing an MD degree joined the paediatric registrar rotation at the Red Cross Children's Hospital in Cape Town. After additional jobs in the UK, and further experience in Canada he joined the respiratory team at GOS in 1993.

Dr Wallis has a specific interest in the care and management of children with chronic lung disease in particular cystic fibrosis and the child with long term ventilatory needs. He is chairman of a UK working party looking at the needs of the chronically ventilated child and was awarded an NHS HTA grant to review the current status of paediatric long-term ventilation in the UK. He also established the "Aspiration Clinic" at GOSH – a decision of dubious wisdom.

Dr Wallis is an examiner for the Royal College of Paediatrics and Child Health and past president of the BPRS. He has published over 80 articles in peer review journals and is the author of several chapters in leading paediatric respiratory texts.



Poster Presentations and Prizes

Posters will be available for viewing from 0830 on the 15th of March until the end of the Conference.

The Ella Roberta Family Foundation Awards for the Best Poster Prize Presentation will take place at 1650 on the 15th of March, prior to the drinks reception.

First prize - £1000
Second prize - £250

The objectives of the Foundation are:

- Make hospital life easier for children suffering from difficult to treat asthma in South East London by providing facilities for treatment, education and recreation.
- Raise awareness and understanding among young people and the general public about severe asthma.
- Promote research into severe asthma in children.

We are working to:

Preserve the health among children suffering from severe asthma through the provision of facilities not normally provided by the statutory authorities, for treatment, education and recreation.

Advance the education of the general public, in particular, but not exclusively, young people in all areas relating to severe asthma.

Promote all research necessary to find the cause and prevent severe asthma in children.

Lecture Theatre

Main Hall

Refreshments

Toilets

F6	F5	F4	F3	F2	F1	E1
D1	D2	D3	D4	D5	D6	D7

C6	C5	C4	C3	C2	C1	B3
A1	A2	A3	A4	A5	B1	B2

Stairs

Categories

A **Asthma and Wheeze**
B **Cystic Fibrosis**
C **Respiratory Tract Infections**
D **Case Reports**
E **Other**
F **Sleep, Physiology and Technology**

Poster Display Guide

List of Abstracts

A: Asthma and Wheeze

A1 A National Survey on Asthma Education and Discharge Planning

Dr Haji M Sheeraz A Khan
Hull Royal Infirmary

Background: UK is one of the European countries with the highest Asthma prevalence rate and 10% of children get readmitted within a month. Randomised trials suggest that good discharge planning and education can substantially reduce the number of future asthma readmissions. According to Paediatric Asthma Audit Report 2012 and 2013, discharge planning remains the area for improvement.

Telephonic Survey Method: There were six simple questions about asthma Patient Information Leaflets (PIL), written discharge planning and the hospital practice.

Results: 36 responses were collected from different paediatric registrars working in DGHs and level three paediatric hospitals in the UK (Fig 1). Three of them were not aware of any asthma PIL (8.3%). Four of them denied if children get PIL upon discharge (11%) and seven of them were not sure (19.5%). Twelve of them were not aware if PIL says about asthma management at home post discharge (33%). Six did not think they give any written management plan (17%). Ten of them said there is no asthma nurse in their hospital (28%). Almost all the responses about the weaning of salbutamol inhaler after discharge from hospital were different. Only one mentioned about the personalised management plan.

Post discharge salbutamol weaning protocols differ widely: From 10 puffs 4 hourly on day one to wean gradually to 2 puffs 12 hourly on day seven. To 2 puffs 4 hourly for 2 days only.

Conclusion: We need more awareness about the discharge planning and "Personalized" action plan for children going home after an acute admission.

References:

Asthma UK Press release 13th March 2014

Paediatric Wheeze /Asthma Audit Report 2012 and 2013 British Thoracic Society Dr Paton

NICE guidelines 2013

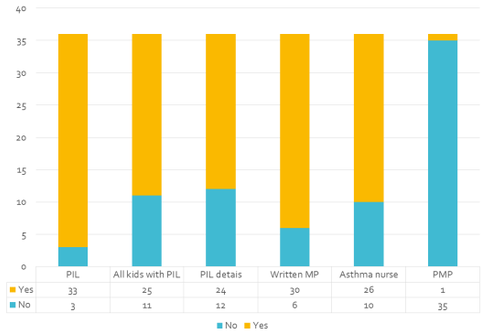


Fig 1
PIL: Patient Information Leaflet
MP: Management Plan
PMP : Personalized Management Plan

A2 The Use of Prednisolone in Viral Induced Wheeze

Dr Helen Toop, Dr Elizabeth Clyde
Lewisham Hospital

Aims: This project aimed to evaluate the use of oral prednisolone in cases of viral induced wheeze (VIW) presenting to our accident and emergency (A+E) department. We wanted to determine:

- the rate of use of prednisolone
- the factors that influenced clinician decision in prescribing prednisolone
- the dose of prednisolone given

Methods: This retrospective study gathered data from A+E notes of patients diagnosed with VIW between January and March 2015. Data gathered included patient demographics, personal and family histories, severity of presentation and outcome.

Results: A total of 157 patients were included. 49.8% of patients received prednisolone, with the highest rate of prescription being in the 2-3 year old population. The average dose was 1.5mg/kg (range 0.8-2.2mg/kg). Across all age ranges factors that increased the odds of being prescribed a course of prednisolone were previous episodes of VIW (OR 3.7, 95% CI 1.81-7.57, p=0.0003) and admission to hospital (OR 2.72, 95% CI 1.24-6.10, p=0.0131). Having a personal history of atopy also increased the odds across all age ranges (OR 2.67, 95% CI 1.29-5.51, p=0.0079) but was not a significant factor in the under 3 year old population.

Conclusion: Recent research has suggested that historically prednisolone has been overused in the treatment of preschool children with VIW. This audit has confirmed that in our A+E department prednisolone is overused, particularly in the 2-3 year olds and that a higher dose than recommended is often prescribed. As per recent guidelines, admission to hospital does appropriately increase the odds of being prescribed prednisolone. However, having had previous episodes also significantly increases the chance of being given prednisolone, although there is no evidence that this reduces readmission or duration of symptoms. Further education is needed to inform decision making in the management of VIW in light of recent evidence against the efficacy of prednisolone.

A3 Diagnosis and Management of Asthma for Children Under Five Years in Primary Care

Hannah Zhu[1], John Wright[2], Donna McShane[3], Robert Ross-Russell[3]
Evelina Children's Hospital, Guys and St Thomas' NHS Foundation Trust
Royston Health Centre General Practice
Cambridge University Hospitals NHS Foundation Trust

Purpose: The UK has among the highest prevalence rates of asthma symptoms in children worldwide and almost half the asthma deaths occurred in children with mild/ moderate asthma.[1] There is much uncertainty when diagnosing asthma in under 5's age group and some children may not be on appropriate therapy as a result.

To assess how an asthma diagnosis is made in general practice (GP) for under 5's

To assess whether we are following the BTS asthma guidelines in management

Methods: All children aged under 5 with a coded asthma diagnosis on July 1st 2014 at our GP were selected. Their electronic notes were reviewed for current age and age at diagnosis, symptoms at diagnosis and in the last year, number of attendances to their general practitioner, hospital admissions for asthma and asthma management in the last year. Their probability of asthma was scored based on their symptoms (1 for every symptom that increased probability of asthma, minus 1 for every symptom that decreased probability of asthma) according to the BTS guidelines.[2]

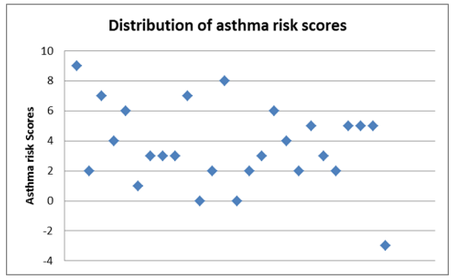
Results: There were 769 children aged under 5 at our GP and 26 (3.4%) had an asthma diagnosis. Their mean age at diagnosis was 2 years and 19 (73%) were male. The most common symptoms that increased probability of asthma were cough (n=24), recurrent symptoms (n=23) and response to asthma therapy (n=18), whereas only 7 children had triggers other than colds. The most common symptoms that decreased probability of asthma were symptoms occurring only with URTIs (n=18). Four children were found not to have asthma and they all had asthma probability scores of less than 2 (figure 1). Most asthmatic children in GP are on step 2 asthma therapy and about 50% are getting asthma plans, asthma reviews and flu vaccines. These children had a total of 31 GP attendances and 20 hospital admissions for asthma.

