



Respiratory Physiotherapy Task Force

# Recommendations for a core curriculum in respiratory physiotherapy for paediatric patients

The European Respiratory Society (ERS) Respiratory Physiotherapy task force has previously developed a syllabus, describing a core set of knowledge, skills and attitudes that physiotherapists require in order to assess, treat and follow patients with respiratory disorders. A detailed overview of this syllabus and its methodology is available elsewhere (Pitta et al., 2014). From the syllabus, the core team have now built a curriculum, which provides insight in the content and the format of the educational content (skills and knowledge any respiratory physiotherapist should possess). The curriculum focuses on *how these aspects will be taught*. The curriculum is divided into eleven modules, out of which nine are mandatory and two are considered optional. For each module, the *competencies* required of the trainee have been outlined considering the knowledge, skills and attitudes prescribed within the module and expected of the trainee on entry into practice. The CanMEDS 2015 Framework was used as a reference for a competency-based medical education model. For each module the corresponding CanMEDS roles a physiotherapist should be able to acquire/perform after following a certain module were specified.

**Pre-requisites for entering into the specialty:** Trainees must have fully completed their physiotherapy education and to be nationally recognised and licenced to practice.

For those entering into specialty training in paediatric respiratory physiotherapy, it is recommended that a certain number of clinical experience should be present.

**Target Audience:** All certified physiotherapists working within respiratory physiotherapy areas of practice are eligible to enter training.

**Minimum duration of training:** It is recommended a period of minimum one year of work (full time employment) within a respiratory area of practice (depending on local differences such as availability of specific centres/ general hospital with respiratory ward). It should be allowed the possibility of completing the programme part time within a maximum of 3 years. The length of training may be reviewed by an appeals committee in exceptional circumstances.

The curriculum includes the following elements:

The **learning outcomes** (knowledge, skills and attitudes) a respiratory physiotherapist should possess. These will guide the trainee and trainer to achieve competencies.

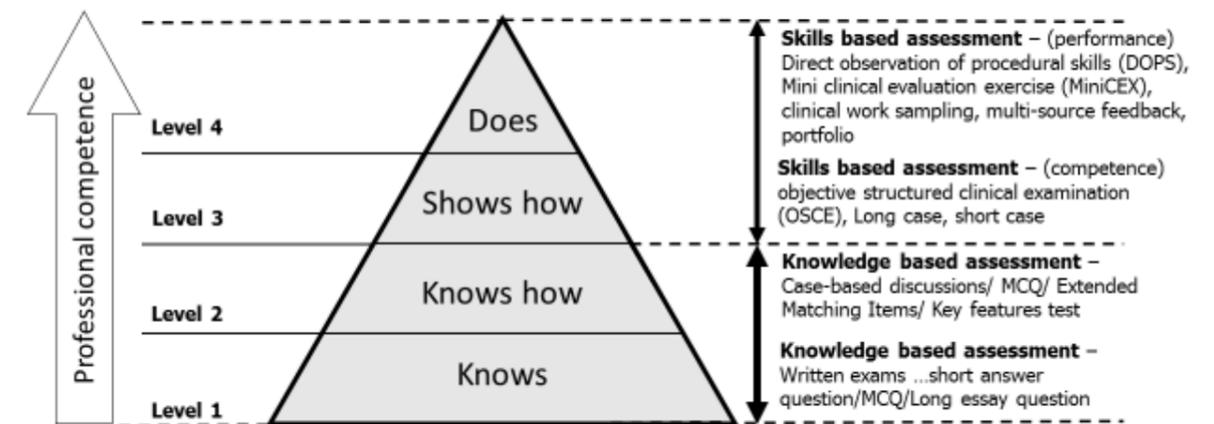
The **teaching and learning opportunities** used to teach the learning outcomes. These prescribe a teaching method appropriate to the competency or may include a sample clinical situation. This may include informal and/or formal learning opportunities suitable for postgraduate/postspecialty learning environments.

The best **teaching methods and assessments** used. These include the methods which are applicable across all training centre networks irrespective of geographical location. Assessments are linked to the learning outcomes and the level of competence required.

The appropriate **assessment level** used to evaluate the desired learning outcomes. This is based upon Miller's model of clinical competence). Selection of appropriate assessment methods fit for purpose are essential to the validity of assessments and to predict whether a trainee is competent to practice. The level of assessment has been assigned in alignment with the learning outcomes (knowledge, skills and attitudes), assessment methods chosen and teaching and learning opportunities.

The **minimum clinical and educational exposure** (such as number of patients/procedures) considered necessary for a paediatric respiratory physiotherapist to practice on its own. These are defined globally per curriculum track in terms of a total number of patients. In addition, the specific procedures that should be mastered in each module are to be identified specifically. A certain number of cases to be mentioned as necessary to be performed both independently and under supervision. To assess this in terms of percentages of learning outcomes and by providing the evidence attesting that it was performed under clinical exposure. For instance, a minimum of 50 patients is considered sufficient to cover at least 80% of the procedures listed across all modules. The patients can come from different settings such as: hospital based, ambulatory or community care. The procedures should be performed a certain number of times (to be determined per module). At the same time, we recommend using (whenever it is possible) the same patients for performing the different procedures. In addition, for the experience trainees can't acquire at their local unit, we recommend a placement at a different institution.

Millers Model of clinical competence



Adapted figure from Miller's model of clinical competence, and organisation of assessment methods reproduced from Amin et al. (2006)<sup>1</sup>, with permission from the publisher.

The **attitudes** are classified according to the CanMEDS (the framework is included below in the document for convenience). At graduate level, physiotherapy is defined by the World Confederation for Physical Therapy (WCPT, a confederation of local and regional professional physical therapy/physiotherapy professional associations) as follows<sup>2</sup>: "Physical therapy involves the interaction between the physical therapist, patients/clients, other health professionals, families, care givers and communities in a process where movement potential is examined/assessed and goals are agreed upon, using knowledge and skills unique to physical therapists". From this definition it is clear that interactions with different stakeholders is in the core of the physiotherapists profession and training. At the entry-level to the profession the WCPT defined a number of 10 professional attitudes that are expected from physical therapists at this stage. These attitudes are very closely related to those described in the CanMEDS system and include: Accountability, Altruism, Compassion/caring, Cultural competence, Ethical behavior, Integrity, Personal and professional development, Professional duty, Social responsibility and advocacy, Teamwork<sup>3</sup>.

