The Royal Australasian College of Physicians

Respiratory Medicine

Advanced Training Curriculum

Paediatrics & Child Health Division

TSANZ
The Thoracic Society of Australia & New Zealand Inc

The Royal Australasian College of Physicians

Physician Readiness for Expert Practice (PREP) Training Program

Paediatric Respiratory Medicine Advanced Training Curriculum

TO BE USED IN CONJUNCTION WITH:

Basic Training Curriculum – Paediatrics & Child Health

Professional Qualities Curriculum

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The process was managed by the Curriculum Development Unit within the College's Education Deanery, who designed the document, drafted content material, organised and facilitated writing workshops, developed resource materials, and formatted the final document.

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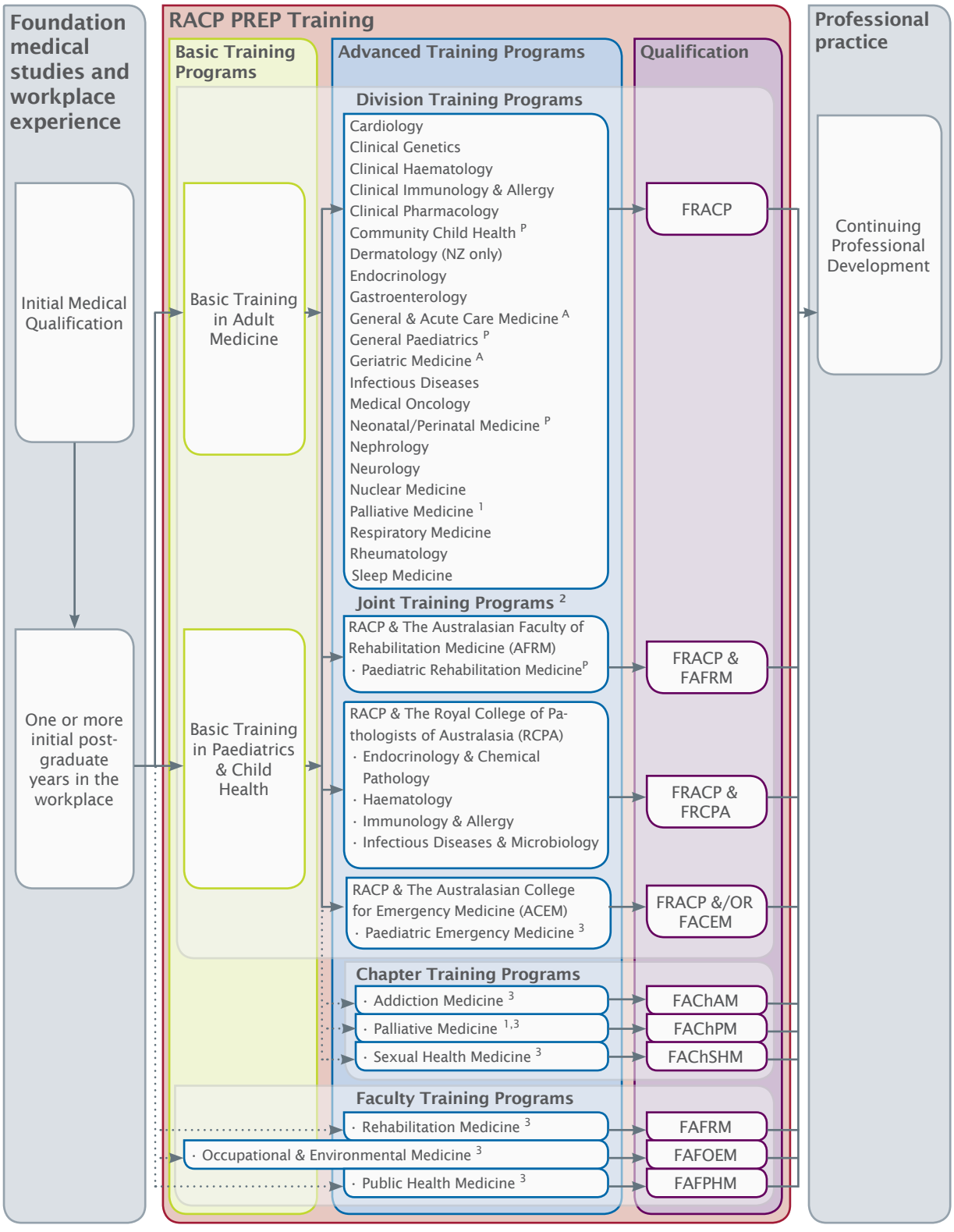
Please note: No Domains, Themes or Learning Objectives have been updated for this edition; design changes ONLY.

RACP FELLOWSHIP TRAINING PATHWAYS AND THE CONTINUUM OF LEARNING



P Trainees must complete Basic Training in Paediatrics & Child Health to enter this program.
A Trainees must complete Basic Training in Adult Medicine to enter this program.
1 Trainees who have entered Advanced Training in Palliative Medicine via a RACP Basic Training Program will be awarded FRACP upon completion and may subsequently be awarded FAChPM. Trainees who have NOT entered Advanced Training in Palliative Medicine via a RACP Basic Training Program will only be awarded FAChPM upon completion.
2 The Child & Adolescent Psychiatry Joint Training Program with the Royal Australian and New Zealand College of Psychiatrists (RANZCP) is currently under review by the RACP and RANZCP and closed to new entrants at present.
3 Alternative entry requirements exist for these training programs; please see the corresponding PREP Program Requirements Handbook for further information.

NB1: This diagram only depicts training programs that lead to Fellowship. Please see the RACP website for additional RACP training programs.
NB2: For further information on any of the above listed training programs, please see the corresponding PREP Program Requirements Handbook.

OVERVIEW OF THE SPECIALTY

Paediatric respiratory medicine encompasses diseases of the respiratory system, including the upper airway, the lungs, the chest wall and the ventilatory control system. It incorporates knowledge of lung development and developmental physiology, normal and disordered respiratory structure and function, clinical respiratory diseases and the specialised diagnostic techniques, tests and procedures employed in clinical assessment.

The importance of the specialty's role within both the medical profession and the broader community is recognised through the increasing need for respiratory services as a result of a growth in the incidence and prevalence of respiratory related diseases within our population and the recognition that early respiratory health may have life-long consequences.

Respiratory disorders include a wide range of pathology, giving ample opportunity for intellectual challenge, the satisfaction of improving the health of others, as well as further subspecialisation if desired.

Features of the specialty and its practice include:

- working in a diversity of environments (academic, public hospital, private, metropolitan, and regional) that draw on the specialist's full range of consultative and procedural skills
- drawing on a broad-based general medical knowledge as specific respiratory diseases are frequently associated with other system disorders
- an opportunity to specialise in an area or subspecialty of interest. This includes a wide spectrum of clinical practice (such as cystic fibrosis, physiology, sleep related disorders, respiratory infections, airway diseases and lung transplantation)
- an opportunity to engage in academic medicine, teaching and research in fields such as epidemiology, respiratory physiology, immunology, molecular biology and genetics
- management of a range of disorders which include both acute and chronic conditions with the potential to deal with challenging diagnostic problems, to establish long term therapeutic relationships with patients and their families, and to utilise a multidisciplinary, team based approach to patient management
- performance of interventional diagnostic procedures including flexible bronchoscopy and management of chest drains.

Evolving developments

Some of the currently identified emerging developments within this broad field include the:

- recognition that early influences on lung development may have life-long impact
- recognition that the pathology of chronic conditions such as asthma and cystic fibrosis begins during the first two years of life
- significant advances in medical technology particularly in relation to imaging techniques, and associated diagnostic procedures
- advances in management of pulmonary vascular disease
- research in the area of genetic screening and associated therapies
- advances in lung transplantation procedures
- development of noninvasive ventilation procedures for respiratory failure
- advances in relation to the diagnosis and management of sleep related disorders
- advances in the range and alternative delivery mechanisms for pharmaceuticals, particularly in relation to aerosol therapies
- advances in molecular biology, which promises novel therapies for the future.

Significance of respiratory disease to the community

Respiratory disorders have a high prevalence in the community and approximately 50 per cent of all acute paediatric illness affects the respiratory system. The majority of avoidable causes of hospital admissions in children are respiratory conditions. Some examples of the more common disorders are briefly illustrated below.

Asthma is a common chronic condition in children with its prevalence in Australia and New Zealand being some of the highest in the world. It is estimated that four million Australians have been diagnosed with asthma by a doctor or nurse at some time in their lives, equating to over 20 per cent of Australians reporting ever having been diagnosed with asthma. Asthma remains one of the targets of the Australian National Service Improvement Strategies and the next two decades are likely to see the introduction of new strategies that aim to modify the onset and progress of asthma during the first few years of life.

Respiratory infections have a huge diversity, both in their epidemiology and likely severity, and may involve the upper airway, the lower airway, and/or the lung itself.

Pneumonia is a major killer globally resulting in approximately two million deaths per annum in children under the age of five years. An additional 500,000 children die each year from tuberculosis.

Lower respiratory tract infections account for almost three million visits to general practitioners each year, and croup and bronchiolitis account for the majority of winter hospitalisations in children.

Respiratory infection is a common cause for exacerbations of asthma whilst chronic respiratory infection with intermittent exacerbations play a major role in the natural history of bronchiectasis and cystic fibrosis, the latter being the most common life limiting genetic disorder in western societies.

Viral infections such as influenza and severe acute respiratory syndrome (SARS) can cause epidemics and pandemics with enormous morbidity and mortality.

The lung is also affected by environmental diseases, pulmonary vascular diseases, diffuse interstitial lung diseases, iatrogenic diseases, pulmonary manifestations of systemic/extrapulmonary disorders, immunodeficiency disorders, sleep related disorders, genetic and developmental disorders, and a variety of orphan lung diseases that necessitate knowledge of a diverse range of physiological and biological principles in order to facilitate management. Importantly, respiratory conditions cause considerable morbidity in indigenous children and contribute to the lower life expectancy in these populations.

Summary

Respiratory medicine is a specialty which provides many attractions in the diversity of its conditions, both acute and chronic; the diagnostic and therapeutic challenges that these conditions provide; the opportunity for procedural work if so desired; the emergence of new diagnostic and therapeutic approaches; the opportunity for development of a subspecialty interest; the opportunity to work in a diversity of environments and its relevance and importance to the community at large. The Thoracic Society of Australia and New Zealand (TSANZ) is a growing and friendly society with a balanced mixture of physicians, respiratory scientists, basic scientists, nurses and allied health professionals. Paediatric respiratory medicine is very well represented by the Paediatric Respiratory Medical Group and a number of Special Interest Groups of the Society.