Conclusions: We need to be careful with asthma diagnosis codes. We recommend using symptoms to score probability of asthma and document this to aid clinical reasoning at diagnosis. There is much scope for improvement in providing asthma plans, reviews and flu vaccines.

References:

Anagnostou K, Harrison B, Iles R, Nasser S. Risk factors for childhood asthma deaths from the UK Eastern Region Confidential Enquiry 2001-2006. Prim Care Respir J. 2012 Mar;21(1):71-7.

British Guideline on the Management of Asthma. The British Thoracic Society and Scottish Intercollegiate Guidelines Network. Revised edition 2011.



Mean = 3.6
Median = 3

<2 = Low probability of asthma

2-4 = Intermediate probability of asthma

>4 = High probability of asthma

A4 A Quality Improvement Project to Improve Asthma Care for Children in Herefordshire by Working Across Traditional Professional Boundaries

JM Hartfield, JL Clarke.
Paediatric Department, Wye Valley NHS Trust, Hereford, UK.

Introduction: Well recognised national guidance exists for the management of acute and chronic asthma in children[1]. However the National Review into Asthma Deaths demonstrated there are still many occasions when these are not being followed and preventable asthma deaths in childhood still occur[2]. Following the death of a local teenager a review was undertaken to find ways to improve asthma care in Herefordshire through joined up working between primary and secondary care teams and also schools.

Methods: A raft of asthma tools were proposed for use across the county. Stakeholder involvement was obtained from the hospital paediatric team, emergency department team, the out of hours GP service, GPs, asthma practice nurses, school teachers, parents and children. The pathways were modified for use in the primary care and school settings following feedback. The Herefordshire Paediatric Asthma Strategy was launched in September 2013; every GP practice in the county attended the launch event and received the tools as electronic resources. Every school in the county received the school specific tools by post and nurseries via electronic newsletter.

Results: Feedback from the launch was overwhelmingly positive (95% will change their practice, 95% felt it was an 'interesting' and 'valuable' meeting). A postal questionnaire audit was undertaken in 2014/15 to evaluate the impact of the strategy one year after the launch. 58% of GP practices responded – 72% had seen the tools and found them useful. 27% of schools responded – over 50% had seen the tools and found them useful.

Conclusion: This project demonstrates that for children with a chronic condition it is possible to develop and share resources across primary and secondary care settings and schools.

References:

British Thoracic Society/Scottish Intercollegiate Guidelines Network (2014) *British guideline on the management of asthma- A national clinical guideline* Available at: https://www.brit-thoracic.org.uk/guidelines-and-quality-standards/asthma-guideline/

Royal College of Physicians (2014) *Why asthma still kills The National Review of Asthma Deaths (NRAD)* Available at: https://www.rcplondon.ac.uk/projects/outputs/why-asthma-still-kills

A5 A Cost Effective Primary School Asthma Education Program: pilot study from inner London schools

Everson, L[1]; Kearney, J[1]; Coppel, J[1]; Braithwaite, S[1]; Chodhari, R[2]
University College London, London, United Kingdom
The Royal Free NHS London Foundation Trust, London, United Kingdom

Introduction: There are on average 2 children with asthma in every classroom. It is thought that as many as 75% of deaths from asthma are preventable. Building on children's curiosity in the classroom about asthma is a possible method of increasing awareness of the condition and its treatment, with the overall aim of reducing hospital admissions and deaths

Methods:

- UCL medical students who were trained in asthma education visited 14 schools in inner city London.
- 1443 children between the ages of 7 and 13 took part
- The children completed a quiz before and after a 15 minute presentation on asthma. The presentation and the quiz questions addressed treatment, emergencies, triggers, misconceptions and basic physiology.
- The average total score (out of 13) and marks for each question were calculated and the pre and post presentation test results compared

Results:

- The average pre-presentation score was 37% and the average post presentation score was 83%
- The most poorly answered pre-presentation questions were those about asthma treatment and triggers
- Knowledge in all areas of the quiz was improved on average after the presentation. The greatest areas of improvement were how to deal with an asthma emergency and misconceptions about asthma.
- Participating medical students gave positive feedback.

Conclusion:

Medical student run education sessions provide a cost-effective and simple method of teaching school children about asthma

The improvement in quiz scores before and after the presentation demonstrates the efficacy of the programme

Expanding the education programme across the high prevalence asthma areas may help reduce hospital

B: Cystic Fibrosis

B1 Hearing Assessment in Patients with Cystic Fibrosis in the UK

Rania Abusamra, Atul Gupta
Paediatric respiratory department, Kings college university hospital, London, UK.

Background: Hearing loss is a major health and social problem that affects every day life. Patients with Cystic Fibrosis (CF) are at high risk of hearing loss as a result of receiving multiple courses of aminoglycoside antibiotics. In addition some CF patients also carry the mitochondrial mutation m.1555A>G which leads to severe and rapid onset hearing loss when exposed to aminoglycosides.

Aim: To evaluate the current practice of hearing assessment in patients with CF among the UK CF centers.

Results: 20/49 national CF centers took part in anonymous survey via monkey survey. 5/20 (25%) do not routinely assess if patients with CF have any hearing concern. 11/20 (55%) do not perform routine hearing test at annual review. 3/20 (15%) continue to use aminoglycosides for patients with hearing loss. 4/20 (20%) have no alternative antibiotics to aminoglycoside listed at local hospital CF guideline. 17/20 (85%) do not refer patients with CF for genetic analysis of aminoglycoside ototoxicity mutation m.1555A>G before starting aminoglycoside. 13/20 (65%) do not refer CF patients with sensorineural hearing loss for genetic analysis of aminoglycoside ototoxicity mutation m.1555A>G.

Summary: There is a variation in current practice regarding routine hearing screening of patients with CF including the ones who receive aminoglycosides. Hearing assessment in patients with CF guideline is needed to establish. To identify patients at risk of hearing loss is essential to early recognize, prevent and treat.

B2 Improved Lung Function in Pre-school Children with CF Over the Last Decade

Duncan, J A[1]; Raywood, E[1]; Lee, S[1]; Davies, G[1]; Wade, A[1]; Bush, A[2]; Stocks, J[1]; Aurora, P[1]
and on behalf of the London Cystic Fibrosis Collaboration (LCFC)
Institute of Child Health, London, United Kingdom
National Heart and Lung Institute, London, United Kingdom

Objective: The first LCFC study of infants with CF (born 1999-2002),diagnosed before newborn screening (NBS), showed clearly abnormal lung function by preschool years; with the Lung Clearance Index (LCI) from multiple breath washout (MBW) being abnormal in the majority of individuals1. The second LCFC cohort (born 2007-2011), diagnosed by NBS, demonstrated near normal lung function at 1 year2 and 2 years3. We now report results from preschool testing, hypothesising that by this age, children with CF have poorer lung function than controls. As a secondary analysis, we compared NBS preschool results with those from the first LCFC cohort.

Methods: Children with CF and healthy controls (HC) completed MBW in triplicate (primary outcome: LCI), plethysmography (outcome: specific total airway resistance, sRtot) and spirometry (outcome: FEV1). Results were converted to standard deviation scores (z-s) from reference data 4-6; abnormality defined as being >+/-1.96SD. T-tests and cross-plots were used to compare CF to HC for the current cohort, and children with CF from 1st and 2nd cohorts.