In the present postgraduate formation, the Task Force opted not to specifically name all professional attitudes that a physiotherapist should possess, but rather point out specific attitudes that can be evaluated for specific items of the curriculum on top of the Professional Behaviors outlined by the World Confederation for Physical Therapy. It goes without saying that other attitudes of the CanMEDS model are also important in order to successfully execute the tasks dedicated to a physiotherapist. It is noted that some of these roles, may be dependent on the job description. For example not all (respiratory) physiotherapists will be in a 'teaching' role towards scholars or in a 'leadership' position, even after obtaining a further professional competence in respiratory physiotherapy. Attitudes towards patients and other health care workers are, however required and implicit for all physiotherapists, including those with specialization in respiratory physiotherapy.

For the Paediatric module it is important to state that a professional relationship is not only established with the patient, but also with family members with legal and social responsibilities towards the child. In particular the following aspects are considered relevant to all modules:

- Adopt a professional manner with paediatric patients of all ages, families, care givers and professionals in the health care team in helping them to understand the clinical problems, assessment findings and treatment options in relation to alleviating the problem.
- Obtain consent for assessment or treatment from the patient and/or relevant family members, and respect the patient's dignity and privacy.

1. Amin, Z., Chong, Y. S., & Eng, K.H. Practical guide to medical student assessment. World Scientific, 2006.

2. World Confederation for Physical Therapy. WCPT Policy statement: description of physical therapy London, UK: WCPT; 2015. <http://www.wcpt.org/policy/ps-descriptionPT>

3. World Confederation for Physical Therapy. WCPT guideline for physical therapist professional entry level education. London, UK: WCPT; 2011. [www.wcpt.org/guidelines/entry-level-education](http://www.wcpt.org/guidelines/entry-level-education)

## List of abbreviations

<b>ABG</b>	Arterial blood gases	<b>MCQ</b>	Multiple choice question
<b>ACBT</b>	Active cycle of breathing techniques	<b>MDT</b>	Multidisciplinary team
<b>ACT</b>	Airway clearance techniques	<b>Mini-CEX</b>	Mini clinical evaluation exercise
<b>AD</b>	Autogenic drainage	<b>NICU</b>	Newborn / neonatal ICU
<b>ADL</b>	Activities of daily living	<b>NIV</b>	Non-invasive ventilation
<b>BLS</b>	Basic life support	<b>NMD</b>	Neuromuscular disorders
<b>BPAP</b>	Bi-level positive airway pressure	<b>NO</b>	Nitric oxide
<b>CF</b>	Cystic fibrosis	<b>O<sub>2</sub></b>	Oxygen
<b>CICU</b>	Cardiac/ coronary intensive care unit	<b>OSCE</b>	Objective structured clinical examination
<b>CNEP</b>	Continuous negative extrathoracic pressure ventilation	<b>PEEP</b>	Positive end expiratory pressure
<b>CO<sub>2</sub></b>	Carbon dioxide	<b>PEP</b>	Positive expiratory pressure
<b>CPAP</b>	Continuous positive airway pressure	<b>PICU</b>	Paediatric intensive care unit
<b>DOPS</b>	Direct observation of procedural skills	<b>PS</b>	Pressure support
<b>EBM</b>	Evidence-based medicine	<b>RMT</b>	Respiratory muscle training
<b>ECG</b>	Electrocardiogram	<b>SAQ</b>	Short Answer Question
<b>ECMO</b>	Extracorporeal membrane oxygenation	<b>VAPS</b>	Volume assured pressure support
<b>ELTGOL</b>	(fr. Effect of Slow Expiration with Glottis Opened in Lateral Posture)		
<b>FET</b>	Forced expiratory technique		
<b>GPB</b>	Glossopharyngeal breathing		
<b>HFCWO</b>	High frequency chest wall oscillations		
<b>HFOT</b>	High flow oxygen therapy		
<b>HH</b>	Heated humidifiers		
<b>HME</b>	Heat moisture exchangers		
<b>ICU</b>	Intensive care unit		
<b>IPV</b>	Intrapulmonary percussive ventilation		

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**\*General Curriculum Attitudes / Competencies (as dictated by the CanMEDS Physician Competency Framework)**

**Medical Expert:  
Key Competencies**

**Enabling Competencies**

<p><b>1. Practise medicine within their defined scope of practice and expertise</b></p>	<p>1.1 Demonstrate a commitment to high-quality care of their patients                  1.2 Integrate the CanMEDS Intrinsic Roles into their practice of medicine                  1.3 Apply knowledge of the clinical and biomedical sciences relevant to their discipline                  1.4 Perform appropriately timed clinical assessments with recommendations that are presented in an organized manner                  1.5 Carry out professional duties in the face of multiple, competing demands                  1.6 Recognize and respond to the complexity, uncertainty, and ambiguity inherent in medical practice</p>
<p><b>2. Perform a patient-centred clinical assessment and establish a management plan</b></p>	<p>2.1 Prioritize issues to be addressed in a patient encounter                  2.2 Elicit a history, perform a physical exam, select appropriate investigations, and interpret their results for the purpose of diagnosis and management, disease prevention, and health promotion                  2.3 Establish goals of care in collaboration with patients and their families, which may include slowing disease progression, treating symptoms, achieving cure, improving function, and palliation                  2.4 Establish a patient-centred management plan</p>
<p><b>3. Plan and perform procedures and therapies for the purpose of assessment and / or management</b></p>	<p>3.1 Determine the most appropriate procedures or therapies                  3.2 Obtain and document informed consent, explaining the risks and benefits of, and the rationale for, a proposed procedure or therapy                  3.3 Prioritize a procedure or therapy, taking into account clinical urgency and available resources                  3.4 Perform a procedure in a skilful and safe manner, adapting to unanticipated findings or changing clinical circumstances</p>
<p><b>4. Establish plans for ongoing care and, when appropriate, timely consultation</b></p>	<p>4.1 Implement a patient-centred care plan that supports ongoing care, follow-up on investigations, response to treatment, and further consultation</p>
<p><b>5. Actively contribute, as an individual and as a member of a team providing care, to the continuous improvement of health care quality and patient safety</b></p>	<p>5.1 Recognize and respond to harm from health care delivery, including patient safety incidents                  5.2 Adopt strategies that promote patient safety and address human and system factors</p>