CURRICULUM OVERVIEW

Paediatric Respiratory Medicine – Advanced Training Curriculum

This curriculum outlines the broad concepts, related learning objectives and the associated theoretical knowledge, clinical skills, attitudes and behaviours required and commonly utilised by paediatric respiratory physicians within Australia and New Zealand.

The purpose of Advanced Training is for trainees to build on the cognitive and practical skills acquired during Basic Training. At the completion of the Paediatric Respiratory Medicine Advanced Training Program, trainees should be competent to provide at consultant level, unsupervised comprehensive medical care in paediatric respiratory medicine.

Attaining competency in all aspects of this curriculum is expected to take three years of training. It is expected that all teaching, learning and assessment associated with the Paediatric Respiratory Medicine Advanced Training Curriculum will be undertaken within the context of the paediatrician's everyday clinical practice and will accommodate discipline-specific contexts and practices as required. As such it will need to be implemented within the reality of current workplace and workforce issues and the needs of health service provision.

There may be learning objectives that overlap with or could easily relate to other domains; however, to avoid repetition, these have been assigned to only one area. In practice, however, it is anticipated that within the teaching/learning environment, the progression of each objective would be explored.

Note: The curricula should always be read in conjunction with the relevant College Training Handbook available on the College website.

The curriculum for Advanced Training in paediatric respiratory medicine is based on the essential roles and key competencies of specialist physicians defined by the CanMEDS 2005© project. The following is a summary of the medical expert role.

Medical Expert

The specialist must be able to:

- demonstrate diagnostic and therapeutic skills for ethical and effective patient care
- access and apply relevant information to clinical practice
- demonstrate effective consultation services with respect to patient care, education, and legal opinions.

To be a medical expert in paediatric respiratory medicine, the trainee should acquire:

1. Knowledge of normal and abnormal lung development, respiratory system structure and function

The respiratory system includes respiratory control centres, chemoreceptors, respiratory muscles, airways, lungs, pulmonary vasculature, and chest wall. Detailed knowledge is required of:

- Lung development and growth
- Normal anatomy
- Developmental physiology
- Normal physiology
- Development and aging
- Pharmacology

Some knowledge of the basic sciences (histopathology, molecular biology, immunology and defence mechanisms, genetics, microbiology, chemical pathology) is required to understand the pathogenesis of diseases of the respiratory system.

2. Knowledge and skills to assess people presenting with the following respiratory problems:

Symptoms:

- Tachypnoea
- Cough
- Stridor
- Wheeze
- Haemoptysis
- Apnoea and apparent life threatening events
- Sleep disordered breathing
- Dyspnoea
- Chest pain

Abnormal findings:

- Abnormal radiology
- Abnormal respiratory function

3. Knowledge of the indications, risks and interpretation of investigations of the respiratory system:

- Respiratory function tests
- Imaging
- Radiology including ultrasound
- Nuclear medicine
- Microbiology
- Immunology and allergy
- Pathology
- Polysomnography

4. Knowledge and skills to perform interventions in respiratory medicine; to know indications, benefits, harms, costs, and procedures:

- Oxygen therapy
- Assisted ventilation including noninvasive ventilation and continuous positive airway pressure
- Aerosol therapy
- Pleural procedures (e.g. pleural aspiration)
- Flexible bronchoscopy
- Smoking cessation
- Pulmonary rehabilitation
- Chest physiotherapy

5. Knowledge and skills to manage respiratory disorders

This requires knowledge of basic sciences to understand their pathogenesis, manifestations and complications. In addition, knowledge is required of current information on diagnosis, treatment, prognosis and cause. Diseases of the respiratory system involving:

- Ventilatory control
- Respiratory muscles
- Airways (upper and lower)
- Lung parenchyma
- Lung circulation
- Chest wall
- Respiratory neoplasms
- Respiratory infections
- The interstitium
- Cardiac disease

6. Knowledge and skills in respiratory research

Some knowledge of the processes of research, audit, statistics and evidence-based medicine, and the ability to review publications is required.

7. Knowledge and skills in specialties allied to respiratory medicine

Basic knowledge of allergy and immunology, intensive care medicine, cardiology and infectious diseases are required. These allied skills and areas of knowledge have been incorporated into themes one to five of the curriculum.

8. Knowledge and skills to manage respiratory sleep disorders

All trainees in respiratory medicine should have some basic knowledge and expertise in sleep related disorders and these curriculum requirements are integrated into themes one to five of the curriculum.

It is recognised that some respiratory trainees may wish to gain further expertise in sleep medicine. Those wishing to do so are advised to consult the **Paediatric Sleep Medicine Advanced Training Curriculum**, which is designed for those who wish to make this their area of subspecialty.

More training and experience in paediatric sleep medicine would particularly include Advanced Training in the following areas in addition to topics included in the Paediatric Respiratory Advanced Training Curriculum:

- Physiology of sleep and breathing in neonates and children, including detailed understanding of the effects of development on sleep architecture and physiology
- In-depth knowledge and understanding of polysomnography and other sleep-related investigations
- Expertise in the management of sleep disordered breathing in children
- Competence in the initiation and management of continuous positive airway pressure and noninvasive ventilation
- Understanding of the broader field of sleep medicine including sleep-wake transition disorders, circadian rhythm disorders, parasomnias and disorders of excessive daytime sleepiness

Professional Qualities Curriculum

The Professional Qualities Curriculum (PQC) outlines the range of concepts and specific learning objectives required by, and utilised by, all physicians, regardless of their specialty or area of expertise. It spans both the Basic and Advanced Training Programs and is also utilised as a key component of the Continuing Professional Development (CPD) program.

Together with the various Basic and Advanced Training Curricula, the PQC integrates and fully encompasses the diagnostic, clinical, and educative-based aspects of the physician's/paediatrician's daily practice.

Each of the concepts and objectives within the PQC will be taught, learnt and assessed within the context of everyday clinical practice. It is important, therefore, that they be aligned with, and fully integrated into, the learning objectives within this curriculum.

EXPECTED OUTCOMES AT THE COMPLETION OF TRAINING

Graduates from this training program will be equipped to function effectively within the current and emerging professional, medical and societal contexts. At the completion of the Advanced Training Program in Paediatric Respiratory Medicine, as defined by this curriculum, it is expected that a new Fellow will have developed the clinical skills and have acquired the theoretical knowledge for competent practice in paediatric respiratory medicine. It is expected that a new Fellow will be able to:

- investigate and manage children presenting with common respiratory symptoms and problems
- identify less common respiratory problems
- apply and interpret diagnostic investigations commonly used in the management of respiratory conditions
- describe the indications, benefits, risks and clinical processes of interventions used in the management of common respiratory conditions and acquire proficiency in performing these procedures
- diagnose and manage a range of respiratory conditions as detailed in the curriculum
- demonstrate a compassionate, caring attitude to children and their families and possess skills in communication, especially in regard to conveying bad news and in conflict resolution
- behave in a professional and ethical manner
- work with other health professionals and within a team where appropriate
- manage acute respiratory failure and paediatric medical emergencies (determined by completion of an appropriate course in advanced life support).

CURRICULUM THEMES AND LEARNING OBJECTIVES

Each of the curriculum documents has been developed using a common format, thereby ensuring a degree of consistency and approach across the spectrum of training.

Themes

The Themes identify and link more specific aspects of learning into logical or related groups.

Learning Objectives

The Learning Objectives outline the specific requirements of learning. They provide a focus for identifying and detailing the required knowledge, skills and attitudes. They also provide a context for specifying assessment standards and criteria as well as providing a context for identifying a range of teaching and learning strategies.

LEARNING OBJECTIVES TABLES

Theme 1	Structure and Function of the Respiratory System
Learning Objectives	
1.1	Identify and explain the normal and abnormal structure and function of the components of the respiratory system
1.2	Identify and explain normal lung development
1.3	Identify and explain developmental physiology
1.4	Identify and explain developmental immunology, immunology and host defence mechanisms
Theme 2	Presenting Problems
Learning Objectives	
2.1	Apply diagnostic procedures and develop a management plan for patients presenting with tachypnoea
2.2	Apply diagnostic procedures and develop a management plan for patients presenting with cough
2.3	Apply diagnostic procedures and develop a management plan for patients presenting with stridor
2.4	Apply diagnostic procedures and develop a management plan for patients presenting with wheeze
2.5	Apply diagnostic procedures and develop a management plan for patients presenting with haemoptysis
2.6	Apply diagnostic procedures and develop a management plan for patients presenting with apnoea in infancy or an apparent life threatening event (ALTE)

2.7	Apply diagnostic procedures and develop a management plan for patients presenting with concerns about breathing during sleep
2.8	Apply diagnostic procedures and develop a management plan for patients presenting with dyspnoea
2.9	Apply diagnostic procedures and develop a management plan for patients presenting with chest pain
Theme 3	Investigations
Learning Objectives	
3.1	Apply diagnostic procedures and interpret results of lung function tests
3.2	Describe the principles and indications for more complex tests of lung function, and interpret results
3.3	Describe the principles and indications for lung function tests in the infant and pre-school group, and interpret results
3.4	Describe the indications for polysomnography (PSG) and interpret results
3.5	Describe the indications for and risks of radiological tests, and interpret results
3.6	Describe the indications for and risks of miscellaneous investigations, and interpret results
3.7	Describe the indications for and risks of cilia studies, and interpret results
3.8	Explain the properties of investigations and interpret abnormal results in asymptomatic patients
Theme 4	Interventions and Prevention Measures
Learning Objectives	
4.1	Describe the indications and contraindications for paediatric flexible bronchoscopy and rigid bronchoscopy
4.2	Perform or supervise diagnostic bronchoscopy
4.3	Perform or supervise pleural procedures
4.4	Administer oxygen therapy
4.5	Apply ventilatory support interventions
4.6	Describe the indications, benefits, risks and clinical processes of airway management
4.7	Supervise the use of airway delivery systems
4.8	Explain the indications, benefits, risks and clinical processes of smoking cessation
4.9	Describe the indications, benefits, risks and clinical processes of chest physiotherapy and airway clearance techniques
4.10	Describe the indications, benefits and risks of long term venous access