Results: Of 108 NBS children tested (73 CF; 44 HC), 95% completed MBW, 92% sRtot and 83% spirometry. The mean age (range) of children with CF was 4.7y (3.1; 6.0y) and HC 4.4y (3.1;6.0y). NBS children with CF had significantly poorer lung function than HC for all outcomes: with mean difference [95% CI, p-value], for CF-HC, for z-sLCI being 1.5 [1.0;2.0, p<0.0001]; z-ssRtot 0.8 [0.4;1.21, p=0.0001]; z-sFEV1 -0.5 [-0.9; -0.1, p= 0.009]. When compared by era, the 1st LCFC cohort had poorer lung function than the current cohort for all outcomes: with mean difference [95%CI,p- value], for 1st-2nd, for z-sLCI being 1.2 [0.5; 1.9, p=0.002]; z-s sRtot 1.4[0.9;1.9,p<0.0001]; z-sFEV1 -0.5 [-1.1; 0.0, p=0.07].

a) First LCFC cohort (non-NBS)

b) Second LCFC cohort (NBS)

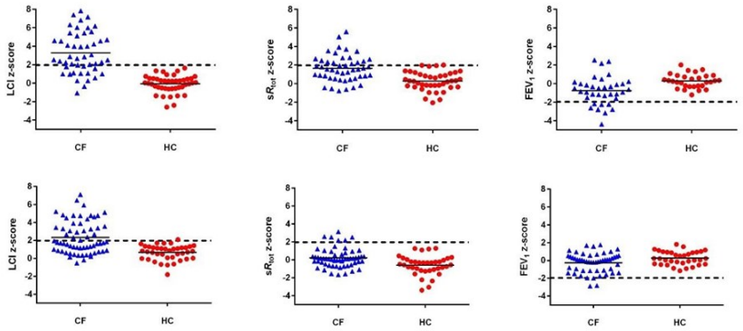


Figure 1: Comparison of lung function in the first (a) and second (b) LCFC cohorts

By cross-plot: 27/70 (39%) of NBS children with CF had abnormal LCI, only 6/68 (9%) had abnormal sRtot and 5/61(8%) abnormal FEV1. By contrast, in the 1st cohort the proportion of children with CF with abnormal results was 34/48 (71%), 17/48 (35%) and 8/36 (22%) for the three tests respectively.

Conclusion: By preschool years, children diagnosed by NBS have significantly abnormal lung function. LCI remains the most discriminative outcome. The degree of abnormality is less than seen at this age in the 1st LCFC cohort,confirming that power calculations for intervention studies must be based on recent data.

References: 1. Aurora P. et al, AJRCCM 2011;6:752-8, 2. Nguyen T, et al. Thorax 2013;69:910-7, 3. Brennan L, et al. Thorax 2013;68 (Suppl 3):A6-7, 4. Lum S, et al. ERJ 2013;6:1371-7, 5. Kirkby J, et al. ERJ 2010;3:622-9, 6. Quanjer P, et al. ERJ 2012;6:1324-43

B3 Difficulties in Optimizing Vitamin D levels in Paediatric Cystic Fibrosis Patients: A review of progress and future practice.

Dr Aarti Mistry, Robyn Huggins, Amanda Ward, Dr Jayesh Bhatt.
Nottingham University Hospital NHS trust.

Method: We retrospectively reviewed our paediatric CF cohort over 2011-2014 at the point of their annual assessment. We looked at their vitamin D levels; compared the preparations they took, and highlighted where key interventions took place over the period assessed. We reviewed whether the standards were met in relation to appropriate Vitamin D dosing and our attainment of optimal levels as recommended by the CF Bone mineralisation trust.

2011-2014 results				
	2011 n=73	2012 n=80	2013 n=70	2014 n=83
Vitamin D Prep appropriate daily dose	55% (40/73)	57.5% (46/80)	67.1 % (47/70)	82% (68/83)
% Meeting Vitamin D level (75-150nmol/l)	17.7%	6.25%	10.6%	23%
Improvement from previous years		15%	67.7%	49%

Results: 2011 data showed that patients were not receiving the appropriate preparations and the dose required for their age. Alongside this compliance; palatability of the preparations and severity of CF disease were suggestive contributing factors. In 2012 we instigated use of cholecalciferol, this led to improvements in meeting standards in preceding years, and compliance to medication. 2013 into 2014 we adopted the use of higher dose cholecalciferol maintenance therapy, as explored by Shephard et al (2012), with Stoss therapy. Ongoing progress has led us to have a proactive attitude in treating Vitamin D levels and the development of our new guidance for 2015.

Conclusion: We understand that achieving levels is affected by multiple factors, however with use of high dose maintenance therapy, and providing appropriate doses of vitamin D, has allowed us to overcome some aspects of our initial difficulties. The significance of achieving optimal vitamin D levels and its relationship to future outcomes in bone health, and severity of CF disease would require a large prospective study.

C: Respiratory Tract Infections

C1 Impact of introducing Humidified High Flow Nasal Cannula (HHFNC) to a Paediatric Department at a District General Hospital.

D Wasala, M Tariq
Walsall Manor Hospital, West Midlands

Background: Bronchiolitis is one of the most common lower respiratory tract infections in infants younger than 2 years of age. Humidified High Flow Nasal Cannula (HHFNC) has been used nationwide to manage bronchiolitis in the NHS. It was introduced to our district general hospital (DGH) in mid-2014.

Aims: To explore the impact of introducing HHFNC on the management of bronchiolitis in a DGH in reducing transfer to PICU and length of stay.

Methods: A retrospective comparison was made of patients with bronchiolitis aged 0-18 months in September 2013 to March 2014 (pre-HHNFC group) and September 2014 to March 2015 (post-HHNFC group). We used electronic records to look at the number of patients requiring higher ventilation support (i.e headbox oxygen/low flow oxygen) and compared the rate of transfer to HDU/ICU and length of stay in hospital.

Results: Out of 229 patients with bronchiolitis in the pre-HHHNFC year group, 7 patients needed higher ventilation support (i.e HHNFC/CPAP). Out of 228 patients with bronchiolitis in the post-HHHNFC year group, 18 patients needed higher ventilation support. In post-HNFC group, only 2 out of 18 (11%) of patients needed transfer to PICU; the rest were managed on the ward using HHHNFCO. Interestingly, in the pre-HHNFC group, 6 out of 7 (85%) of patients requiring higher ventilation support were transferred to PICU. The mean length of stay was 7 and 6 days in pre and post-HNFC groups respectively.

Conclusion: There is a clear difference in the rate of invasive ventilation and PICU transfer between pre and post-HHNFC groups. We can conclude that HHNFC has made a positive impact on the DGH transfer rates. However, there was no significant difference in length of stay in hospital between the two groups.

C2 Clinico-aetiological Profile of Empyema Thoracis in Children

Dr Sanjiv Nanda
Department of Pediatrics, Postgraduate Institute of Medical Sciences, Rohtak, India

Methods: It was a prospective observational study carried out in 25 children admitted with pleural empyema (post-pulmonic). Their **clinical spectrum, bacteriological flora, antibiotic sensitivity pattern, radiological findings, time taken for response to conservative management course, duration of intercostal drainage and complications were analyzed.**

Results: Majority of the cases were aged 1-5 years (44%) , malnourished 20 (80%), from rural areas (88%) and low socio economic status. The presenting symptoms were fever (96%), cough (88%), chest pain (56%), tachypnoea (40%), rashes (4%), and refusal to feeds (8%). Associated and predisposing infections, present in 7 (28%) cases, were pyoderma (16%), measles (6%) and ear discharge (6%). Twenty one patients(84%) had taken prior various antibiotics ,3 (12%) had pleural tapping and 2 patients (8%) had intercostal drainage done outside. The radiological findings were complete opaque hemithorax 14(56%) , hydropneumothorax 7 (28%), thickened pleura 5(20%) and encysted pyothorax in 4(16%)patients. Eleven patients showed loculated collection out of which 8 patients had septate loculated pyothorax and 3 patients had loculated pyothorax of non-septate nature. Infective organisms isolated in 10 (40%) cases were staphylococcus 4(16%), pseudomonas 3 (12%), E.coli and Klebsiella in1 patient (4%). Repeated thoracocentesis led to full expansion in only one case. Intercostals drainage (ICD) was done in 21 cases, of which 18 showed good lung expansion but 3 patients had to undergo decortication. Minimum duration of intercostal chest drainage was 7 days and maximum was 55 days. Maximum amount of pus drained was 2 litres and minimum was 300cc. The commonest complication of ICD was surgical emphysema in 4 (17.4%) patients.