**Communicator:  
Key Competencies**

**Enabling Competencies**

<p><b>1. Establish professional therapeutic relationships with patients and their families</b></p>	<p>1.1 Communicate using a patient-centred approach that encourages patient trust and autonomy and is characterised by empathy, respect, and compassion                  1.2 Optimize the physical environment for patient comfort, dignity, privacy, engagement, and safety.                  1.3 Recognize when the values, biases, or perspectives of patients, physicians, or other health care professionals may have an impact on the quality of care, and modify the approach to the patient accordingly.                  1.4 Respond to a patient's non-verbal behaviours to enhance communication                  1.5 Manage disagreements and emotionally charged conversations                  1.6 Adapt to the unique needs and preferences of each patient and to his or her clinical condition and circumstances</p>
<p><b>2. Elicit and synthesize accurate and relevant information, incorporating the perspectives of patients and their families</b></p>	<p>2.1 Use patient-centred interviewing skills to effectively gather relevant biomedical and psychosocial information                  2.2 Provide a clear structure for and manage the flow of an entire patient encounter                  2.3 Seek and synthesize relevant information from other sources, including the patient's family, with the patient's consent</p>
<p><b>3. Share health care information and plans with patients and their families</b></p>	<p>3.1 Share information and explanations that are clear, accurate, and timely, while checking for patient and family understanding                  3.2 Disclose harmful patient safety incidents to patients and their families accurately and appropriately</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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<p><b>4. Engage patients and their families in developing plans that reflect the patient’s health care needs and goals</b></p> <p><b>5. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy</b></p>	<p>4.1 Facilitate discussions with patients and their families in a way that is respectful, non-judgemental, and culturally safe.</p> <p>4.2 Assist patients and their families to identify, access, and make use of information and communication technologies to support their care and manage their health</p> <p>4.3 Use communication skills and strategies that help patients and their families make informed decisions regarding their health</p> <p>5.1 Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements</p> <p>5.2 Communicate effectively using a written health record, electronic medical record, or other digital technology</p> <p>5.3 Share information with patients and others in a manner that respects patient privacy and confidentiality and enhances understanding</p>
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<u>Collaborator:</u> Key Competencies	Enabling Competencies
<p><b>1. Work effectively with physicians and other colleagues in the health care professions</b></p> <p><b>2. Work with physicians and other colleagues in the health care professions to promote understanding, manage differences, and resolve conflicts</b></p> <p><b>3. Hand over the care of a patient to another health care professional to facilitate continuity of safe patient care</b></p>	<p>1.1 Establish and maintain positive relationships with physicians and other colleagues in the health care professions to support relationship-centred collaborative care</p> <p>1.2 Negotiate overlapping and shared responsibilities with physicians and other colleagues in the health care professions in episodic and ongoing care</p> <p>1.3 Engage in respectful shared decision-making with physicians and other colleagues in the health care professions</p> <p>2.1 Show respect toward collaborators</p> <p>2.2 Implement strategies to promote understanding, manage differences, and resolve conflicts in a manner that supports a collaborative culture</p> <p>3.1 Determine when care should be transferred to another physician or health care professional</p> <p>3.2 Demonstrate safe handover of care, using both verbal and written communication, during a patient transition to a different health care professional, setting, or stage of care</p>