Theme 5	Diseases
Learning Objectives	
5.1	Diagnose and manage conditions relating to congenital malformations
5.2	Diagnose and manage conditions relating to newborn respiratory disorders (excluding apnoea)
5.3	Diagnose and manage conditions relating to pulmonary infections (other than mycobacterial)
5.4	Diagnose and manage conditions relating to pulmonary disorders in the immunocompromised host (excluding HIV/AIDS)
5.5	Diagnose and manage conditions relating to HIV/AIDS and their pulmonary manifestations
5.6	Diagnose and manage conditions relating to mycobacterial infections
5.7	Diagnose and manage asthma and related conditions
5.8	Diagnose and manage behavioural aspects of respiratory disease
5.9	Diagnose and manage pulmonary conditions relating to hypereosinophilia
5.10	Diagnose and manage conditions relating to chronic suppurative lung disease (excluding cystic fibrosis, empyema and lung abscess)
5.11	Diagnose and manage cystic fibrosis and related conditions
5.12	Diagnose and manage conditions relating to pleuropulmonary manifestations of systemic disease and extrapulmonary disorders
5.13	Diagnose and manage conditions relating to diseases of the chest wall, spine and respiratory muscles
5.14	Diagnose and manage conditions relating to orphan lung diseases
5.15	Diagnose and manage conditions relating to interstitial lung disease of childhood (ChILD)
5.16	Diagnose and manage paediatric thoracic tumours
5.17	Diagnose and manage conditions relating to gastro-oesophageal reflux (GORD) and acute and chronic aspiration syndromes
5.18	Diagnose and manage conditions relating to environmental lung diseases
5.19	Diagnose and manage conditions relating to lung injury
5.20	Diagnose and manage pneumothorax
5.21	Diagnose and manage conditions relating to pulmonary complications on the intensive care unit
5.22	Diagnose and manage conditions relating to pulmonary haemorrhage syndromes and venous thrombo-embolic disease
5.23	Diagnose and manage respiratory conditions relating to disorders of the pulmonary circulation

5.24	Diagnose and manage respiratory complications of congenital heart disease
5.25	Diagnose and manage conditions relating to lung transplantation
5.26	Diagnose and manage common causes of sleep disordered breathing
Theme 6	Research
Learning Objectives	
6.1	Identify and apply methods used in research in paediatric respiratory medicine
6.2	Identify and apply methods used in clinical and/or basic research in respiratory medicine
6.3	Plan and execute a clinical or basic respiratory research project

THEME 1	LEVELS OF COMPETENCE
Level 1	Basic grasp of the concepts
Level 2	Knowledge sufficient to inform clinical practice
Level 3	Advanced knowledge sufficient for the education of others

Theme 1	Structure and Function of the Respiratory System	
Learning Objective 1.1	Identify and explain the normal and abnormal structure and function of the components of the respiratory system	Level 3

Knowledge of Normal Structure and Function	Components of the Respiratory System include:
• normal anatomy • normal physiology • normal pathology • pharmacology • cellular and molecular biology • genetics • biochemistry.	• respiratory muscles • chest wall • airways (upper & lower) • lungs • pulmonary vasculature • respiratory control centres • chemoreceptors.

Theme 1	Structure and Function of the Respiratory System	
Learning Objective 1.2	Identify and explain normal lung development	Level 3

Background Knowledge	Normal Lung Development includes:
• describe embryologic development • explain alveolisation, airspace septation and microvascular maturation • describe vasculogenesis • explain growth factors • describe ongoing developmental changes throughout childhood, including the effect of puberty and ageing.	• airways • alveoli, air space septation, microvascular maturation • respiratory muscles • chest wall • smooth muscle and receptors • pulmonary vasculature • type 2 cells, Clara and goblet cells.

Theme 1	Structure and Function of the Respiratory System	
Learning Objective 1.3	Identify and explain developmental physiology	Level 3

Background Knowledge	Developmental Physiology includes:

• explain developmental changes in chest wall compliance
• describe dysynaptic lung growth
• explain maturation of control of breathing
• describe developmental strategies, including:
  • Hering-Breuer inflation reflex
  • preferential nasal breathing
  • braking, grunting and lung protection strategies
  • airway closure and determination of end-expiratory level
• describe the mechanics of breathing in an infant.
	• infant pulmonary physiology
	• physiology and development of the lung in the pre-term infant.

Theme 1	Structure and Function of the Respiratory System	
Learning Objective 1.4	Identify and explain developmental immunology, immunology and host defence mechanisms	Level 3

Background Knowledge	Developmental and basic immunology, and pulmonary host defence mechanisms includes:
• describe innate immunity and complement • describe cell mediated immunity • describe humoral immunity • describe antibody classes and function • explain vaccines and vaccine responses • explain the development of atopy • explain hypersensitivity reactions • describe pulmonary defence mechanisms, particularly the role of cilia, cough and defensins.	• innate immunity • acquired immunity • pulmonary defence mechanisms • developmental immunity • atopy.

THEME 2	LEVELS OF COMPETENCE
Level 1	Awareness sufficient to recognise and know when to refer
Level 2	Knowledge sufficient to manage with supervision (or refer)
Level 3	Advanced knowledge sufficient for independent specialist practice

Theme 2	Presenting Problems	
Learning Objective 2.1	Apply diagnostic procedures and develop a management plan for patients presenting with tachypnoea	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the causes and mechanisms of tachypnoea • identify the indicators for further investigation of tachypnoea and methods of treatment.	• describe respiratory physiology, including neural mechanisms • discuss differential causes of tachypnoea • describe indications for radiological imaging studies • describe the interpretation of respiratory function tests • describe the indications for and interpretation of exercise testing.	• take a history • conduct a clinical examination • interpret spirometry and measures of gas exchange • interpret radiological examinations • formulate differential diagnoses.

Theme 2	Presenting Problems	
Learning Objective 2.2	Apply diagnostic procedures and develop a management plan for patients presenting with cough	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the causes and mechanisms of cough • identify the indicators for further investigation of cough and methods of treatment.	• describe respiratory and neural anatomy and physiology, including upper airway • explain the differential diagnosis of 'dry' vs. 'wet' cough • explain management approaches to different causes of cough • describe the indications for respiratory and non-respiratory investigations • describe the indications for and interpretation of bronchial provocation testing • describe the indications for rigid and flexible bronchoscopy.	• take a history • conduct a clinical examination • interpret spirometry and measures of gas exchange • interpret radiological examinations • perform flexible bronchoscopy and bronchoalveolar lavage • formulate differential diagnoses.

Theme 2	Presenting Problems	
Learning Objective 2.3	Apply diagnostic procedures and develop a management plan for patients presenting with stridor	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the causes and mechanisms of stridor • identify the indicators for further investigation of stridor and methods of treatment.	• describe respiratory anatomy and physiology, including upper airway • explain the differential diagnosis of stridor • describe the indications for rigid versus flexible bronchoscopy • describe the indications for radiological imaging studies • describe the indications for corrective surgery (e.g. vascular ring repair).	• take a history • conduct a clinical examination • interpret radiological examinations • perform flexible bronchoscopy • formulate differential diagnoses.

Theme 2	Presenting Problems	
Learning Objective 2.4	Apply diagnostic procedures and develop a management plan for patients presenting with wheeze	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the causes, epidemiology and mechanisms of wheeze • identify the indicators for further investigation of wheeze and methods of treatment.	• describe respiratory anatomy and physiology, including upper airway • discuss the differential diagnosis of wheeze in infants, preschool children, school aged children, adolescents • describe the mechanisms and indications for respiratory function tests, including flow-volume loops and bronchial provocation testing • explain respiratory function testing in infants and preschool children, e.g. forced oscillation technique, exhaled nitric oxide (NO) • describe the indications for rigid and flexible bronchoscopy.	• take a history • conduct a clinical examination • interpret spirometry and measures of gas exchange • perform and interpret bronchial provocation testing • interpret radiological examinations • perform flexible bronchoscopy and bronchoalveolar lavage.

Theme 2	Presenting Problems	
Learning Objective 2.5	Apply diagnostic procedures and develop a management plan for patients presenting with haemoptysis	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the causes and mechanisms of haemoptysis • identify the indicators for further investigation of haemoptysis and methods of treatment.	• describe respiratory anatomy and physiology including upper airway • explain grading of severity • describe the indications for bronchoscopy and imaging, including angiography • describe the indications for bronchial artery embolisation and surgery.	• take a history • conduct a clinical examination • interpret radiological examinations • perform bronchoscopy.

Theme 2	Presenting Problems	
Learning Objective 2.6	Apply diagnostic procedures and develop a management plan for patients presenting with apnoea in infancy or an apparent life threatening event (ALTE)	Level 3

Background Knowledge	Specialised Knowledge	Skills

• describe the causes and mechanisms of apnoea in infancy and ALTE
• identify the indicators for further investigation of apnoea and ALTE and methods of treatment.
	• describe the anatomy and physiology of the upper airway and central respiratory centre
	• discuss differential causes of apnoea in infants and children
	• describe the indications for respiratory and non-respiratory investigations, including :
	  • electrocardiography
	  • polysomnography
	  • echocardiography
	  • Holter monitoring
	  • electroencephalography
	  • assessments for gastro-oesophageal reflux disorder
	• explain control of breathing in the first months of life
	• explain the modifiable and non-modifiable risk factors for sudden infant death syndrome (SIDS)
	• describe the definition, prevalence, causes and clinical presentations of ALTEs in infants
	• discuss the evidence for the use of home apnoea monitors
	• describe the indications for polysomnography.
		• take a history
		• conduct a clinical examination
		• interpret radiological examinations
		• perform and interpret oximetry
		• interpret results of polysomnography
		• discuss and emphasise avoidance of known SIDS risk factors
		• plan and initiate appropriate investigations for a child who has had an ALTE
		• identify infants at risk, including social and family factors
		• demonstrate the operation of home apnoea monitors and explain their use and limitations to parents.

Theme 2	Presenting Problems	
Learning Objective 2.7	Apply diagnostic procedures and develop a management plan for patients presenting with concerns about breathing during sleep	Level 3

Knowledge	Skills
• describe anatomy and physiology of the upper airway in a child • describe respiratory control mechanisms and how they are affected by sleep • explain the nature and health consequences of obstructive sleep apnoea in childhood • discuss the causes of sleepiness and sleep disturbance in children other than sleep disordered breathing • describe the indications for monitoring of sleep, including limited channel studies such as oximetry as well as polysomnography • discuss the nature, risks and benefits of adenotonsillectomy (T&A) • discuss the different treatment options available for obstructive sleep apnoea in childhood, including continuous positive airway pressure (CPAP) • describe the prevalence, causes and clinical presentation of sleep-related hypoventilation, including central congenital hypoventilation syndrome.	• take a detailed sleep history and a comprehensive examination to elicit both the common and less common clinical features of obstructive sleep apnoea (OSA) • evaluate clinical findings to exclude other causes of noisy breathing in infants and children • determine whether OSA is likely to be the cause of sleep disturbance or daytime tiredness or sleepiness in a child • formulate a differential diagnosis of excessive daytime sleepiness in a child who does not snore • refer appropriately for polysomnography and limited channel sleep studies, and explain the limitations of these tests • apply the different treatment options for OSA to individual cases • refer appropriately for T&A • advise on and contribute to peri-operative care of children with OSA having T&A • identify and refer for appropriate investigations, e.g. lateral neck x-ray, allergy testing, and laryngobronchoscopy.