Conclusions: The main contributory factors leading to the stage of chronicity and subsequent empyema included malnutrition, delay in seeking the therapy, inadequate and inappropriate treatment along with indiscriminate use of antibiotics prior to hospitalization.

C3 Management of Pseudomonas Aeruginosa Infection in Children with Long-term O_2, Long-term Ventilation or Tracheostomy

Hannah Zhu[1] Cara Bossley[2]
Evelina Children's Hospital, Guys and St Thomas' NHS Foundation Trust
King's College Hospitals NHS Foundation Trust

Introduction: Pseudomonas aeruginosa (P.aeruginosa) is associated with increased PICU admissions, worsening morbidity and mortality in our patient group. However, there are currently no

guidelines for management of P.aeruginosa in these patients.

Aim: To report on incidence and management practices of P. aeruginosa infection in children with long term O_2, long term ventilation or tracheostomy

Methods: All children with long term O_2 therapy, ventilation or tracheostomy and initial P. aeruginosa infection, at King's College Hospitals from January 2010 to August 2015 were included. P. aeruginosa infection was defined as the isolation of P. aeruginosa from a respiratory sample. Patients with cystic fibrosis and non-cystic fibrosis bronchiectasis were excluded. Cases were identified from hospitalisation records using diagnostic codes. The electronic medical records were reviewed for demographics, presenting illness, comorbidities and subsequent management.

Results: There were 64 children with long term O2 therapy (3/30, 10% grew P.aeruginosa), ventilation (8/27, 30% grew P.aeruginosa) and tracheostomy (6/7, 85% grew P.aeruginosa). All children who grew P.aeruginosa were inpatients and clinically unwell; 11 were male (65%) and the mean age when P.aeruginosa was initially isolated was 4.7 years (range 0-17 years). There was huge variability in sampling practices (range 0 to 5 samples per month), with more frequent sampling in tracheostomy patients. Treatment was initiated in 13 (76%) patients; 4 had ciprofloxacin only, 5 had colistin only, 2 had meropenem, 2 had both ciprofloxacin and colistin. Eradication was achieved in 50% of treated patients.

Conclusions: A significant proportion of patients on long term O_2 therapy, ventilation or tracheostomy grow P. aeruginosa with huge variation in frequency of sampling and treatment practices. There is need for further research and consensus for management of these patients.

C4 Non-invasive Ventilation for Bronchiolitis: Experience of One District General Hospital

Durga Sigdel, Nandinee Patel, Stephen Goldring
Hillingdon Hospital NHS Foundation Trust

Aim: To report the experience of using non-invasive-ventilation (NIV) for bronchiolitis in a district general hospital (DGH) setting.

Methodology: We undertook a retrospective review of infants less than 12 months admitted with bronchiolitis who required NIV during any part of their admission from November *2014* to February 2015. We evaluate pH, pCO_2, respiratory rate (RR), heart rate (HR) and oxygen saturations (O_2) at initiation and two hours after commencement of NIV. We also looked at total length of admission after NIV was commenced.

Results: 10 children received NIV during the season. Average age was 4.3 months (range from 0 to 12 months) and weight 5.7 kg (range from 2.15 to 9.88 kg). Three had underlying conditions (neuromuscular, chronic lung disease, immunodeficiency, prematurity). Nine were started on optiflow and one directly on CPAP, which was changed to optiflow later. One patient required intubation seven hours after NIV (five hours Optiflow and two hours CPAP) and was transferred to intensive care. Six patients had capillary or venous gases performed before and two hours after commencing NIV. Ph improved by 0.06 and pCO_2 by 0.791 kPa on average. In all ten patients, RR reduced by 2, HR reduced by 14.2 and O_2 saturation increased by 2.3% on average. Average duration of support was 83.5 hours ranging from 7 to 203 hours. Average time of discharge from starting support was 122.7 hours, and from stopping support 44.3 hours. There were no untoward events in all patients studied.

Conclusion: Use of NIV in our setting resulted in improvement in physiological and biochemical parameters of infants with bronchiolitis presenting with hypoxia, apnoea and increase work of breathing for the majority of patients, and there were no untoward events suggesting NIV is safe to be used in the DGH setting.

C5 **Reducing Repeat Admissions for Aspiration Pneumonia in Children with Severe Neurological Dysfunction Through Positioning Techniques – A Case Series Report**

A Kapur, H Perry, T Dewan, S Murthy
BC Children's Hospital, Vancouver, Canada

Aims & Objectives: Swallowing dysfunction and gastroesophageal reflux are recognised risk factors for aspiration pneumonia in the neurologically impaired population. Despite undergoing invasive procedures including inserting feeding tubes and fundoplication, many children continue to present to hospital with respiratory distress attributed to aspiration, some requiring multiple admissions each year. Our upper airway drainage [UAD] positioning protocol, used during sleep and symptomatically during the day, may effectively minimize respiratory exacerbation due to aspiration in children with poor secretion control. It involves the child sleeping in ¾-prone and adjusting feeding tubes to minimize gastric filling.

Methods: Three children had UAD initiated during their hospital stay, with families taught to continue the plan at home. All children had a gastronomy tube (G tube) to straight drainage with gastrojejunostomy (GJ) feeds. During follow up visits, all families reported using UAD positioning at home. A retrospective review of these three charts was conducted for a quality

improvement project.

Results: Results show a drastic reduction in chest imaging (CXR) and admissions. In the 12 months prior to initiation, there were 62 CXRs and 23 admissions, with 145 days in hospital. In the 12 months following, there were six CXRs and a single one-day admission for respiratory exacerbation.

Conclusions: Our results suggest that these minimally invasive measures may lead to reduced admission rates, lessening the burden of respiratory disease in certain neurologically impaired children. Further comparative studies of UAD positioning are needed to assess outcomes associated with this intervention and to clarify the target group.

C6 Blood Gas Analysis in Acute Bronchiolitis – Who and When?

Unger, SA[1,2]; Halliday, C[1]; Cunningham, S[1,2]
Department of Respiratory and Sleep Medicine, Royal Hospital for Sick Children, Sciennes Road, Edinburgh, EH9 1LF
Department of Child Life and Health, University of Edinburgh, 20 Sylvan Place, Edinburgh, EH9 1UW

Background: Utilisation of blood gas analysis (BGA) in acute bronchiolitis is common with wide variation between hospitals. Guidelines recommend its use only in those with severe respiratory distress and who are tiring but evidence for such practice is sparse. This study investigated indicators that demarcate clinically important rise in carbon dioxide (CO_2).

Methods: We undertook a prospective observational study of children admitted from the emergency department (ED) to a tertiary care university hospital with a diagnosis of bronchiolitis (October 2014 - January 2015). Data from hospital charts and electronic patient information was analysed using STATA/IC 12.1. Logistic regression models were used to examine the relationship between rise in CO_2 and possible clinical indicators.

Results: 220 patients with bronchiolitis were admitted (mean age of 0.57 years (95% CI:0.05,0.64)). 113 (51%) had at least one BGA. 14% (30/220) required intensive/high dependency care (ITU/HDU). In ED a CO_2>7kPA was associated with ITU/HDU admission (OR 3.75(95%CI:1.13,12.47), p=0.031); prematurity and young age also independently predicted ITU/HDU (IRR1.53(95%CI:1.21,1.93)), p<0.0001 and IRR0.68(95%CI:0.53,0.86), p=0.001 respectively). All but one patient with CO_2>7kPa in ED were < 3months and/or premature.