<u>Leader:</u> Key Competencies	Enabling Competencies
<p><b>1. Contribute to the improvement of health care delivery in teams, organizations, and systems</b></p> <p><b>2. Engage in the stewardship of health care resources</b></p> <p><b>3. Demonstrate leadership in professional practice</b></p> <p><b>4. Manage career planning, finances, and health human resources in a practice</b></p>	<p>1.1 Apply the science of quality improvement to contribute to improving systems of patient care</p> <p>1.2 Contribute to a culture that promotes patient safety</p> <p>1.3 Analyze patient safety incidents to enhance systems of care</p> <p>1.4 Use health informatics to improve the quality of patient care and optimize patient safety</p> <p>2.1 Allocate health care resources for optimal patient care</p> <p>2.2 Apply evidence and management processes to achieve cost-appropriate care</p> <p>3.1 Demonstrate leadership skills to enhance health care</p> <p>3.2 Facilitate change in health care to enhance services and outcomes</p> <p>4.1 Set priorities and manage time to integrate practice and personal life</p> <p>4.2 Manage a career and a practice</p> <p>4.3 Implement processes to ensure personal practice improvement</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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<b>Health Advocate:</b> Key Competencies	Enabling Competencies
<p><b>1. Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment</b></p> <p><b>2. Respond to the needs of the communities or populations they serve by advocating with them for system-level change in a socially accountable manner</b></p>	<p>1.1 <i>Work with patients to address determinants of health that affect them and their access to needed health services or resources</i></p> <p>1.2 <i>Work with patients and their families to increase opportunities to adopt healthy behaviours</i></p> <p>1.3 <i>Incorporate disease prevention, health promotion, and health surveillance into interactions with individual patients</i></p> <p>2.1 <i>Work with a community or population to identify the determinants of health that affect them</i></p> <p>2.2 <i>Improve clinical practice by applying a process of continuous quality improvement to disease prevention, health promotion, and health surveillance activities</i></p> <p>2.3 <i>Contribute to a process to improve health in the community or population they serve</i></p>
<b>Scholar:</b> Key Competencies	Enabling Competencies
<p><b>1. Engage in the continuous enhancement of professional activities through ongoing learning</b></p> <p><b>2. Teach students, residents, the public, and other health care professionals</b></p> <p><b>3. Integrate best available evidence into practice</b></p> <p><b>4. Contribute to the creation and dissemination of knowledge and practices applicable to health</b></p>	<p>1.1 <i>Develop, implement, monitor, and revise a personal learning plan to enhance professional practice</i></p> <p>1.2 <i>Identify opportunities for learning and improvement by regularly reflecting on and assessing their performance using various internal and external data sources</i></p> <p>1.3 <i>Engage in collaborative learning to continuously improve personal practice and contribute to collective improvements in practice</i></p> <p>2.1 <i>Recognize the influence of role-modelling and the impact of the formal, informal, and hidden curriculum on learners</i></p> <p>2.2 <i>Promote a safe learning environment</i></p> <p>2.3 <i>Ensure patient safety is maintained when learners are involved</i></p> <p>2.4 <i>Plan and deliver a learning activity</i></p> <p>2.5 <i>Provide feedback to enhance learning and performance</i></p> <p>2.6 <i>Assess and evaluate learners, teachers, and programmes in an educationally appropriate manner</i></p> <p>3.1 <i>Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that address them</i></p> <p>3.2 <i>Identify, select, and navigate pre-appraised resources</i></p> <p>3.3 <i>Critically evaluate the integrity, reliability, and applicability of health-related research and literature</i></p> <p>3.4 <i>Integrate evidence into decision-making in their practice</i></p> <p>4.1 <i>Demonstrate an understanding of the scientific principles of research and scholarly inquiry and the role of research evidence in health care</i></p> <p>4.2 <i>Identify ethical principles for research and incorporate them into obtaining informed consent, considering potential harms and benefits, and considering vulnerable populations</i></p> <p>4.3 <i>Contribute to the work of a research programme</i></p> <p>4.4 <i>Pose questions amenable to scholarly inquiry and select appropriate methods to address them</i></p> <p>4.5 <i>Summarise and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry</i></p>
<b>Professional:</b>	

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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Key Competencies	Enabling Competencies
<p><b>1. Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards</b></p>	<p>1.1 Exhibit appropriate professional behaviours and relationships in all aspects of practice, demonstrating honesty, integrity, humility, commitment, compassion, respect, altruism, respect for diversity, and maintenance of confidentiality</p> <p>1.2 Demonstrate a commitment to excellence in all aspects of practice</p> <p>1.3 Recognize and respond to ethical issues encountered in practice</p> <p>1.4 Recognize and manage conflicts of interest</p> <p>1.5 Exhibit professional behaviours in the use of technology-enabled communication</p>
<p><b>2. Demonstrate a commitment to society by recognizing and responding to societal expectations in health care</b></p>	<p>2.1 Demonstrate accountability to patients, society, and the profession by responding to societal expectations of physicians</p> <p>2.2 Demonstrate a commitment to patient safety and quality improvement</p>
<p><b>3. Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation</b></p>	<p>3.1 Fulfil and adhere to the professional and ethical codes, standards of practice, and laws governing practice</p> <p>3.2 Recognize and respond to unprofessional and unethical behaviours in physicians and other colleagues in the health care professions</p> <p>3.3 Participate in peer assessment and standard-setting</p>
<p><b>4. Demonstrate a commitment to physician health and well-being to foster optimal patient care</b></p>	<p>4.1 Exhibit self-awareness and manage influences on personal well-being and professional performance</p> <p>4.2 Manage personal and professional demands for a sustainable practice throughout the physician life cycle</p> <p>4.3 Promote a culture that recognizes, supports, and responds effectively to colleagues in need</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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### Module 1 Introduction to respiratory paediatrics

Mandatory

Module Competency *To assess the paediatric patient spectrum with its enormous variation in size and weight, acknowledge age-specific structural and functional features of the patient in general and the respiratory system in particular. To appraise the impact of the disease on changing structure and function and translate this into physiotherapeutic approaches.*

CanMEDS Roles



*In this module the following CanMEDS roles are identified: This module is mainly a theoretical, knowledge based module. No specific attitudes are required.*

1. Anatomy	<ul style="list-style-type: none"> <li>• Discuss normal growth and development with special focus on the respiratory tract system</li> <li>• Discuss impact of developmental disorders on vulnerability and disease</li> <li>• Distinguish between prenatal and postnatal growth disorders with impact on the respiratory tract system</li> <li>• Discuss risk factors leading to disturbed growth and developmental defects</li> <li>• Translate knowledge on growth and development into diagnostic and therapeutic approaches to patients of varying age and size</li> </ul>			<ul style="list-style-type: none"> <li>Self-directed learning</li> <li>Literature search and appraisal</li> <li>Formal learning through courses</li> </ul>	<ul style="list-style-type: none"> <li>Multiple choice question (MCQ)</li> <li>Short answer question (SAQ)</li> </ul>	1	Keep up to date with advances, discuss with educators
2. Physiology	<ul style="list-style-type: none"> <li>• Discuss the impact of growth and development on respiratory structure and function</li> <li>• Discuss age-specific characteristics including the transition from foetal to neonatal life and from adolescence to adulthood.</li> <li>• Discuss the impact of growth and development on respiratory symptoms and normal values</li> <li>• Demonstrate ability to transfer physiology knowledge into diagnostic and therapeutic approaches</li> <li>• Discuss the interaction between the cardiovascular and respiratory systems</li> </ul>	<ul style="list-style-type: none"> <li>• Approach, assess and treat patients with age- and development-specific strategies, that correspond to the intellectual, social, somatic and respiratory developmental stage of the patient</li> </ul>		<ul style="list-style-type: none"> <li>Self-directed learning</li> <li>Literature search and appraisal</li> <li>Management of patients in clinical practice</li> <li>Learn with other professionals</li> <li>Participate in case-based discussions</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ</li> </ul>	2	Keep up to date with advances, discuss with teachers
3. Pathophysiology	<ul style="list-style-type: none"> <li>• Discuss age-specific disease patterns and their impact on respiratory functions</li> <li>• Discuss the responses of a growing respiratory tract system to inherited disorders, infections, trauma and other pathogenic processes</li> <li>• Discuss the impact of growth on disease mechanisms including growth and maturation as a possible factor for healing and alleviation of disease</li> <li>• Discuss the impact of disease mechanisms on growth and development</li> <li>• Translate knowledge into appropriate diagnostic and therapeutic strategies</li> <li>• Recognize age-specific symptoms</li> </ul>			<ul style="list-style-type: none"> <li>Self-directed learning</li> <li>Literature search and appraisal</li> <li>Management of patients in clinical practice under supervision</li> <li>Learn with other professionals</li> <li>Participate in case-based discussions</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ</li> </ul>	2	Keep up to date with advances, discuss with teachers