Theme 2	Presenting Problems	
Learning Objective 2.8	Apply diagnostic procedures and develop a management plan for patients presenting with dyspnoea	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the causes and mechanisms of dyspnoea • identify the indicators for further investigation of dyspnoea and methods of treatment.	• describe respiratory physiology including neural mechanisms • discuss dyspnoea scales • describe the interpretation of pulmonary function tests and imaging of the respiratory system • discuss exercise related symptoms • describe the indications for and interpretation of cardiopulmonary exercise testing • explain symptom control including respiratory rehabilitation • describe the indications for oxygen therapy.	• take a history • conduct a clinical examination • interpret spirometry and measures of gas exchange • interpret radiological examinations.

Theme 2	Presenting Problems	
Learning Objective 2.9	Apply diagnostic procedures and develop a management plan for patients presenting with chest pain	Level 3

Background Knowledge	Specialised Knowledge	Skills
• describe the organic and non-organic causes and mechanisms of chest pain • identify the indicators for further investigation of chest pain and methods of treatment.	• describe respiratory physiology including neural mechanisms • describe the role of analgesia • describe the interpretation of pulmonary function tests and imaging of the respiratory system • explain symptom control, including respiratory rehabilitation.	• take a history • conduct a clinical examination • interpret spirometry and measures of gas exchange • interpret radiological examinations • lead and contribute to a multidisciplinary approach to non-organic pain.

THEME 3	LEVELS OF COMPETENCE
Level 1	Awareness of indications and associated risks
Level 2	Awareness of indications and associated risks and ability to interpret results without assistance
Level 3	Advanced knowledge sufficient for independent specialist practice

Theme 3	Investigations	
Learning Objective 3.1	Apply diagnostic procedures and interpret results of lung function tests	
Investigations include:		**Competency Level**
• Spirometry		**Level 3**
• Lung volumes		**Level 3**
• Gas transfer		**Level 3**
• Blood gases		**Level 3**
• Oximetry		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**
• define the anatomy and physiology of the respiratory system • identify normal lung growth and development • define reference standards.	• explain reference standards • explain the technical aspects of tests, including limitations and data • recognise operator dependant and patient related issues • interpret results and clinical implications • select age-appropriate standards for acceptable measurement • explain definitions and clinical relevance of bronchial reversibility testing • explain principles of infection control and prevention of cross-infection.	• interpret lung function tests in clinical settings • perform spirometry, lung volumes, arterial blood gas testing and diffusing capacity of the lung for carbon monoxide (DLCO) measurements • use oximetry in the acute and chronic management of children with respiratory disease.

Theme 3	Investigations	
Learning Objective 3.2	Describe the principles and indications for more complex tests of lung function, and interpret results	
Investigations include:		**Competency Level**
• Cardiopulmonary exercise testing		**Level 3**
• Bronchial challenge testing		**Level 3**
• Altitude simulation tests and assessment of fitness to fly		**Level 3**
• Lung compliance/resistance testing		**Level 2**
• Maximal inspiratory and expiratory pressures		**Level 2**
• More complex respiratory muscle function tests		**Level 1**
• Pulmonary shunt calculations		**Level 2**
Background Knowledge	**Specialised Knowledge**	**Skills**
• define the anatomy and physiology of the respiratory system • identify normal lung growth and development • define reference standards.	• explain reference values • explain the technical aspects of tests, including limitations and data • recognise operator dependant and patient related issues • interpret results and clinical implications • identify potential complications • discuss the differences between direct and indirect bronchial challenge tests • explain the clinical relevance of results • describe the clinical indications for cardiopulmonary exercise testing.	• select appropriate tests for specific indications • interpret results of these tests in clinical settings • interpret spirometry results in the pre-school child.

Theme 3	Investigations	
Learning Objective 3.3	Describe the principles and indications for lung function tests in the infant and pre-school group, and interpret results	
Investigations include:		**Competency Level**
• Infant lung function testing		**Level 2**
• Forced oscillation technique (FOT)		**Level 2**
• Preschool spirometry (including incentive spirometry)		**Level 3**
• Multiple breath washout technique		**Level 2**
Background Knowledge	**Specialised Knowledge**	**Skills**
• define the anatomy and physiology of the respiratory system • identify normal lung growth and development • define reference standards.	• explain reference values • explain the technical aspects of tests, including limitations and data • recognise operator dependant and patient related issues • interpret results and clinical implications • explain the role of sedation in infant lung function testing • discuss the clinical vs. research role of the above investigations.	• select appropriate tests for specific indications • apply safe use of sedation for infant lung function testing.

Theme 3	Investigations	
Learning Objective 3.4	Describe the indications for polysomnography (PSG) and interpret results	Level 2

Background Knowledge	Specialised Knowledge	Skills
• define the anatomy and physiology of the respiratory system • define reference standards • explain the technical aspects, including limitations and data • interpret results and clinical implications • identify potential complications.	• describe the clinical context in which PSG might be useful, particularly in children with symptoms of upper airway obstruction or neuromuscular disease.	• interpret components of a PSG report to determine the presence, nature and severity of sleep disordered breathing • explain the nature and limitations of abbreviated sleep studies • prioritise when a PSG might be appropriate • explain treatment options for various types of sleep-disordered breathing and discuss their relative merits and complications.

Theme 3	Investigations
Learning Objective 3.5	Describe the indications for and risks of radiological tests, and interpret results

Investigations include:	Competency Level
• Chest x-rays	**Level 3**
• Chest computed tomography (CT) scans	**Level 3**
• Magnetic resonance imaging (MRI)	**Level 2**
• Ultrasonography	**Level 3**
• Fluoroscopy	**Level 3**
• Barium swallow	**Level 3**
• Bronchography	**Level 3**

Background Knowledge	Specialised Knowledge	Skills
• define the anatomy and physiology of the respiratory system • identify normal lung growth and development • identify potential complications.	• describe the indications for specific tests • interpret results and clinical implications.	• select appropriate radiological investigations • interpret chest x-rays • interpret chest CT scans.

Theme 3	Investigations
Learning Objective 3.6	Describe the indications for and risks of miscellaneous investigations, and interpret results

Investigations include:	Competency Level
• Nuclear medicine scans	**Level 2**
• Echocardiography	**Level 2**
• Oesophageal manometry and pH monitoring	**Level 2**
• Allergy tests	**Level 3**
• Delayed hypersensitivity tests	**Level 2**
• Immunological investigations	**Level 3**
• Sweat test and genotype for cystic fibrosis (CF)	**Level 3**

Theme 3	Investigations	
Learning Objective 3.6	Describe the indications for and risks of miscellaneous investigations, and interpret results	
Background Knowledge	**Specialised Knowledge**	**Skills**
• define the anatomy and physiology of the respiratory system • identify normal lung growth and development • describe developmental immunology • identify the genetic basis of CF • define reference standards • explain the technical aspects, including limitations and data • recognise operator dependant and patient related issues • interpret results and clinical implications • identify potential complications.	• explain the indications, contra-indications and limitations of ventilation-perfusion (V/Q) scanning • explain the role of echocardiography and other cardiac investigations in the evaluation of infants and children presenting with respiratory symptoms • explain the interpretation and limitation of tests for the evaluation of gastro-oesophageal reflux and aspiration syndromes • explain the role of tests in the evaluation of atopic disease and clinical implications • describe the screening and diagnosis of CF.	• perform allergy skin prick tests and intradermal challenges • select and interpret tests of immune function in children with respiratory disease • interpret and explain results of screening and diagnostic tests for CF • explain atypical CF • counsel parents and family members on the results of screening and diagnostic tests.

Theme 3	Investigations	
Learning Objective 3.7	Describe the indications for and risks of cilia studies, and interpret results	Level 2
Background Knowledge	**Specialised Knowledge**	**Skills**
• define the anatomy and physiology of the respiratory system • describe the indications, risks, benefits and procedural skills associated with cilia studies • identify potential complications.	• describe cilial function • describe cilial ultrastructure • describe the physiology of NO • explain the role of nasal NO, cilial beat frequency and ultrastructural abnormalities in the diagnosis of primary ciliary dyskinesia.	• identify when to refer for investigation • explain how to perform a nasal ciliary brushing • interpret ultrastructural abnormalities.

Theme 3	Investigations	
Learning Objective 3.8	Explain the properties of investigations and interpret abnormal results in asymptomatic patients	
Background Knowledge	**Specialised Knowledge**	**Skills**
• define the anatomy and physiology of the respiratory system • define reference standards • explain the technical aspects, including limitations and data • recognise operator dependant and patient related issues • interpret results and clinical implications • identify potential complications.	• describe the principles of clinical epidemiology • explain medical uncertainty and prior probability • identify sensitivity and specificity in diagnostic tests.	• apply understanding of investigations to the interpretation of abnormal test results to develop appropriate management plans.

THEME 4	LEVELS OF COMPETENCE
Level 1	Awareness sufficient to recognise and know when to refer
Level 2	Knowledge sufficient to manage with supervision (or refer)
Level 3	Advanced knowledge sufficient for independent specialist practice

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.1	Describe the indications and contraindications for paediatric flexible bronchoscopy and rigid bronchoscopy	Level 3
Learning Objective 4.2	Perform or supervise diagnostic bronchoscopy	Level 3

Background Knowledge	Specialised Knowledge	Skills

• describe basic pulmonary physiology and pathophysiology
• describe the anatomy of:
  • upper airway
  • lower airway
  • bronchial anatomy including lobar
  • segmental anatomy including 3D anatomy
	• describe airway cytology and microbiology
	• describe the indications and contraindications for procedures
	• describe the complications of flexible bronchoscopy and their management (e.g. bleeding, pneumothorax, ventilation effects, temperature)
		• perform paediatric flexible bronchoscopy, demonstrate the ability to:
		  • assemble and disassemble all equipment independently and to handle instruments safely