Length of stay (LOS) was also significantly longer in this patient group. For BGA taken during the admission, only oxygen requirement and age (particularly <3months) were significantly associated with CO_2 >7kPa (OR 2.46(95%CI:1.42,4.26), p=0.001 and OR 0.08(95%CI:0.03,0.17), p<0.001; respectively). There was no association between quantity of oxygen supplemented and level of CO_2. Overall, LOS was significantly higher in those who had BGA during admission (4.0 days (d) (95%CI 3.5,4.5) versus 2.3d (95%CI:2.0,2.6)).

Conclusion: Age under 3m, history of prematurity and CO_2 >7kPa done in ED identify those with prolonged LOS and/or HDU/ITU admission. Significantly raised CO_2 is not seen in bronchiolitis without oxygen requirement. Further work will look to elucidate when BGA may be helpful in the management of bronchiolitis.

D: Case Reports

D1 Neonatal Stridor and *S. aureus:* are they related?

Althaf Ansary, Deepa Varghese, Lesley Jackson
Neonatology, Royal Hospital for Children, Glasgow, G514TF

Staphylococcus aureus septicaemia in the neonate can be complicated by the development of pneumatoceles. Affected infants usually present systemically unwell with raised inflammatory markers and worsening respiratory failure. We report the clinical progress of an extremely premature infant born at 25 weeks gestation diagnosed with invasive Staphylococcus aureus septicaemia, previously stable on non invasive respiratory support, who developed acute onset stridor on day 14 of antibiotic treatment. Further evaluation demonstrated a large pneumatocele in the right lower lobe with associated deviation of the major airways. Compression of his trachea and right main bronchus by the Pneumatocele was felt to be the most likely explanation for the acute onset of stridor. Intubation and ventilation was required for respiratory support at this stage. Of note, whilst there had been an acute inflammatory marker rise at the onset of the septic episode, by the development of acute stridor this had normalised and clinically there were no acute respiratory concerns for this infant. This case highlights the need for vigilance in extremely preterm infants with Staphylococcus aureus septicaemia and an awareness that pulmonary complications may arise during the recovery phase of such septic episodes.

D2 An Interesting Case of Multiple Pulmonary Emboli Presenting with Right-sided Abdominal Pain in an Adolescent Male

Dr Prita Rughani, Dr Susanna Talarico
The Hospital for Sick Children, 555 University Avenue, Toronto, Canada, M5G 1X8

Case summary: A previously healthy 13-year-old male presented to the emergency department with a 2-week history of a non-productive cough and intermittent fevers. He complained of significant right-sided abdominal pain. A chest X-ray and ultrasound scan revealed evidence of bilateral consolidation associated with bilateral pleural effusions. He was commenced on intravenous antibiotic therapy. His symptoms of pain and tachypnoea subsequently worsened, and he had an isolated episode of haemoptysis. CT pulmonary angiography revealed multiple bilateral pulmonary emboli (PE). He was initiated on treatment with subcutaneous enoxaparin. Given the broad aetiology of PE, he underwent extensive investigation including a pro-thrombotic and autoimmune screen, ultrasound screening of his major vasculature, and magnetic resonance imaging of the abdomen and pelvis; all of which was unremarkable. Of note, his body mass index (BMI) was at the 89th percentile for his age. His triglyceride and HbA1C level were at the upper limits of normal on basic metabolic screening. He remains clinically well at follow-up.

Discussion: Pulmonary embolism (PE) is rarely encountered within paediatric practice. The reported incidence of PE is 0.9 per 100 000 children per year (1). There is a 10% mortality rate in children[1, 2], highlighting the potential consequences of delayed recognition. One large retrospective study involving paediatric patients diagnosed with PE, reported that the key risk factors included obesity (BMI $\geq$ 25), oral contraceptive use, and a history of previous thrombus without PE[1]. The most common symptoms were chest pain (52%), shortness of breath (44%), and cough (32%); haemoptysis was uncommon (4%). The cardinal signs were tachycardia (58%), tachypnoea (75%), and hypoxia (17%)[1]. This case highlights the importance for general paediatricians to recognise this seemingly rare condition, as a differential diagnosis when encountering children presenting with symptoms which are not in keeping with the expected clinical course for more common conditions, such as pneumonia.

References:

Agha BS, Sturm JJ, Simon HK, Hirsh DA. Pulmonary embolism in the Pediatric Emergency Department. Pediatrics 2013; 132 (4).

Dijk FN, Curtin J, Lord D, Fitzgerald DA. Pulmonary embolism in children. Paediatric Respiratory Review 2012; 13 (2): 112-22

D3 Pneumothorax as a Rare Complication in Bronchiolitis

Dr SY Chau, Paediatric ST1, Dr S Ali, Dr S Mukhopadhyay
Lincoln County Hospital

Introduction: Bronchiolitis is a common viral illness amongst infants. The spectrum of bronchiolitic illness varies from needing oxygen, support with feeding, antibiotics for secondary bacterial infections, or support with high flow, continuous positive airway pressure (CPAP) or mechanical ventilation when faced with respiratory failure. Pneumothoraces (air leaks), however, are rare occurrences in bronchiolitis.

Case Description: A 7-month-old returned to the Emergency Department, having been seen several days earlier on Christmas Eve with a three day history of cough and coryza. He was discharged home with a diagnosis of bronchiolitis. Seven days into his illness he was maintaining his own airway but was now intermittently grunting with marked respiratory distress. Oxygen saturations were in the mid-80s in air but improved with 15L/minute oxygen via a non-rebreathe mask. Some response was observed following a trial of ipratropium nebuliser with improvement in the work of breathing and slight improvement of air entry. There was little further response with subsequent nebulisation. An initial gas did not show evidence of respiratory failure. Surprisingly, the CXR demonstrated a right sided pneumothorax with mediastinal shift.

Discussion: In 2008, a letter by Pirgon and colleagues described pneumothoraces in three of their patients with bronchiolitis during winter 2007. In the same correspondence, Pirgon and colleagues reported their literature review identifying seven other cases of pneumothoraces in bronchiolitis. Lipinski and Goodman reported a case of pneumothorax complicating bronchiolitis in 1980 in South Africa and postulated that ruptured apical blebs within an atelectic lung resulted in air leak into the pleural space and collapse of the lung. We present an overview of the literature relating to pneumothoraces as a complication of bronchiolitis with focus on pathophysiology and learning points from personal experience of the case described.

References:

Pirgon et al (2008) Letter to the Editor: Air Leaks in Children with Acute Bronchiolitis, Journal of Paediatrics and Child Health, 44 (2008)599-609

Lipinski JK, Goodman A (1980) Pneumothorax complicating bronchiolitis in an infant. Pediatr Radiol. Jul 9 (4):244-6.

D4 Asthma versus Laryngeal Dysfunction: A visual case presentation.

Dr. Thomas Slater, Dr. Frederick Speyer and Dr. Sebastian Gray
University Hospital Southampton NHS Foundation Trust

Asthma and laryngeal dysfunction have traditionally been difficult to isolate. Vocal cord dysfunction is seen as paradoxical movement of the vocal cord folds. Typically the cords adduct during the inspiratory phase of the respiratory cycle. It is not associated with an allergic response and bronchoconstriction, pathognomic of asthma. Unfortunately, the two often present concurrently creating a complex picture of brittle asthma.

We present the case of a 12 year old girl, who was admitted to University Hospital Southampton 23 times in the space of 18 months from August 2013 to February 2015. This young girl clinically showed a picture in keeping with laryngeal dysfunction, typically severe dysphonia without a typical precipitant with the ability to retain partial pressures of carbon dioxide greater than 14kPa in the hyperacute admission. This is in the context of an atopic history and a high background total immunoglobulin E level. With over 8 different maintenance therapies trialled, prolonged courses of steroids, complex physiotherapy input and attempts at psychological interventions, long term management was becoming increasingly troublesome.

This poster attempts to visually show this difficult situation, to interrogate and to analysis the diagnosis of laryngeal or vocal cord dysfunction, both from the perspective of the patient and that of the clinician.