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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## Module 2 General assessment of paediatric patients with respiratory conditions

### Mandatory

Module Competency *To perform assessment of paediatric patients presenting with respiratory conditions, and interpret findings in a systematic way using a standard evaluation (Nolan 2011, Robertson & Al-Haddad 2013, Thim et al 2012)*

### CanMEDS Roles



*In this module the following CanMEDS roles are identified: the Expert, Communicator, Collaborator, Professional, Scholar and Health Advocate.*

*Specifically for attitudes the following roles are identified: communicator (all items under point 1). Collaborator (all items under points 1 & 2), is mainly relevant for assessments that are not performed by PTs but rather by other HCPs. Other attitudes specific for specific items are listed below.*

1. Respiratory pattern	<ul style="list-style-type: none"> <li>Discuss characteristic signs and symptoms, including respiratory rate, chest shape and movement, respiratory symmetry and asymmetry, retractions, breath sounds and noises, paradoxical breathing, respiratory alternans, abdominal and accessory muscle contribution and skin colour across the entire spectrum of growth and development</li> <li>Demonstrate an understanding of the change in respiratory pattern during growth and development in children</li> <li>Discuss physiological concepts of dead space ventilation and alveolar ventilation</li> <li>Discuss main mechanisms of control of breathing</li> <li>Explain how pathologies may result in different respiratory patterns and differentiate between types of normal and abnormal breathing patterns in children, including signs of respiratory distress such as nasal flaring, inter- and sub-costal recession, tachypnoea, grunting and cyanosis</li> <li>Discuss indications and limitations of assessment in respiratory pattern</li> </ul>	<ul style="list-style-type: none"> <li>Observe the child's breathing pattern (including chest wall and abdominal movement) throughout the assessment, looking out for signs of effort, dyspnoea or distress, accessory muscle use, asymmetry or pain and evaluate the quality of speech or crying</li> <li>Develop a clear diagnostic picture of disease-inflicted alterations of respiratory structure and function</li> <li>Assess the child's breathing pattern in terms of respiratory muscle strength, central respiratory drive, frequency, amplitude, variation, and its appropriateness for function</li> <li>Palpate, percuss and auscultate the chest wall in order to assess tracheal position, quality of air entry, resonance and relative movement of the chest wall during breathing, as well as the presence of fremitus or added sounds, in order to identify any factors that might affect breathing patterns</li> <li>Assess any changes in respiratory pattern during and after any treatment intervention</li> <li>Assess and re-assess the efficacy of treatment</li> </ul>	<ul style="list-style-type: none"> <li>Develop sufficient patience for assessing these signs and symptoms accurately in a fearful, struggling, crying or otherwise difficult to handle paediatric patient</li> </ul>	<p>Formal learning through courses</p> <p>Work-based learning / Clinical internships</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	4	Assess and diagnose respiratory distress and dyspnoea in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients managed alone
2. Respiratory distress and dyspnoea	<ul style="list-style-type: none"> <li>Discuss the main physiological, pathological and psychological mechanisms leading to respiratory distress and dyspnoea in children of all ages.</li> <li>Explain how the complex interactions between respiratory feedback mechanisms and cognitive and contextual factors may result in and affect dyspnoea.</li> <li>Discuss the impact of age and developmental stage on symptoms for respiratory distress and dyspnoea</li> <li>Explain terminology related to respiratory distress and dyspnoea such as orthopnoea, tachypnoea, bradypnoea</li> <li>Explain how respiratory and non-respiratory conditions may result in and affect respiratory distress and dyspnoea</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate competence in administration of an appropriate logical, systematic assessment to identify respiratory distress and dyspnoea in children of different ages</li> <li>Demonstrate competence in accurately interpreting findings from assessment in directing and evaluating respiratory physiotherapy treatments</li> <li>Assess the duration and severity of dyspnoea, as well as any changes over time, and the factors that exacerbate or relieve dyspnoea, such as body positions, physical activity, anxiety or exposure to allergens.</li> <li>Decide on an initial physiotherapy treatment if available for the patient to alleviate respiratory distress and dyspnoea</li> </ul>	<ul style="list-style-type: none"> <li>Communicator 4.2 and 4.3</li> <li>Professional 1.1</li> <li>Communicate about the impact of dyspnoea in a clear, honest and comprehensible manner to children and families, with due regard to their age appropriate understanding, and ability to cooperate.</li> </ul>	<p>Work-based learning/ Clinical internships</p> <p>Formal learning through courses</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	4	Assess and diagnose respiratory distress and dyspnoea in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients managed alone