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.1	Describe the indications and contraindications for paediatric flexible bronchoscopy and rigid bronchoscopy	Level 3
Learning Objective 4.2	Perform or supervise diagnostic bronchoscopy	Level 3
• describe normal anatomical variants of airway anatomy • explain the visual appearance of congenital upper and lower airway lesions (e.g. bronchitis, tumours, haemangiomas).	• explain the process for bronchoscopic intubation • describe anaesthetic processes and drugs used • identify all aspects of bronchoscopic equipment • explain processes for sterilisation and maintenance of equipment.	• pass the bronchoscope into the airway independent of the endotracheal tube (ETT) and laryngeal masks • pass the scope with minimal trauma within an appropriate time (i.e. an easy airway inspection procedure should be completed within two - five minutes) • plan the sequencing of visual inspection of the upper and lower airway • maintain full anatomical orientation and 3D orientation (great vessels, artery, oesophagus) • perform broncho-alveolar lavage (BAL) • lead and contribute to a team approach to manage adverse reactions or airway compromise situations • liaise with anaesthetic/ recovery staff to contribute to postoperative management • manage postoperative complications • explain operative findings to the child and their parents • appraise and discuss own performance of procedures.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.3	Perform or supervise pleural procedures	
Interventions include:		**Competency Level**
• Needle thoracentesis (fluid and air)		**Level 3**
• Intercostal tube drainage (large and small bore)		**Level 3**
• Pleural ultrasound imaging		**Level 2**
• Pleural biopsy		**Level 1**
• Pleural aspiration		**Level 1**
• Intercostal catheter placement		**Level 1**
• Empyema management		**Level 1**
• Pleurodesis		**Level 1**
• Thoracoscopy		**Level 1**
Background Knowledge	**Specialised Knowledge**	**Skills**
• define pleural anatomy and physiology • define the indications for pleural procedures • discuss procedure risks and benefits • identify the procedural skills required • discuss potential complications.	• describe the physiology and biochemistry of pleural fluid • identify normal and abnormal anatomy of the pleura • discuss the diagnostic and therapeutic indications for pleural procedures • evaluate risks and benefits of each of the diagnostic/therapeutic interventions.	• select and assess patients for procedural intervention • administer sedation, topical anaesthesia and analgesia • perform pleural aspiration • perform intercostal tube placement as an emergency procedure • manage empyema, including administration of thrombolytics or appropriate referral for surgical intervention.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.4	Administer oxygen therapy	Level 3

Background Knowledge	Specialised Knowledge	Skills
• define respiratory anatomy and physiology • define the indications for oxygen therapy • identify the procedural skills required • discuss therapy risks and benefits • discuss potential complications.	• describe the physiology of ventilatory drive and gas exchange • explain the oxygen-haemoglobin dissociation curve • define the indications and guidelines for use of oxygen • explain the assessment for oxygen therapy • describe the delivery systems and use in noninvasive ventilation • explain adverse effects.	• measure and interpret oxygen saturation and arterial blood gases (ABGs) • apply oxygen delivery systems (nasal prongs, masks etc) • determine appropriate supplemental oxygen dose • interpret overnight oximetry recordings.

Theme 4	Interventions and Prevention Measures
Learning Objective 4.5	Apply ventilatory support interventions

Interventions include:	Competency Level
• Noninvasive ventilation (NIV)	**Level 3**
• CPAP	**Level 3**
• Bi-level NIV	**Level 2**
• Invasive ventilation	**Level 2**
• Different ventilatory strategies	**Level 2**

Background Knowledge	Specialised Knowledge	Skills
• define respiratory anatomy and physiology • define the indications for ventilatory support interventions • identify the procedural skills required • discuss intervention risks and benefits • discuss potential complications.	• describe the physiology of respiratory control mechanisms, respiratory failure and sleep related breathing disorders • evaluate indications for use, effects, and limitations of CPAP and Bi-level NIV • describe initiation, monitoring and weaning procedures • explain the anatomy and control of upper airway and respiratory muscles.	• identify the functioning of, and indications for, a variety of face masks • apply a mask and head gear to a child • apply the principles of ventilation and adjustment of NIV and CPAP settings • monitor patient progress • use humidification circuits in NIV.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.6	Describe the indications, benefits, risks and clinical processes of airway management	
Interventions include:		**Competency Level**
• Emergency intubation		**Level 3**
• Tracheostomy care and weaning		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• define airway anatomy and physiology
• define the indications for airway management
• identify the procedural skills required
• discuss management risks and benefits
• discuss potential complications.
	• review and describe aspects of:
	  • intubation
	  • tracheostomy care.
		• perform emergency intubation
		• manage tracheostomy care and weaning
		• devise strategies for decannulation.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.7	Supervise the use of airway delivery systems	Level 3
Background Knowledge	**Specialised Knowledge**	**Skills**
• define airway anatomy and physiology • define the indications for airway delivery systems • identify the procedural skills required • discuss system risks and benefits • discuss potential complications.	• describe principles of pressurised metered dose inhalers, dry powder inhalers and nebulisers • describe principles of aerosol distribution to the lung • explain the correct use of devices • describe adverse effects of aerosol medications and their mechanisms • identify infection control issues with airway delivery.	• demonstrate, instruct and supervise use of the various inhalers and nebulisers in patients.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.8	Explain the indications, benefits, risks and clinical processes of smoking cessation	Level 3

Background Knowledge	Specialised Knowledge	Skills
• define respiratory anatomy and physiology • define the indications for smoking cessation and prevention strategies • identify the procedural skills required • discuss risks and benefits of smoking cessation • discuss potential complications.	• describe the adverse effects of smoking on general health • describe the specific effects of smoking on respiratory health • discuss principles of smoking cessation • describe motivational interviewing techniques • evaluate non-pharmacological and pharmacological treatments available for smoking cessation • describe side effects of pharmacologic therapies.	• provide advice, counselling and support to parents • refer appropriately for adjuvant treatments for smoking cessation • advise and introduce strategies to minimise exposure to environmental tobacco smoke.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.9	Describe the indications, benefits, risks and clinical processes of chest physiotherapy and airway clearance techniques	Level 3

Background Knowledge	Specialised Knowledge	Skills

• define airway anatomy and physiology
• define the indications for airway clearance
• identify the procedural skills required
• discuss risks and benefits
• discuss potential complications.
	• describe different airway clearance techniques
	• describe different airway clearance devices
	• discuss the role of:
	  • exercise
	  • vest devices
	  • cough-augmentation devices
	  • medications which improve mucociliary clearance.
		• refer to chest physiotherapist where indicated
		• explain basic physiotherapy techniques and their indications for, and importance in management of various respiratory disorders.

Theme 4	Interventions and Prevention Measures	
Learning Objective 4.10	Describe the indications, benefits and risks of long term venous access	Level 3

Background Knowledge	Specialised Knowledge	Skills
• define venous anatomy and physiology • define the indications for venous access • identify the procedural skills required • discuss risks and benefits of long term venous access • discuss potential complications.	• describe the indications, benefits and risks of long lines, central venous lines and peripherally inserted central catheters • describe the indications, benefits and risks of total implanted venous access devices.	• insert long lines • refer appropriately for insertion of other lines • manage complications of all lines • flush total implanted venous access devices.

THEME 5	LEVELS OF COMPETENCE
Level 1	Awareness sufficient to recognise and know when to refer
Level 2	Knowledge sufficient to manage with supervision (or refer)
Level 3	Advanced knowledge sufficient for independent specialist practice

Theme 5	Diseases	
Learning Objective 5.1	Diagnose and manage conditions relating to congenital malformations	Level 3

Background Knowledge	Specialised Knowledge	Skills

• describe the following for conditions relating to congenital malformations:
  • definition
  • pathogenesis
  • pathophysiology
  • embryology
  • anatomy
  • pathology
  • epidemiology
  • clinical features including age appropriate presentations
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• describe the embryological origin of congenital malformation
	• describe the genetics of congenital malformations
	• describe the anatomical relationships of pulmonary structures and congenital cardiac defects
	• explain the role of relevant investigations to assist in diagnosis and aid management
	• identify and manage congenital malformations in the context of a child with a syndrome
	• identify congenital malformations of the upper respiratory tract
	• identify congenital malformations of the lower respiratory tract
	• identify congenital pulmonary airway malformations
	• explain current classifications of congenital cystic adenomatoid malformation and discuss management issues in terms of malignancy.
		• apply ventilatory strategies for congenital malformations
		• perform flexible bronchoscopy
		• insert percutaneous chest drains
		• recognise appropriate timing to involve ear, nose and throat specialists (ENT) and thoracic surgeons
		• explain the role of rigid bronchoscopy
		• manage tracheostomy care and weaning.

Theme 5	Diseases	
Learning Objective 5.2	Diagnose and manage conditions relating to newborn respiratory disorders (excluding apnoea)	
Conditions include:		**Competency Level**
• Transient tachypnoea of newborn		**Level 3**
• Meconium aspiration		**Level 3**
• Pulmonary interstitial emphysema		**Level 3**
• Bronchopulmonary dysplasia/chronic lung disease of prematurity (CLDP)		**Level 3**
• Surfactant protein deficiency		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to congenital malformations:
  • definitions
  • pathogenesis
  • pathophysiology
  • clinical features including age appropriate presentations
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• describe acute management principles
	• describe ventilation strategies including high frequency oscillation (HFO) and extracorporeal membrane oxygenation (ECMO)
	• describe the use of NO and other strategies in the management of pulmonary hypertension
	• describe the role and use of surfactant
	• explain the role of steroids and diuretics
	• explain options for patent ductus arteriosus (PDA) management
	• explain options for long term care of CLDP, particularly:
	  • home oxygen
	  • nutrition
	• identify other sequelae and liaise with neurodevelopmental services.
		• interpret blood gases
		• interpret radiological investigations
		• apply ventilation strategies on the neonatal intensive care unit (NICU)
		• insert chest drains
		• monitor home oxygen prescription
		• identify and utilise community services.

Theme 5	Diseases	
Learning Objective 5.3	Diagnose and manage conditions relating to pulmonary infections (other than mycobacterial)	
Conditions include:		**Competency Level**
• Upper and lower respiratory tract infections		**Level 3**
• Croup		**Level 3**
• Epiglottitis		**Level 3**
• Bronchiolitis , respiratory syncytial virus (RSV) and other causes		**Level 3**
• Pertussis		**Level 3**
• Mycoplasma and other atypical infections (e.g. Legionella)		**Level 3**
• Community acquired pneumonia (CAP)		**Level 3**
• Parapneumonic effusion and empyema		**Level 3**
• Lung abscess		**Level 3**
• Fungal infection		**Level 3**
• Parasitic infection		**Level 2**
• Viral infection, including epidemic, e.g. influenza, severe acute respiratory syndrome (SARS)		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to pulmonary infections:
  • definition
  • pathogenesis
	• describe the age appropriate differential diagnosis of infective causes, including newborn, pre-school, school aged child	• assess the severity of CAP
		• describe the role of the following in the assessment of CAP:

Theme 5	Diseases	
Learning Objective 5.3	Diagnose and manage conditions relating to pulmonary infections (other than mycobacterial)	
• pathophysiology • epidemiology • clinical features including age appropriate presentations • differential diagnosis • investigations • treatment • complications • prognosis.	• describe the differential diagnosis of non-infective causes • describe the investigation and management of acute, recurrent, persistent and atypical pneumonia • describe the investigation and management of typical versus atypical croup • describe the treatment of community and hospital acquired pulmonary infections including ventilator-associated pneumonia • describe relevant microbiology and choose appropriate antibiotics • describe the role of immunological investigations • assess the role of intrapleural fibrinolytic therapy and the role of video-assisted thoracoscopic surgery (VATS) procedure in the treatment of parapneumonic effusions and empyema • describe the management options for allergic bronchopulmonary aspergillosis (ABPA) • identify long term sequelae of RSV, adenovirus, mycoplasma, and bronchiolitis obliterans • describe public health issues, including infection control guidelines, cohorting, and smoking • discuss the role of vaccination.	• World Health Organisation's acute respiratory infections (ARI) program • blood gas analysis • oxygen dissociation curve • provide supportive therapy for patients (e.g. oxygenation, ventilatory support, nutritional support) • provide intensive care management including: • intubation • basic intensive care principles e.g. fluid balance • ventilatory strategies (e.g. HFO) • describe the role of NO and nutritional support • use diagnostic techniques, including bronchoscopy, lavage, and brushings • utilise diagnostic pleural techniques, including intercostal catheter (ICC) • treatment of empyema including ICC and intrapleural urokinase/VATS • select and interpret appropriate radiological investigations.