D5 Holy Lungs

Selby L, Polychronakios T, Ross Russell RI.
Cambridge University Hospitals NHS Foundation Trust

We will present the challenging case of a four year old boy with severe necrotising pneumonia.

A 4 year old boy presented to his local hospital with a two week history of worsening cough and fever. Chest x-ray revealed right sided pneumonia and complicating effusion. He was commenced on IV antibiotics and transferred for assessment at our tertiary centre. A chest drain was inserted and the empyema successfully drained. After 3 days, the drain was removed with resolution on chest x-ray. A small but stable pneumothorax remained 24 hours after drain removal, but he remained clinically well, afebrile and was discharged to continue intravenous antibiotics at his local hospital.

36 hours later he re-presented with back pain. Chest x-ray revealed a right sided tension pneumothorax which was drained and he was transferred back to our care. CT chest revealed a bronchopulmonary fistula and large area of air trapping, with several areas of necrotic lung. There was re-accumulation of empyema, and high spikes in temperature. A further chest drain was inserted for the empyema. After 10 days the first drain was removed, and the second drain removed after 48 hours after that. Chest x-rays after drain removal appeared stable, however over the next few days the pneumothorax enlarged and he developed pneumatoceles, and CT revealed persistent areas of necrotic lung. He was taken for thoracotomy, insertion of tunnelled drain and removal of necrotic areas of lung and made a good recovery.

This presentation will detail the clinical course, imaging and a discussion regarding the pros, cons and difficulties involved in deciding upon the optimal time frame for surgical intervention with such children.

D6 Fair COP

Selby L, Polychronakios T, Ross Russell RI.
Cambridge University Hospitals NHS Foundation Trust

We present the unusual case of cryptogenic organising pneumonia secondary to coeliac disease in a teenage girl, highlighting the clinical course from presentation to diagnosis and the dilemmas associated with transition of her care and referral for lung transplantation.

A 14 year old girl of Pakistani origin presented to her local hospital with 3 weeks of cough, weight loss and intermittent fevers. She had radiological signs of bilateral pneumonia and severe anaemia. Blood tests revealed high levels of tissue transglutaminase consistent with coeliac disease (confirmed on duodenal biopsy) and the anaemia responded to transfusions. No signs of malignancy were detected and investigations for tuberculosis were negative. Despite treatment with intravenous antibiotics her chest x-ray changes and cough did not resolve. Lung function revealed restrictive spirometry (FEV1/FVC 41%). Further investigations including open and transbronchial lung biopsy were undertaken, transbronchial showing a mild to moderate mix of inflammatory infiltrate of sub epithelial stroma and mild baseline membrane thickening and open biopsy showing non- specific fibrosis, pneumocyte hyperplasia, minor interstitial lymphocytic infiltrate, focal collections of intra alveolar macrophages and oedema. After reviews at Cambridge and Great Ormond Street and discussion with multiple

pathologists and clinicians it was concluded that clinically, radiologically and histologically she had a rare pulmonary complication of coeliac disease – cryptogenic organising pneumonia.

As she reached her sixteenth birthday and time for transition she was referred to adult services and the young people's community team. She is currently undergoing consideration for lung transplant, however recurrence of disease in transplanted lungs will need to be carefully considered, along with the additional burden of anti-rejection drugs and existing pulmonary comorbidity.

To date we have found only one other case report within the paediatric population of such a complication of coeliac disease, making this clinical course and process of investigation interesting for respiratory paediatricians.

D7 Can One Lung Be Better Than Two?

Zheyi Liew[1], Santosh Mallikarjuna[1], Asif Hasan[2], F Kate Gould[4], Su Bunn[3], Matthew F Thomas[1], Jim L Lordan[4], Christopher O'Brien[1] and Malcolm Brodlie[1, 5]

Department of Paediatric Respiratory Medicine, Great North Children's Hospital, Newcastle upon Tyne, UK.
Department of Paediatric Cardiothoracic Surgery, Freeman Hospital, Newcastle upon Tyne, UK.
Department of Paediatric Gastroenterology, Great North Children's Hospital, Newcastle upon Tyne, UK.
Institute of Transplantation, Freeman Hospital, Newcastle upon Tyne, UK.
Institute of Cellular Medicine, Newcastle University, UK.

Background: Cystic fibrosis (CF) lung disease is generally a diffuse process however rarely one lung may become particularly damaged through chronic collapse and consolidation resulting in end-stage bronchiectasis with relative sparing of the contralateral lung. We report a successful outcome following pneumonectomy in a teenage boy referred to our centre for lung transplantation assessment.

Case history: A 14-year-old boy was referred with a forced expiratory volume in 1 second (FEV_1) of 35-40 percent predicted and severe problems with chronic collapse and consolidation of his entire right lung. This was causing significant morbidity including a continuous requirement for intravenous antibiotics over the preceding 12 months, limited exercise tolerance necessitating home tuition and overall poor quality of life. His left lung had only mild bronchiectasis on a recent high-resolution computed tomography scan.
After careful multidisciplinary assessment and discussion, although relatively high risk, it was felt that a right pneumonectomy could be a beneficial intervention to remove a chronic sump of infection and improve his current status as a strategy to delay the need for transplantation. The operation was uneventful, he was extubated within 24 hours. Amikacin, piperacillin/tazobactam and moxifloxacin were used to provide targeted antibiotic cover. His subsequent course was smooth with improvement in chest symptoms and successful withdrawal of intravenous antibiotics. He was discharged back to his home country 3 weeks later. Subsequently his FEV_1 has increased to 60% predicted, he has not required any intravenous antibiotics over the last 18 months and his quality of life has improved considerably.

Discussion: We believe that careful case selection and targeted antimicrobial therapy contributed to the successful outcome in this case. The risks and benefits must be considered in individual cases however; lung resection surgery has historically been associated with adverse outcomes and may make future transplantation more challenging surgically.

E: Other

E1 The Global Tracheostomy Collaborative (GTC) – Impact to Date

Hannah Zhu,[1] Sonia Yuen[2], Karen Watters[2], David Roberson[2]
Evelina Children's Hospital, Guys and St Thomas' NHS Foundation Trust
Boston Children's Hospital, USA

Objectives: The Global Tracheostomy Collaborative (GTC) is a quality improvement collaborative established in 2013 to improve tracheostomy care. Hospitals that become members of the GTC implement the GTC's five key drivers: 1. Coordinated Multidisciplinary Tracheostomy Care Team, 2. Interdisciplinary Staff Education, 3. Institution-Wide Interdisciplinary Tracheostomy Protocols, 4. Patient and Family-Centered Tracheostomy Care, and 5. Outcome-based Metrics and data collection. The aim of this study was to assess the impact and effectiveness the GTC has made in member hospitals to date.

Methods: Analysis of GTC member hospitals was performed. Qualitative interviews with standardized questionnaires were conducted either face-to-face or via email with care teams from GTC member hospitals.

Results: As of January 2016, 23 hospitals in the U.S.A., U.K., Qatar, and Australia have joined the GTC, with 16 additional hospitals in the process of joining. Tracheostomy "Champions" at member hospitals are multidisciplinary, for example ENT, anaesthesia, neonatology, respiratory, intensive care, physiotherapy, nursing, speech therapy and hospital management. Two launch events are planned for 2016 - one in April (Johns Hopkins, U.S.A.) and October (Milan, Italy). Data collection has been successful with 937 new tracheostomy cases entered in a secure REDCap database since June 2014. Member hospitals receive institution-specific data reports biannually, starting in December 2015. Qualitative interviews reveal that many sites have instituted new practices in response to joining, including establishing multidisciplinary tracheostomy teams, standardizing protocols and education, increasing reporting of tracheostomy adverse events, and increasing patient and family participation. Many sites value the webinars held with experts of various fields and the sharing of educational material on the GTC website.

Conclusions: The GTC has received a robust international response, reflecting the global need for improving tracheostomy care. Feedback from member hospitals has emphasized the value of the GTC's inter-disciplinary approach, patient-centered care and the development of a global learning community.