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Discuss indications and limitations of assessment tools in respiratory distress and dyspnoea including scales and questionnaires</li> <li>Discuss treatment strategies for respiratory distress and dyspnoea in different diseases and age groups</li> <li>Differentiate accurately the types and severity of chronic and acute respiratory distress and dyspnoea in individual patients</li> </ul>	<ul style="list-style-type: none"> <li>Assess the changes in respiratory distress and dyspnoea during and after treatment and adapt or modify the treatment accordingly</li> <li>Adapt the treatment to the severity of respiratory distress and dyspnoea as well as to the age and developmental stage of the paediatric patient</li> </ul>					
3. Auscultation and lung sounds	<ul style="list-style-type: none"> <li>Discuss anatomy and physiology of the respiratory system related to auscultation</li> <li>State the basic physics leading to lung sounds in paediatric patients and explain the differences between normal and abnormal lung sounds heard over different parts of the chest wall</li> <li>Describe optimal conditions for assessing and interpreting breath-sounds, including quiet environment, systematic sequence comparing sides, with direct skin contact, from lung apex to base, both anteriorly and posteriorly and the patient breathing with an open mouth.</li> <li>Appraise normal lung sounds and explain how pathologies may result in altered sounds</li> <li>Translate various respiratory sounds and noises into pathophysiologic concepts</li> <li>Describe how palpation or percussion over the chest wall may assist with diagnosis of respiratory pathology, through changes in resonance or fremitus</li> <li>Discuss assessment of lung sounds and the presence of lung sounds to the application of respiratory physiotherapy practice</li> <li>List the risk associated with auscultation (cross infection) and the steps taken to minimize these risks</li> </ul>	<ul style="list-style-type: none"> <li>Perform auscultation in children of all ages taking into account the environment where this investigation is best performed (systematic sequence comparing sides, with direct skin contact, from lung apex to base, both anteriorly and posteriorly and the patient breathing with an open mouth when feasible)</li> <li>Use appropriate direct or indirect techniques such as palpation or percussion over the chest wall to identify abnormal lung sounds</li> <li>Amalgamate auscultation findings with other clinical signs into a pathophysiologic concept</li> <li>According to guidelines, implement hygiene measures related to the use of a stethoscope</li> <li>Maintain contemporaneous, comprehensive and legible medical records in relation to assessment and monitoring, consistent with medico-legal requirements</li> </ul>	<ul style="list-style-type: none"> <li>Develop sufficient patience and ensure cooperation of the child in order to obtain meaningful auscultation findings</li> <li>Communicator 3.1</li> </ul>	<p>Self-directed learning</p> <p>Courses</p> <p>Clinical Simulators</p> <p>Supervised bedside learning</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation</p> <p>Case based (long/short case) examination</p>	4	Perform auscultation and interpret findings in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients auscultated alone
4. Cough and Mucus	<ul style="list-style-type: none"> <li>Describe mucus production, sputum characteristics, mucociliary clearance and cough mechanisms, in the lungs in health and disease</li> <li>Explain the physiological principles and mechanisms of mucus production and clearance and how it is affected by pathology and pharmacotherapy</li> <li>Describe the advantages and limitations of different outcome measures for measuring cough, expiratory flow, mucus volume, weight and rheology in different clinical circumstances</li> <li>Describe the rheology of mucus and how it affects airway clearance</li> <li>Describe the components of cough and evaluate the different steps in effective coughing</li> <li>Distinguish between different types of cough in paediatric patients of all age groups</li> <li>Explain how pathologies may result in abnormal cough and mucus production/retention</li> <li>Explain potential physiotherapy interventions for alleviating problems associated with mucus</li> </ul>	<ul style="list-style-type: none"> <li>Distinguish between different cough patterns</li> <li>Use appropriate assessment tools for cough (i.e. peak cough flow, peak expiratory flow, maximal expiratory pressure, lung volumes, etc.)</li> <li>Assess the changes in cough and mucus retention after pharmacological and non-pharmacological treatment (for example airways clearance techniques, cough assist devices, and assisted cough techniques)</li> <li>Obtain sputum samples of good quality</li> <li>Evaluate sputum characteristics (volume, viscosity, adhesivity, colour, smell)</li> <li>Assess the changes in mucus quality and quantity after pharmacological and non-pharmacological treatment</li> <li>Minimise the risks associated with cross infection and maintain compliance with local guidelines on infection prevention and control policies</li> </ul>	<ul style="list-style-type: none"> <li>Communicator 3.1</li> </ul>	<p>Courses</p> <p>Work-based learning/ Clinical internships</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	4	Interpret cough and mucus characteristics in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients interpreted alone