Theme 5	Diseases	
Learning Objective 5.4	Diagnose and manage conditions relating to pulmonary disorders in the immunocompromised host (excluding HIV/AIDS)	
Conditions include:		**Competency Level**
• Congenital immunodeficiencies		**Level 3**
• Acquired immunodeficiencies		**Level 3**
• Drug induced disease		**Level 3**
• Graft vs. host disease		**Level 3**
• Post bone marrow transplantation immunodeficiency		**Level 3**
• Post lung transplant management		**Level 2**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to pulmonary disorders in the immunocompromised host:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • genetic basis
• describe the following for conditions relating to pulmonary disorders in the immunocompromised host:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • genetic basis clinical features including age appropriate presentations
  • immunology
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• assess the conditions, genetics and treatments producing immunodeficiency
	• describe the range of potential infections in the immunocompromised host
	• describe relevant investigation of respiratory symptoms, including complications and atypical presentation due to immunocompromised status
	• describe pulmonary complications of bone marrow/stem cell transplant
	• appraise treatment options, including novel antibiotics, antiviral and antifungals, and potential side effects
	• describe potential iatrogenic pulmonary complications of chemotherapy and radiotherapy
	• identify and discuss issues relating to lung transplantation, including the complications of immunosuppression (infection, malignancy, renal disease etc)
	• describe bronchiolitis obliterans syndrome.
		• perform bronchoscopy and related techniques such as BAL
		• explain ventilation strategies in immunocompromised children
		• differentiate a diagnosis of infection vs. rejection
		• describe transbronchial biopsy techniques
		• develop working relationships with specialised lung transplant centres.

Theme 5	Diseases	
Learning Objective 5.5	Diagnose and manage conditions relating to HIV/AIDS and their pulmonary manifestations	Level 2

Background Knowledge	Specialised Knowledge	Skills

• describe the following for conditions relating to HIV/AIDS and their pulmonary manifestations:
  • definition
  • pathogenesis
  • pathophysiology/immunology
  • epidemiology
  • maternal transmission
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • vaccination schedule
  • complications
  • prognosis.
	• describe the virology and immunology of HIV, and explain AIDS defining criteria
	• discuss at risk populations
	• identify pulmonary manifestations, including infective and neoplastic
	• describe types of HIV-related infections in lung
	• explain the role and management of pneumocystis carinii pneumonia (PCP) infections and mycobacterial disease
	• explain the role of bronchoscopy and BAL
	• interpret imaging, invasive tests and microbiology
	• describe acute and prophylactic treatment, including highly active antiretroviral therapy (HAART) and directly observed treatment, short course (DOTS).
		• perform bronchoscopy and explain the role of brushing and BAL
		• explain occupational health and safety issues for staff treating patients with HIV/AIDS.

Theme 5	Diseases	
Learning Objective 5.6	Diagnose and manage conditions relating to mycobacterial infections	
Conditions include:		**Competency Level**
• Extra-pulmonary tuberculous (TB)		**Level 3**
• TB in the immunocompromised host		**Level 3**
• Latent TB infection		**Level 3**
• Non-TB mycobacterial diseases		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to mycobacterial infections:
  • physiology
  • anatomy
  • immunology
  • epidemiology
  • indications
  • risk/benefit
  • procedural skills
  • complications
  • natural history
  • vaccinations
	• describe the pathophysiology of TB and non-TB infection
	• discuss the diagnosis of TB and atypical mycobacteria, including emerging investigations and differentiation of TB from non-TB mycobacterial diseases
	• differentiate TB from sarcoidosis
	• describe the treatment options for TB and atypical mycobacteria
	• identify relevant public health legislation
	• explain the role of TB clinics, including contact tracing and screening
	• discuss the importance of TB in global as well as local perspective
	• describe the management of TB in the immunocompromised host.
		• interpret tuberculin skin prick tests
		• interpret serological testing
		• explain the role of directly observed therapy
		• explain the role of isolation of patients in diagnostic stages (infection control) and infectiousness of children with TB
		• conduct contact screening
		• explain occupational health and safety issues for staff treating patients with TB
		• describe potential immunological defects in atypical mycobacteria infections.

Theme 5	Diseases	
Learning Objective 5.7	Diagnose and manage asthma and related conditions	Level 3

Background Knowledge	Specialised Knowledge	Skills

• describe the following for asthma and related conditions:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology and influence of environmental factors
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• discuss asthma phenotypes
	• evaluate paediatric asthma guidelines (for both preschool and school aged children)
	• explain the management of difficult asthma
	• discuss the role of community based services (e.g. asthma foundations)
	• appraise various treatments and side effects
	• apply aerosol therapy and age appropriate delivery devices
	• demonstrate patient education techniques, goals and action plans
	• describe methods for the influence and management of the upper airway
	• identify complications of asthma
	• evaluate different forms of provocation testing
	• describe the role of specific immunoglobulin E (IgE)
	• describe the role of noninvasive tests (e.g. FeNO)
	• distinguish the role of allergy and allergen testing
	• discuss the role and management of allergic rhinitis and the nasobronchial reflex
	• explain exercise induced asthma
	• describe other causes of cough and wheeze.
		• manage acute asthma
		• manage chronic asthma
		• provide asthma education, using age appropriate devices for medication delivery
		• develop Asthma Action Plans
		• perform spirometry and bronchodilator responsiveness
		• use peak expiratory flow (PEF) charts
		• perform allergy skin prick testing.

Theme 5	Diseases	
Learning Objective 5.8	Diagnose and manage behavioural aspects of respiratory disease	
Conditions include:		**Competency Level**
• Hyperventilation syndromes		**Level 3**
• Vocal cord dysfunction		**Level 3**
• Psychogenic cough		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for behavioural aspects of respiratory diseases:
  • definition
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• identify signs and symptoms of these conditions
	• describe the range of manifestations of psychogenic disease
	• describe comorbidity issues in children with asthma.
		• use appropriate investigations to diagnose and manage conditions
		• discuss the diagnosis with patients and their families
		• implement strategies to providing reassurance and/or psychological support.

Theme 5	Diseases
Learning Objective 5.9	Diagnose and manage pulmonary conditions relating to hypereosinophilia

Conditions include:	Competency Level
• ABPA	**Level 3**
• Simple pulmonary eosinophilia (Loffler's syndrome)	**Level 3**
• Eosinophilic pneumonias (acute, chronic and drug induced)	**Level 3**
• Parasitic infections	**Level 2**
• Idiopathic hypereosinophilic syndrome	**Level 3**
• Churg-Strauss syndrome	**Level 2**

Background Knowledge	Specialised Knowledge	Skills

• describe the following for pulmonary conditions relating to hypereosinophilia:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• describe the causes of eosinophilic diseases
	• discuss the investigation and management of patients with eosinophilic diseases
	• evaluate investigations and treatments for ABPA, including the role of corticosteroids, antifungal agents and anti-IgE therapies
	• evaluate emerging monoclonal antibody therapies.
		• interpret skin and blood immunologic testing relevant to allergic lung disorders, including ABPA
		• explain the roles and limitations of investigative procedures (including BAL, open lung biopsy and high resolution CT chest scans).

Theme 5	Diseases
Learning Objective 5.10	Diagnose and manage conditions relating to chronic suppurative lung disease (excluding cystic fibrosis, empyema and lung abscess)

Conditions include:	Competency Level
• Persistent bacterial bronchitis	**Level 3**
• Non-CF bronchiectasis	**Level 3**
• Primary ciliary dyskinesia (PCD)	**Level 3**
• Other causes of moist cough (aspiration syndromes, tracheomalacia etc)	**Level 3**
• Suppurative lung disease in children with neurodevelopmental disabilities	**Level 3**

Theme 5	Diseases	
Learning Objective 5.10	Diagnose and manage conditions relating to chronic suppurative lung disease (excluding cystic fibrosis, empyema and lung abscess)	
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to chronic suppurative lung disease (CSLD):
  • definitions
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• describe relevant investigations, including the role of specialised tests, such as:
	  • high resolution CT (HRCT) exclusion of CF and PCD
	  • ciliary structural and functional analysis
	  • use of NO in assessment for PCD
	• discuss the importance of antibiotics and age appropriate airway clearance techniques in treatment and prevention of progression
	• explain the role of surgery in treatment of bronchiectasis
	• discuss options for end-of-life management and respiratory failure, including:
	  • home oxygen
	  • noninvasive support
	  • palliative care
	• evaluate emerging genetics and therapies.
		• contribute to a multidisciplinary approach to management
		• explain and demonstrate the management of home intravenous therapy
		• prescribe inhaled therapies, including antibiotics and hypertonic saline
		• manage the process of transition to adult services.

Theme 5	Diseases	
Learning Objective 5.11	Diagnose and manage cystic fibrosis and related conditions	Level 3
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for CF and related conditions:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
	• describe typical phenotypic features
	• discuss common genetic abnormalities and CF transmembrane conductance regulator (CFTR) class mutations
	• describe the effects of CFTR abnormalities
		• manage home intravenous therapy
		• prescribe inhaled therapies, including antibiotics
		• perform flexible bronchoscopy
		• apply screening and therapeutic +/- DNase

Theme 5	Diseases	
Learning Objective 5.11	Diagnose and manage cystic fibrosis and related conditions	Level 3
• differential diagnosis • investigations • treatment • prognosis and complications.	• define the incidence and prevalence in populations • discuss the indications for screening programs (neonatal and community) • describe clinical manifestations • describe multisystem effects (e.g. CF related diabetes, gastrointestinal, fertility, bone disease) • identify atypical presentations • evaluate diagnostic tests (physiological and molecular) • describe physical, pharmacological and nutritional management • describe physiotherapy techniques and exercise • describe infection control measures • discuss common morbidities of disease and complications of therapies • describe the principles and indications for genetic counselling • define indications for lung transplant • explain the management of CF during pregnancy • discuss the importance of social issues.	• diagnose and manage atypical CF • manage end-of-life issues and palliative care • utilise multidisciplinary team management • manage the process of transition to adult services.