F: Sleep, Physiology and Technology

F1 Effect of Hydroxyurea on Nocturnal and Awake Oxygen Saturations in Children with Sickle Cell disease.

L van Geyzel[1], B Singh[2], M Akthar[1], G Ruiz[1], B Inusa[2], D Rees[1], A Gupta[1]
Kings's College Hospital, London UK
Evelina London Children's Hospital, London, UK

Introduction: Sickle cell disease (SCD) causes lifelong morbidity and reduced life expectancy. Resting hypoxaemia and intermittent nocturnal oxygen desaturation are often seen in children with SCD, which may contribute to morbidity associated with vaso-occlusive episodes. Treatment with hydroxyurea reduces the frequency and severity of vaso-occlusive episodes[1] but the impact of hydroxyurea on oxygen saturation and sleep apnoea is unknown.

Objective: To look for any difference in baseline oxygen saturation asleep and awake and the frequency of intermittent nocturnal desaturation after starting hydroxyurea in children with SCD.

Methods: A retrospective review of children who were commenced on hydroxyurea between March 2006 and July 2014 attending two UK sickle-respiratory clinics. Data was collected from overnight sleep studies and averaged pulse oximeter spot check recordings in clinic notes when awake from a) 6 months before starting hydroxyurea and b) up to 2 years after. Lung function and haemoglobin changes were also noted over the same time periods.

Results: Forty-six children (25 male) with a median age of 9 years (range 1.8 -18 years) were started on hydroxyurea. Haemoglobin and HbF rose significantly on hydroxyurea as expected (Table 1). After starting hydroxyurea the average overnight oxygen saturation increased from median of 93.5% to 95.2% (p = 0.01) and the median daytime spot oxygen saturation rose from 93.5% to 96.3% (p=0.001). There was no significant change in the median intermittent nocturnal 3% oxygen desaturation index (ODI), nocturnal PC02 or spirometry.

Table 1. Change in haematological and respiratory indices with hydroxyurea.

	Before Hydroxyurea Median (Interquartile range)	On Hydroxyurea Median (Interquartile range)	*P value
Hb (g/L)	76 (69.5–86.5)	83 (72.7-87.7)	0.04
HbF (%)	6.1 (3.7-12.9)	8.8 (6-16)	<0.001
Average overnight SpO_2 (%)	93.5 (88-97)	95.2 (93-98)	0.01
Nadir overnight SpO_2 (%)	84 (77.4-89)	87 (83-91)	0.009
3% ODI overnight (events/hour)	3.0 (1.5 – 5.2)	2.8 (1.1 – 4.6)	0.08
Mean overnight PCO_2 (kPa)	5.7 (4.7 -6.2)	5.5 (5.2 -6.0)	0.3
Spot daytime SpO_2 (%)	93.5 (91 -97)	96.3 (94 -98)	0.001
% FEV_1	70 (61.5–83.5)	73 (68-88)	0.6

*P values based on Wilcoxon matched-pairs signed rank test

Conclusion: In children with SCD, the use of hydroxyurea was associated with a significant increase in awake and nocturnal baseline oxygen saturations, but no change in intermittent nocturnal desaturation indices or lung function. This preliminary data suggests that improving oxygen saturation may be an important outcome of hydroxyurea therapy with potential benefits in reducing not only vaso-occlusive crises but also future respiratory morbidities. This hypothesis would need to be tested by a prospective multicentre trial.

Reference:

1. Charache S, Terrin ML, Moore RD, *et al.* Effect of hydroxyurea on the frequency of painful crises in sickle cell anaemia. *Investigators of the Multicenter Study of Hydroxyurea in Sickle Cell Anemia. N Engl J Med* 1995; 332: 1317-1322

F2 Pulse Oximetry is Unreliable in Measuring Haemoglobin Saturation in Ambulatory Paediatric Sickle Cell Patients

Sean Zheng, Gary Ruiz, Fiona Chan, David Rees, Atul Gupta

Department of Paediatric Respiratory Medicine, King's College Hospital, Denmark Hill, London

Aim: Accurate measurement of Hb saturation is essential in the care of children with sickle cell disease (SCD). The gold standard of Hb saturation measurement is by ABG with co-oximetry. Minute-by-minute changes are detected with pulse oximetry (SpO_2). SpO_2 shows good correlation to ABG co-oximetry in well patients with normal Hb. SCD patients represent a different population: previous small studies have shown discrepancies in calculated ABG and SpO_2 Hb saturations. SpO_2 may be falsely low due to high carboxyhaemoglobin and metahaemaglobin levels following heme catabolism, or high due to hyperbilirubinaemia. Both occur in acute and chronic haemolysis. With treatment decisions in acute and ambulatory settings driven by bedside SpO_2, inaccuracies can result in mismanagement. Earlobe blood gas (EBG) co-oximetry is an alternative better tolerated method of measuring Hb O_2 saturation in arterialised capillary blood (SaO_2), with good correlation to ABG measurements. We sought to investigate the correlation between SpO_2 and SaO_2 measured by EBG co-oximetry in ambulatory SCD children.

Methods: We retrospectively reviewed paediatric SCD patients attending a UK tertiary sickle-respiratory clinic from February 2012-August 2015, and who had simultaneous EBG and SpO_2 measurements. Differences were calculated, with positive values showing SpO_2 overestimating EBG.

Results: We identified 39 simultaneous paired SaO_2 and SpO_2 readings from 33 patients (52% male, median age 10years, range: 5-17). Mean difference between readings was -0.7% (Figure 1). In 23% of cases, difference was >±2%. SaO_2 was overestimated in one-third and underestimated in two-thirds. Of 17 hypoxaemic measurements (SpO_2<94%), only 76% had SaO_2<94% (means: SpO2 90.3%, SaO_2 92.1%; difference -1.8%; CI -3.3 to -0.4, p=0.02) (Table 1). In terms of determining hypoxia based on a cut-off of 94%, SpO_2 had sensitivity 85%, specificity 100%, PPV 100% and NPV 76%.

Conclusion: Pulse oximetry as a measure of Hb oxygen saturation was inaccurate in a significant proportion of ambulatory SCD children. SpO_2 tended to be lower than actual SaO_2 as measured with EBG, with SpO_2≥94% more likely to predict true result than SpO_2<94%. In patients with SpO_2<94%, there was a significant difference in calculated Hb saturation. EBG should be used more widely as an accurate means of detecting changes in arterial Hb oxygen saturation.

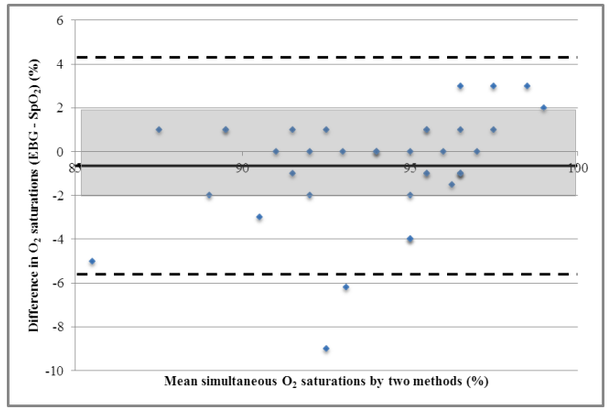


Figure 1: Bland-Altman plot showing mean simultaneous O_2 saturations by EBG and pulse oximetry and difference between results. Unbroken line indicates mean difference (-0.7%) and broken lines indicate limits of agreement (-5.6 to +4.3%) (*mean ± 2SD*). Shaded region represents a difference of ±2%, the accepted error range.

	Mean SpO2	Mean SaO2	Difference (CI)	P	*r*
All measurements	93.7%	94.3%	-0.7% (-1.4 to 0.1)	0.10	0.75
SpO2 <94% (n=17)	90.3%	92.1%	-1.8% (-3.3 to -0.4)	0.02 *	0.48
SpO2≥94% (n=22)	96.3%	96.0%	+0.3% (-0.4 to +0.9)	0.44	0.58

Table 1: Mean values by total, and presence or absence of hypoxaemia as measured by SpO_2. Paired two-tailed T-test used to calculate P-values. Pearson correlation co-efficient used to calculate *r*.