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	retention or ineffective cough in children with respiratory disorders						
5. Pulmonary function testing: assessment and interpretation	<ul style="list-style-type: none"> <li>Differentiate between different types of <b>pulmonary</b> function tests and explain how respiratory mechanics and lung volumes, are assessed at different stages during childhood</li> <li>Interpret a pulmonary function test result in relation to its role in directing or evaluating pharmacological and non-pharmacological treatments</li> <li>Integrate clinical findings with <b>pulmonary</b> function test results for developing an in-depth picture of compromised respiratory function</li> <li>Recognise normal signal quality versus artefact of measurement techniques</li> <li>Link the lung function impairment to therapeutic implications in respiratory physiotherapy</li> <li>Describe the normal lung function values during growth and development and explain how <b>pulmonary</b> function tests may provide specific information about abnormalities of lung function in children</li> <li>Explain the impact of different cardiorespiratory disorders on lung function (e.g. lung defects, airway diseases, obesity, neurological and muscle disorders)</li> <li>Explain the impact of thorax deformities in the interpretation of <b>pulmonary</b> function tests (e.g. use armspan instead of height)</li> <li>Describe the physiologic background and interpretation of lung volumes and flows as well as curve shapes, including the diagnostic implications of such measurements</li> <li>Describe the strengths and limitations of the primary techniques used to measure lung function (including static and dynamic lung volumes) in children of all ages</li> <li>Discuss the impact of age, developmental stage, intellectual and language abilities on the possibility to perform <b>pulmonary</b> function tests in paediatric patients and the importance of familiarisation and encouragement in optimising performance in paediatric <b>pulmonary</b> function testing</li> <li>Describe the impact of age on applicable lung function technology</li> <li>Describe hygiene requirements for performing <b>pulmonary</b> function testing</li> </ul>	<ul style="list-style-type: none"> <li>Select and perform appropriate basic <b>pulmonary</b> function tests in children over the age of 6 years</li> <li>Demonstrate competence in familiarisation and encouragement of children to optimise lung function performance</li> <li>Perform basic <b>pulmonary</b> function tests to set-up or follow-up treatment</li> <li>Adhere to hygiene guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Develop age-specific strategies for gaining cooperation with <b>pulmonary</b> function testing in younger children</li> <li>Communicator 3.1</li> </ul>	<p>Self-directed learning</p> <p>Courses</p> <p>Interpretation of lung function results and translation of findings into a concept of disturbed respiratory function under experienced guidance</p> <p>Work experience, watching video's including patient cases</p>	<p>SAQ</p> <p>MCQ</p> <p>Case reports</p> <p>Portfolio</p>	4	Interpret lung function in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients interpreted alone
6. Skeletal muscle function assessment and interpretation	<ul style="list-style-type: none"> <li>Describe age-specific skeletal muscle strength</li> <li>Explain the normal structure and function of the cardiorespiratory musculoskeletal system (including musculoskeletal interactions between ribs, spine, sternum and shoulder girdle)</li> <li>Recall concepts of strength, endurance as well as basic muscle physiology related to muscle structure, contraction and fibre types and explain basic exercise physiology in relation to strength and endurance in developing children</li> </ul>	<ul style="list-style-type: none"> <li>Apply appropriate techniques for the assessment of skeletal muscle strength and skeletal muscle function across all age groups</li> <li>Review the impact of medical disorders on muscle strength</li> <li>Link the musculoskeletal function impairment to therapeutic implications in rehabilitation and respiratory physiotherapy</li> <li>Assess activity pattern, posture and motoric skills in infants and young children</li> </ul>	<ul style="list-style-type: none"> <li>Show patience required for obtaining meaningful assessments in younger children</li> <li>Communicator 3.1</li> </ul>	<p>Courses</p> <p>Watching videos including patient cases</p> <p>Work-based learning/ Clinical internships</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	4	Assess 10 patients under supervision covering the entire paediatric age/size range and when competency is demonstrated, a minimum of 10 patients assessed alone

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Describe the factors that increase the risk for musculoskeletal dysfunction in children (e.g. lung defects, airway diseases, abnormal body composition, neurological and muscle disorders). Differentiate between different types of muscle function tests and activity assessment</li> <li>Describe the strengths and limitations of the primary techniques used to measure musculoskeletal dysfunction in children of all ages</li> <li>Explain the impact of different cardiorespiratory disorders on musculoskeletal dysfunction in children (e.g. lung defects, airway diseases, obesity, neurological and muscle disorders)</li> <li>Explain how to interpret basic musculoskeletal dysfunction test results in children</li> <li>Explain therapeutic options available in respect of abnormal musculoskeletal function in children with respiratory disorders</li> <li>Identify real signals from artefact or suboptimal effort in basic musculoskeletal function measurement techniques</li> <li>Interpret musculoskeletal function results, particularly in relation to their role in directing or evaluating pharmacological and non-pharmacological treatments</li> <li>Link the musculoskeletal function impairment to therapeutic implications in rehabilitation and respiratory physiotherapy</li> </ul>	<ul style="list-style-type: none"> <li>Select and perform appropriate basic musculoskeletal function tests in children (including posture and muscle strength and endurance)</li> </ul>					
7. Respiratory muscle assessment and interpretation	<ul style="list-style-type: none"> <li>Explain the normal structure and function of the respiratory muscles during quiet and effortful breathing in children of all ages</li> <li>Explain the impact of different cardiorespiratory disorders on respiratory muscle activity (e.g. lung diseases, neurological and muscle disorders).</li> <li>Describe methods (including strengths and limitations) for the assessment of respiratory muscle function in children of all ages</li> <li>Explain how to interpret results from assessment methods of respiratory muscles</li> <li>Explain therapeutic options available in respect of abnormal respiratory muscle function results in children with respiratory disorders</li> <li>Identify real signals from artefact or suboptimal effort in basic respiratory muscle function measurement techniques</li> <li>Interpret respiratory muscle function results, particularly in relation to their role in directing or evaluating pharmacological and non-pharmacological treatments</li> </ul>	<ul style="list-style-type: none"> <li>Select and perform appropriate basic respiratory muscle function tests in children of different ages</li> <li>Adhere to relevant hygiene measures</li> </ul>	<ul style="list-style-type: none"> <li>Show patience required for obtaining meaningful measurements in children</li> <li>Communicator 3.1</li> </ul>	<p>Formal learning</p> <p>Work-based learning/ Clinical internships</p> <p>Performing procedures with patients</p> <p>Case-based discussions</p>	<p>MCQ</p> <p>Direct Observation of Procedural Skills (DOPS)</p> <p>Portfolio</p> <p>Case-based examination</p>	4	Assess inspiratory and expiratory muscle strength and endurance in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients assessed alone
8. Blood gas – interpretation	<ul style="list-style-type: none"> <li>Discuss normal gas exchange physiology and oxygen (O<sub>2</sub>) transport in the body in relation to metabolic requirements in children of all ages</li> <li>Explain the impact of different cardiorespiratory disorders on gas exchange and O<sub>2</sub> transport in children (e.g. lung diseases, neurological and muscle disorders)</li> </ul>	<ul style="list-style-type: none"> <li>Select and perform appropriate non-invasive blood gas measures in children of different ages (transcutaneous carbon dioxide (CO<sub>2</sub>) and O<sub>2</sub>)</li> <li>Register and interpret pulse oximetry</li> </ul>	<ul style="list-style-type: none"> <li>Communicator 3.1</li> </ul>	<p>Self-directed learning</p> <p>Courses</p> <p>Case-based discussions</p>	<p>MCQ</p> <p>SAQ</p> <p>Short case</p> <p>Portfolio</p>	4	Interpret measurements in 10 patients under supervision covering the entire paediatric age/size range and when competency is demonstrated, a minimum