Theme 5	Diseases	
Learning Objective 5.12	Diagnose and manage conditions relating to pleuropulmonary manifestations of systemic disease and extrapulmonary disorders	
Conditions include:		**Competency Level**
• Rheumatoid and connective tissue disorders		**Level 3**
• Haematological disease, including sickle cell disease		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for pleuropulmonary manifestations of systemic disease and extrapulmonary disorders:
  • definition
  • pathophysiology
  • epidemiology
  • genetics
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • natural history
  • prognosis.
	• discuss the recognition, diagnosis and management of these conditions
	• describe potential complications
	• discuss collaborative treatment options with other specialist services (e.g. rheumatology, haematology)
	• describe general and specific therapies
	• explain the use of home oxygen therapy
	• evaluate emerging therapies.
		• interpret clinical, radiological and laboratory investigations
		• manage the process of transition to adult services.

Theme 5	Diseases	
Learning Objective 5.13	Diagnose and manage conditions relating to diseases of the chest wall, spine and respiratory muscles	
Conditions include:		**Competency Level**
• Acquired chest wall deformities		**Level 3**
• Neuromuscular disorders (NMD) and neurological disorders		**Level 3**
• Phrenic nerve palsy and acquired disorders of the diaphragm		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to diseases of the chest wall, spine and respiratory muscles:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• describe characteristic physiological outcomes (e.g. exercise limitations with pectus deformities and respiratory failure in NMD)
	• describe radiological investigations, including fluoroscopy and orthopaedic specific films
	• evaluate the role of neurological testing (electromyography (EMG) etc.)
	• describe the role of airway clearance techniques, including cough assist.
		• apply standard pulmonary function tests, including supine and erect spirometry, maximal inspiratory and expiratory pressures (MIPs and MEPs)
		• interpret specific pulmonary function tests (e.g. arm span, mouth pressures)
		• interpret radiological examinations
		• use noninvasive ventilatory support in respiratory failure
		• manage the process of transition to adult services
		• interpret polysomnography
		• provide respiratory management at the time of spinal or chest corrective surgery.

Theme 5	Diseases	
Learning Objective 5.14	Diagnose and manage conditions relating to orphan lung diseases	
Conditions include:		**Competency Level**
• Obliterative bronchiolitis		**Level 3**
• Pulmonary and pleural lymphangiectasia		**Level 3**
• Langerhan's cell histiocytosis		**Level 2**
• Wegener's granulomatosis		**Level 2**
• Lymphangiomatosis		**Level 2**
• Pulmonary alveolar proteinosis		**Level 2**
• Sarcoidosis		**Level 2**
• Idiopathic pulmonary haemosiderosis		**Level 2**
• Pulmonary alveolar microlithiasis		**Level 2**
• Alpha 1 antitrypsin deficiency		**Level 2**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to orphan lung diseases:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• describe the radiological manifestations of orphan lung diseases
	• discuss national and international approaches to orphan lung diseases
	• identify information resources for rare lung diseases (e.g. patient support groups).
		• recognise, diagnose and manage these diseases
		• perform flexible bronchoscopy
		• interpret pathological and radiological investigations
		• manage the process of transition to adult services.

Theme 5	Diseases	
Learning Objective 5.15	Diagnose and manage conditions relating to interstitial lung disease of childhood (ChILD)	
Conditions include:		**Competency Level**
• Diffuse developmental disorders		**Level 3**
• Growth abnormalities reflecting deficient alveolarisation		**Level 3**
• Neuroendocrine hyperplasia of infancy (NEHI)		**Level 3**
• Pulmonary interstitial glycogenosis (PIG)		**Level 3**
• Surfactant dysfunction disorders (SP-B, SP-C, ABCA3)		**Level 3**
• Chronic pneumonitis of infancy (CPI)		**Level 3**
• Nonspecific interstitial pneumonia (NSIP)		**Level 3**
• Desquamative interstitial pneumonitis (DIP)		**Level 3**
• Disorders relating to systemic disorders		**Level 3**
• Lymphocytic interstitial pneumonia (LIP)		**Level 3**
• Bronchiolitis obliterans organising pneumonia (BOOP)		**Level 3**
• Cryptogenic organising pneumonia (COP)		**Level 3**
• Veno-occlusive disease		**Level 3**
• Pulmonary alveolar proteinosis		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to interstitial lung diseases of childhood:
  • definitions
  • embryology
  • anatomy
  • genetics
  • physiology
  • differential diagnoses
  • investigations
  • treatments
  • risk/benefit
  • procedural skills
  • complications
  • prognosis.
	• identify current classifications and guidelines
	• describe the indications for relevant investigations including:
	  • genetics
	  • interpretation of lung function
	  • high resolution CT scans
	  • exercise tests
	  • nuclear medicine tests
	  • lung biopsy (invasive and other)
	• describe the overlap of orphan lung disease with gastro-oesophageal reflux disease (GORD)
		• elicit a clinical history, including environmental exposures
		• manage the ventilated neonate and select age-appropriate investigations
		• perform bronchoscopy with BAL
		• recognise indications for open lung biopsy
		• interpret high resolution CT
		• monitor disease progression
		• identify the appropriate timing for referral for lung transplantation

Theme 5	Diseases	
Learning Objective 5.15	Diagnose and manage conditions relating to interstitial lung disease of childhood (ChILD)	
Background Knowledge	**Specialised Knowledge**	**Skills**
	• evaluate available treatments including the evidence base for current treatment and emerging therapies • describe the association with pulmonary hypertension • describe the association with cardiac disease (e.g. left heart outflow obstruction) • identify and contribute to collaborative research networks.	• manage the process of transition to adult services.

Theme 5	Diseases	
Learning Objective 5.16	Diagnose and manage paediatric thoracic tumours	
Conditions include:		**Competency Level**
• Benign		**Level 3**
• Malignant (primary, secondary and metastatic)		**Level 3**
• Mediastinal cysts and tumours		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to paediatric thoracic tumours:
  • definition
  • pathology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• describe the role of diagnostic procedures, including bronchoscopy
	• identify the staging of disease in collaboration with oncologists
	• discuss the role of treatments, including:
	  • surgery
	  • chemotherapy
	  • targeted and biological therapies
	  • radiotherapy
	• describe options for symptom control (e.g. pain, breathlessness)
		• perform flexible bronchoscopy
		• conduct a pre-operative and anaesthetic assessment
		• interpret radiological investigations, including CT, MRI and nuclear medicine imaging.

Theme 5	Diseases	
Learning Objective 5.16	Diagnose and manage paediatric thoracic tumours	
	• describe the role of emerging therapies (e.g. stents and laser therapy) • explain the role of palliative care.	

Theme 5	Diseases	
Learning Objective 5.17	Diagnose and manage conditions relating to gastro-oesophageal reflux (GORD) and acute and chronic aspiration syndromes	
Conditions include:		**Competency Level**
• Foreign body inhalation (acute/missed)		**Level 3**
• Recurrent aspiration/gastro-oesophageal reflux		**Level 3**
• Lipoid inhalation pneumonia		**Level 3**
• Drowning/near drowning		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to GORD and aspiration syndrome:
  • definitions
  • anatomy
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• explain the role of bronchoscopy
	• describe the effects of dry drowning, salt water and fresh water drowning
	• explain the role of speech language therapists and video fluoroscopy
	• explain the role of gastroscopy and surgery.
		• diagnose and manage acute and chronic complications (e.g. respiratory failure and CSLD)
		• interpret blood gases
		• perform flexible bronchoscopy and lavage
		• identify and apply ventilation strategies on the ICU
		• interpret related radiological investigations, including video fluoroscopy and HRCT
		• interpret pH and impedance studies.

Theme 5	Diseases	
Learning Objective 5.18	Diagnose and manage conditions relating to environmental lung disease	
Conditions include:		**Competency Level**
• Air pollution, including active and passive smoking		**Level 3**
• Hypersensitivity lung disease		**Level 3**
• Effect of altitude on lung disease		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions environmental lung disease:
  • definition
  • pathogenesis
  • pathophysiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• plan questions to elicit a history of respiratory symptoms and triggers, such as:
	  • air conditioning
	  • humidification
	  • household moulds
	  • pets
	  • plants
	  • furnishings
	  • school
	  • caregivers
	  • stoves
	• explain methods for screening for exposure to environmental tobacco smoke, including urinary/ salivary cotinine
	• discuss the medico-legal implications of environmental lung disease.
		• conduct a lung function assessment, including assessment of fitness to fly
		• use PER rate in suspected asthma
		• use challenge testing where appropriate
		• interpret radiological investigations
		• prepare medico-legal reports and acting as an expert witness.

Theme 5	Diseases	
Learning Objective 5.19	Diagnose and manage conditions relating to lung injury	
Conditions include:		**Competency Level**
• Chest trauma		**Level 3**
• Drug induced injury/disease, including illicit drugs		**Level 3**
• Radiation		**Level 3**
• Thermal smoke inhalation and burns		**Level 3**
• Barotrauma		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to lung injury:
  • definitions
  • anatomy
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• explain the role of rigid bronchoscopy
	• explain the role of bronchial toilet in smoke inhalation and burns to the airway.
		• recognise, diagnose and treat the diseases listed above
		• interpret blood gas measurements
		• perform flexible bronchoscopy and lavage
		• apply ventilation strategies on the ICU
		• insert a chest drain.

Theme 5	Diseases	
Learning Objective 5.20	Diagnose and manage pneumothorax	
Conditions include:		**Competency Level**
• Spontaneous pneumothorax		**Level 3**
• Secondary pneumothorax		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for pneumothorax:
  • definition
  • pathogenesis
  • genetics
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • prognosis and complications.
	• describe the risk factors for spontaneous pneumothorax
	• describe the iatrogenic causes of secondary pneumothoraces
	• explain the implications for air travel and diving for patients with a pneumothorax
	• identify appropriate investigations
	• describe the indications for treatment options, including:
	  • simple aspiration
	  • high flow oxygen
	  • intercostal catheter
	  • pleurodesis
	  • pleurectomy
	• describe the role of surgical options in the management of pneumothorax
	• discuss pneumothorax management in CF.
		• perform simple aspiration
		• insert an ICC
		• manage underwater sealed drains and valves.