F3 Normal Pulse Oximetry Values in Infants Under the Age of 4 Months using Masimo Technology

Cheung CK, Karuntilleke A. Liddle N, Davies M, Evans HJ
University Hospital Southampton NHS Foundation Trust

Background: Nocturnal pulse oximetry (NPO) is used to investigate infants for sleep disordered breathing (SDB). Reference ranges are based on data from older children[1]. Infants spend proportionately more time in REM sleep, when SDB occurs, and are more prone to central apnoeas than older children. Hence normal values in older children may not be applicable to infants.

Aim: To use NPO to collect data on saturation indices in healthy infants.

Methods: Healthy infants were recruited from postnatal wards. During the first month of life (study 1), oxygen saturations and heart rate were monitored at home using NPO (Masimo Rad-8, USA). This was repeated at 3-4 months (study 2). Sleep times were recorded. Visilab software (Stowood Scientific, UK) analysed data. Artefact and wake periods were removed. Mean (SD) for saturations (SAT50), desaturation index >4% from baseline per hour (DI4), delta index 12s (DI12s) and median (range) for minimum SpO2 (SATmin) were calculated.

Results: 23 infants were recruited (13 boys). To date 4 babies have completed Study 2. Results are shown below.

	SAT50 (%)	DI4	DI12s	SATmin (%)
Study 1	95.90 (2.28)	19.69 (16.35)	0.97 (0.28)	80 (64-89)
Study 2	94.88 (2.92)	5.64 (4.00)	0.66 (0.30)	88 (67-89)

Conclusion: Neonates have similar mean saturations but higher desaturation indices than older children, where a DI4 over 4 is considered abnormal. This is likely due to increased REM sleep and central apnoeas in young infants. Preliminary results suggest that these values become similar to older children by 3-4 months of age.

References:

Urschitz MS. Reference Values for Nocturnal Home Pulse Oximetry During Sleep in Primary School Children. *Chest* 2003;123(1): 96-101. doi:10.1378/chest.123.1.96

F4 Parental Video Evidence - an instrument to diagnose obstructive sleep apnoea

Frampton S, Gahleitner F, Fraser L, Ismail Koch H, Burgess A, Evans HJ
University Hospital Southampton NHS Foundation Trust

Objectives: 10-15% children snore regularly but only those experiencing true apnoeas are at risk of serious complications. Adenotonsillectomy is an effective treatment for obstructive sleep apnoea (OSA) in appropriately selected children but its use in simple snorers may unnecessarily expose children to postoperative complications for a condition that is often self-limiting as they grow. Many parents can identify apnoeas in their children but a significant number cannot provide a clear history. Although national guidelines recommend formal respiratory investigations for such children, simple overnight pulse oximetry has comparatively low sensitivity as a confirmatory test so a negative study cannot be relied upon. The use of formal polygraphy has cost implications and may cause treatment delays.

Method: For otherwise healthy children with an unclear history for OSA, we asked parents to provide short video clips of potential apnoea episodes to help secure a diagnosis and reduce the requirement for further investigations. Post-operative improvements in T14 scores were assessed.

Results: In 23 patients, the provision of a parental video clip secured the otherwise unclear diagnosis of OSA and obviated the requirement for further investigation. Comparison of pre and post-operative T14 scores showed improvement in total and obstructive symptoms indicating that the procedures were successful.

Conclusions: In selected, otherwise healthy patients, the use of video evidence recorded on smart phones can provide a useful adjunct to parental history, especially in cases where the primary care giver is absent from the consultation. In our centre we have adapted the application of the national guidelines so that a parental video is undertaken in unclear cases before commitment to respiratory investigations. This has been shown to be effective.

F5 Home Optiflow: An alternative to CPAP for children with airway malacia?

Emily Downing
King's College Hospital, London

Introduction: With increasing pressure on hospital beds, more and more ways of managing children in the community are being sought[1]. In the winter months in particular, a large proportion of paediatric hospital admissions is attributed to respiratory viruses[2]. Often children with pre-existing Respiratory conditions bounce in and out of hospital as they have less reserve to cope with illnesses. This is not only detrimental to the child's health and development, but also has a huge impact on their family life.

Airway malacia is not uncommon in children[3]. If untreated, malacia can have a massive impact on the child's life, causing desaturation, apnoea and chronic increased work of breathing, leading to failure to thrive and developmental delay. Malacia can be exacerbated by respiratory infections, leading these children to often require hospitalisation for an increase in respiratory support. Many children with airway malacia are treated with nocturnal CPAP at home to keep the airway patent and in turn reduce effort of breathing while the muscles are more relaxed during the different stages of the sleep cycle. Although CPAP is a useful treatment for malacia, CPAP can be difficult to initiate and compliance at home can be poor, particularly for young children. In this age group with children whom typically require lower levels of CPAP, if CPAP fails, is there any other non-invasive alternative?

Home Optiflow: Optiflow or Humidified High Flow Nasal Cannula (HHFNC) provides high flows of air with optimal humidity via soft silicone nasal cannula. Optiflow aims to meet and exceed the patient's peak inspiratory demand and in doing so generates a small amount of Positive End Expiratory Pressure (PEEP), decreasing work of breathing. For such young children, whom do not tend to require a high PEEP to maintain a patent airway during sleep is Optiflow enough? A clinical example of nocturnal home optiflow in use for a two year old with airway malacia is discussed. Home Optiflow appears to have had a positive impact on this child and his family's life with them noticing a decrease in hospital admissions since commencing Optiflow. Managing respiratory infections at home has slightly improved quality of life for the family and the child's developmental delay has improved.

Implications for Practice: From this clinical example it appears that Optiflow could be considered to treat airway malacia when CPAP is not tolerated. Despite high PEEP's not being achieved, in this example, nocturnal Home Optiflow was shown to improve gas exchange, improve quality of life and reduce hospital admissions for this patient. However, this only provides one example of Home Optiflow that positively supports the child with Airway malacia in the community. In order for this to be a more widely considered alternative to CPAP in the treatment of Airway malacia it is necessary for more robust, formal research to be undertaken.

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F6 "It's Only a Failure if You Don't Learn Something" – a review of paediatric tracheostomy decannulation.

Crocker C, Krygier S, McGinnity P. Evans HJ
University Hospital Southampton NHS Foundation Trust

Objectives: A retrospective review to investigate the failure rate of decannulation in paediatric patients with a tracheostomy and to think about the reasons affecting success or otherwise of decannulation.

Methods: A retrospective review of patients (6 months – 16 years) admitted via our tertiary level paediatric respiratory service for decannulation of tracheostomy. All patients followed a standard decannulation procedure. For the purposes of this review the children were placed into 3 groups categorised by indication for the tracheostomy:

1. Upper airway obstruction (UAO) (n = 4).
2. Reduced respiratory effort (neuromuscular disease and spinal injuries) (n =4).
3. Ventilator weaning (conditions with respiratory conditions with recognised ability to improve) (n = 5).

Results: Over a 30 month period there were 17 trials of decannulation in 13 patients, with a mean age of 53 months, 5 female, 8 male. Of 17 trials 13 had a formal evaluation in theatre of the upper and lower airway prior to decannulation. The remaining four had bronchoscopic evaluation of the lower airway only. Decannulation was successful in 8/17 trials:

Group 1 = 1/6.
Group 2 = 3/5.
Group 3 = 4/6.

Discussion: A literature review enabled comparison of our results against published data. This review demonstrated that patients with tracheostomy insertion for UAO have a higher decannulation failure rate than other groups. When planning decannulation we need to acknowledge success rate differences between groups, ensuring that families are fully informed about the potential for success or failure. When discussing decannulation we may need to be more cautious about the success of decannulation in children with UAO.