Theme 5	Diseases	
Learning Objective 5.21	Diagnose and manage conditions relating to pulmonary complications on the intensive care unit	
Conditions include:		**Competency Level**
• Acute respiratory distress syndrome (ARDS)		**Level 3**
• Ventilator acquired pneumonia (VAP)		**Level 3**
• Post extubation disorders		**Level 3**
• Severe upper airways disease management		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to pulmonary complications on the ICU:
  • definitions
  • anatomy
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• describe the basic principals of managing a child on intensive care
	• describe the risk factors for developing VAP and ARDS
	• describe the role of rigid bronchoscopy
	• explain controlled extubation and prevention and management of stridor
	• describe the different types and modes of ventilation
	• describe the indications for ECMO.
		• apply the use of treatments on the intensive care units, such as:
		  • steroid
		  • surfactant
		  • NO
		  • magnesium
		  • adrenaline
		• perform intubation of children of all ages
		• perform flexible bronchoscopy and lavage.

Theme 5	Diseases	
Learning Objective 5.22	Diagnose and manage conditions relating to pulmonary haemorrhage syndromes and venous thrombo-embolic disease	
Conditions include:		**Competency Level**
• Primary, including pulmonary arteriovenous malformations		**Level 3**
• Secondary, including systemic disease		**Level 3**
• Pulmonary embolism (PE)		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for conditions relating to pulmonary haemorrhage syndromes and venous thrombo-embolic disease:
  • definition
  • pathogenesis
  • pathophysiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis and complications.
	• explain the acute and chronic management of haemoptysis (with and without underlying lung disease)
	• describe the use of tranexamic acid
	• describe the role of rigid versus flexible bronchoscopy
	• explain the role of angiography
	• identify at risk groups
	• explain the management of:
	  • pulmonary vasculitis
	  • lung-renal syndromes
	  • hepatopulmonary syndrome
	  • pulmonary arteriovenous malformations
	• describe the pharmacology of drugs used to treat PE
	• evaluate emerging medical vasoactive therapies
	• explain the role of thoracic surgery
	• explain the management of pulmonary vasculitis as part of systemic illness (e.g. sickle cell, systemic lupus erythematosus).
		• conduct a clinical assessment of suspected venous thrombo-embolic disease
		• perform flexible bronchoscopy
		• interpret radiological investigations
		• interpret coagulation studies and deep vein thrombosis (DVT) prophylaxis
		• manage acute conditions, including the use of anticoagulation and thrombolysis
		• assess for risk factors, including genetic susceptibility for embolic disease
		• manage complications of therapy and contraindications to therapy.

Theme 5	Diseases	
Learning Objective 5.23	Diagnose and manage respiratory conditions relating to disorders of the pulmonary circulation	
Conditions include:		**Competency Level**
• Pulmonary hypertension, primary and secondary		**Level 3**
• Pulmonary oedema (cardiogenic)		**Level 3**
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for respiratory conditions relating to disorders of the pulmonary circulation:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • prognosis and complications.
	• describe the pathophysiology and genetics of pulmonary hypertension
	• evaluate emerging medical vasoactive therapies
	• explain the process for early clinical detection of pulmonary hypertension
	• identify at risk groups
	• describe the indications for transplantation.
		• assess risk factors for pulmonary hypertension, to determine the:
		  • aetiology
		  • severity/prognosis
		  • need for specific therapies (e.g. prostacyclin, endothelin receptor antagonists)
		• use available therapies for pulmonary hypertension
		• recognise chronic thrombo-embolic pulmonary hypertension and participate in surgical management.

Theme 5	Diseases	
Learning Objective 5.24	Diagnose and manage respiratory complications of congenital heart disease	Level 3
Background Knowledge	**Specialised Knowledge**	**Skills**

• describe the following for respiratory complications of congenital heart disease:
  • definition
  • pathogenesis
  • anatomy
  • pathophysiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • complications
  • prognosis.
	• describe respiratory symptoms and function due to heart disease
	• describe the respiratory presentations of heart disease
	• explain the management of respiratory problems after cardiac surgery
	• explain the management of heart disease with coincident respiratory disease.
		• interpret cardiopulmonary exercise testing
		• perform bronchoscopy
		• manage respiratory complications post-operatively.

Theme 5	Diseases	
Learning Objective 5.25	Diagnose and manage conditions relating to lung transplantation	Level 2

Background Knowledge	Specialised Knowledge	Skills

• describe the following for conditions relating to lung transplantation:
  • definition
  • pathogenesis
  • pathophysiology
  • epidemiology
  • clinical features
  • differential diagnosis
  • investigations
  • treatment
  • prognosis and complications.
	• explain the indications for referral for consideration of lung transplantation
	• describe the absolute and relative contraindications for referral
	• discuss issues relating to lung transplantation, including immunosuppression and complications (infection, malignancy, renal disease etc)
	• describe the indications for, and interpretation of, transbronchial biopsy
	• describe bronchiolitis obliterans syndrome, and its assessment and management.
		• undertake diagnostic tests for infection vs. rejection, including the use of bronchoscopy
		• liaise with specialised transplant centres.

Theme 5	Diseases
Learning Objective 5.26	Diagnose and manage common causes of sleep disordered breathing

Conditions include:	Competency Level
• Obstructive sleep apnoea	**Level 3**
• Central sleep apnoea, and disorders of respiratory control	**Level 3**
• Sleep hypoventilation syndromes	**Level 3**

Knowledge	Skills

• list the causes and treatment of obstructive sleep apnoea, central sleep apnoea and sleep hypoventilation syndromes
• describe the prevalence, causes and clinical presentations of:
  • obstructive sleep apnoea
  • central sleep apnoea
  • disorders of respiratory control
  • sleep hypoventilation syndromes
• define the indications for polysomnography vs. screening sleep investigations
	• identify, investigate and manage sleep disordered breathing
	• identify patients at risk
	• arrange and interpret appropriate investigations
	• participate in the management of children with sleep disordered breathing, including CPAP and NIV
	• refer for treatment of central sleep apnoea and sleep hypoventilation syndromes.

Theme 5	Diseases
Learning Objective 5.26	Diagnose and manage common causes of sleep disordered breathing
• analyse the evidence base for CPAP, NIV, dental devices, surgery (T&A and other surgical approaches) and other treatments in these disorders • explain the natural history, complications and range of treatments available for the common neuromuscular disorders associated with hypoventilation and sleep hypoventilation syndromes • utilise community, rehabilitation, and palliative care services in the management of these patients.	

THEME 6	LEVELS OF COMPETENCE
Level 1	Knowledge of basic research fundamentals
Level 2	Knowledge sufficient to participate in research
Level 3	Able to conduct research ethically and has experience in publishing results

Theme 6	Research	
Learning Objective 6.1	Identify and apply methods used in research in paediatric respiratory medicine	Level 3
Knowledge	**Skills**	
• identify methods used in clinical, basic and population research in paediatric respiratory medicine • discuss the role of epidemiology in study design • identify the types of study design • describe statistical analysis methods, including basics of biostatistics, issues related to sample size and statistical power • discuss the role of clinical audit in quality improvement.	• appraise research methods, particularly the strengths and weaknesses of different types of study design and statistical methods used in paediatric respiratory medicine research • critically appraise the medical literature as it relates to paediatric respiratory medicine • present research findings to a professional audience in the form of an abstract to a national or international meeting (oral or poster presentation) • submit a manuscript for publication in a peer-reviewed journal.	

Theme 6	Research
Learning Objective 6.2	Identify and apply methods used in clinical and/or basic research in respiratory medicine

Knowledge	Skills
• identify methods used in clinical and/or basic research in respiratory medicine • identify components involved in conducting clinical and/or basic research, including study design, data analysis and interpretation of research • describe the strengths and weaknesses of the various tools used in respiratory research • identify the major journals which publish respiratory related research.	• apply research methods, using the various tools employed in respiratory research • apply issues related to study design, data analysis and interpretation • critically evaluate respiratory research in clinical journal clubs • appraise relevance of respiratory research to clinical practice.

Theme 6	Research
Learning Objective 6.3	Plan and execute a clinical or basic respiratory research project

Knowledge	Skills
• identify the types of study design • describe the ethical implications of respiratory research and requirements to submit research projects for ethical approval • describe statistical analysis methods, including issues related to sample size and statistical power • describe measurement techniques • describe the methods of literature review • describe the requirements for publication of research projects.	• formulate a hypothesis • design a basic research protocol • critically evaluate published research studies • collect and analyse research data • construct and write an abstract containing data from a research study • present a research project to an audience in oral or poster format • write a manuscript for publication in a peer review journal.*

**Useful but not essential*

ABBREVIATIONS	
ABGs	arterial blood gases
ABPA	allergic bronchopulmonary aspergillosis
ALTE	apparent life threatening event
ARDS	acute respiratory distress syndrome
ARI	acute respiratory infection
BAL	broncho-alveolar lavage
BOOP	bronchiolitis obliterans organising pneumonia
CAP	community acquired pneumonia
CF	cystic fibrosis
CFTR	cystic fibrosis transmembrane conductance regulator
ChILD	interstitial lung disease of childhood
CLDP	chronic lung disease of prematurity
COP	cryptogenic organising pneumonia
CPAP	continuous positive airway pressure
CPI	chronic pneumonitis of infancy
CSLD	chronic suppurative lung disease
CT	computed tomography
DLCO	diffusing capacity of the lung for carbon monoxide
DIP	desquamative interstitial pneumonitis
DOTS	direct observed treatment, short course
DVT	deep vein thrombosis
ECMO	extracorporeal membrane oxygenation
EMG	electromyography
ENT	ear, nose and throat specialist
ETT	endotrachial tube
FOT	forced oscillation technique
GORD	gastro-oesophageal reflux disease

HAART	highly active antiretroviral therapy
HFO	high frequency oscillation
HIV/AIDS	human immunodeficiency virus/acquired immune deficiency syndrome
HRCT	high resolution computed tomography
ICC	intercostal catheter
ICU	intensive care unit
IgE	immunoglobulin E
LIP	lymphocytic interstitial pneumonia
MIP	maximal inspiratory pressure
MEP	maximal expiratory pressure
MRI	magnetic resonance imaging
NEHI	neuroendocrine hyperplasia of infancy
NICU	neonatal intensive care unit
NIV	noninvasive ventilation
NMD	neuromuscular disorders
NO	nitric oxide
NSIP	nonspecific interstitial pneumonia
OSA	obstructive sleep apnoea
PCD	primary ciliary dyskinesia
PCP	pneumocystis carinii pneumonia
PDA	patent ductus arteriosus
PE	pulmonary embolism
PEF	peak expiratory flow
PIG	pulmonary interstitial glycogenosis
PSG	polysomnography
RSV	respiratory syncytial virus
SARS	severe acute respiratory syndrome
SIDS	sudden infant death syndrome

SP	surfactant protein
T&A	adenotonsillectomy
TB	tuberculosis
VAP	ventilator acquired pneumonia
VATS	video-assisted thoracoscopic surgery
V/Q	ventilation-perfusion