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Describe the strengths and limitations of the different techniques used to measure blood gas (e.g. arterial or capillary) in children of all ages</li> <li>Describe theoretical background of blood gases and acid-base balance and implications of various alterations</li> <li>Explain how to interpret arterial or venous blood gas measures in children and identify the normal range for blood gas parameters</li> <li>Identify appropriate tests (direct or indirect measurements) to determine blood gas levels</li> <li>Interpret invasive or non-invasive blood gas (arterial or capillary) and those from acute or chronic respiratory disorders, in relation to their role in directing and evaluating pharmacological and non-pharmacological treatments</li> <li>Compare normal signal quality versus artefact of measurement techniques including calibration</li> <li>Evaluate significance of changes in blood gas measures after pharmacological and non-pharmacological treatments</li> </ul>						of 10 patients interpreted alone
9. Basic interpretation of chest imaging	<ul style="list-style-type: none"> <li>Recall basic principles, strengths and limitations of radiology of the thorax and indications for chest imaging</li> <li>Explain the basic principles of thoracic imaging in children of all ages (including chest radiography, CT scanning, fluoroscopy and ultrasound)</li> <li>Explain how different cardiorespiratory disorders may change the nature and appearance of normal air-filled or solid organs in the thorax, facilitating diagnosis or evaluation of change in condition due to therapy or progression of disease (e.g. consolidation, collapse, pneumothorax, pleural effusion, abscess, fibrosis)</li> <li>Describe evaluation and interpretation strategies</li> <li>Explain how to systematically interpret chest X-rays in children and discuss the radiological appearance of common paediatric chest problems</li> <li>Explain therapeutic options available in respect of abnormal thoracic imaging results in children with respiratory disorders</li> <li>Differentiate real signals from artefact in thoracic images</li> <li>Distinguish between normal and abnormal findings and translate pathological findings into information relevant for the physiotherapeutic approach</li> <li>Link chest X-ray findings in children with acute or chronic respiratory disorders, to their role in directing or evaluating pharmacological and non-pharmacological treatments</li> <li>Evaluate the significance of chest X-rays changes after pharmacological or non-pharmacological treatments</li> <li>Interpret systematically chest X-rays in children and identify the radiological appearance of common paediatric chest problems</li> </ul>		<ul style="list-style-type: none"> <li>Demonstrate willingness to enter into the necessary learning process and to participate in radiologic discussions and interpretation sessions</li> <li>Communicator 3.1</li> </ul>	<p>Self-directed learning</p> <p>Case studies</p> <p>Learning with other professionals including case-based discussions</p> <p>Courses and/or bedside teaching</p>	<p>MCQ</p> <p>Long Case</p> <p>Short case</p> <p>Portfolio</p>	4	Interpret chest x-rays in 10 patients under supervision covering the entire paediatric age/size range and when competency is demonstrated, a minimum of 10 patients interpreted alone

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
10. Body function, disability and participation	<ul style="list-style-type: none"> <li>Recall the World Health Organization classification of health and health-related conditions for children: International Classification of Functioning, Disability, and Health</li> <li>Describe the impact of different cardiorespiratory disorders on activity limitations and participation restrictions in children (e.g. lung diseases, neurological and muscle disorders)</li> <li>Describe the strengths and limitations of different disability and participation measures used in children of all ages (including generic and disease-specific questionnaires, activities of daily living (ADL) measures, and quality of life measures)</li> <li>Discuss the clinical purpose and indications for measuring physical activity and activity limitations and participation restrictions in children of different age groups</li> <li>Explain how to interpret activity limitation and participation restriction measures in children</li> <li>Explain therapeutic options available in respect of disability and participation restriction in children with respiratory disorders</li> <li>Link disability and participation restriction impairments to therapeutic implications in rehabilitation and respiratory physiotherapy</li> <li>Evaluate significance of changes in disability, participation restriction and quality of life after pharmacological and non-pharmacological treatments</li> <li>Interpret different disability and participation restriction measures in children of different ages, in different clinical populations (e.g. Intensive Care Unit (ICU), neuromuscular, chronic vs acute conditions) particularly in relation to their role in directing or evaluating pharmacological and non-pharmacological treatments</li> </ul>	<ul style="list-style-type: none"> <li>Select and administrate appropriate activity limitation, participation restriction and quality of life measures in children of different ages (including generic and disease-specific questionnaires, symptom measures, hospital admissions, ADL and physical activity measures and quality of life measures)</li> </ul>		<p>Courses</p> <p>Clinical internships</p> <p>Case based discussion</p>	<p>MCQ</p> <p>Case based discussion</p> <p>Portfolio</p>	4	
11. Exercise and physical activity	<ul style="list-style-type: none"> <li>Select and administer appropriate exercise and physical activity assessments (knowledge, skills and attitudes covered in mandatory module 6)</li> </ul>						

**Module 3 Specific assessment and treatment of the preterm and neonate (including neonatal intensive care unit)**

Mandatory

Module Competency	<i>To translate knowledge of structural and functional specialities as well as age-specific pathology and pathophysiology into special diagnostic and therapeutic approaches. Translate such knowledge into an appropriate handling routine.</i>
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Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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<p>CanMEDS Roles</p> 	<p><i>In this module the following CanMEDS roles are identified: the Expert, Communicator, Collaborator, Professional, and Scholar.</i></p> <p><i>Specifically for attitudes the following roles are identified: communicator (point 1.1, 1.2 and 3.1 and 4 all items).</i></p>						
<p>1. Assessment methods</p>	<ul style="list-style-type: none"> <li>Discuss diagnostic approach including reference values on size, weight, gestational age, developmental stage of organ systems with special focus on the respiratory tract</li> <li>Distinguish between developmentally appropriate structures and pathology</li> <li>Identify risk factors for respiratory impairment</li> <li>Identify the mechanisms of adaptation from prenatal to postnatal life</li> <li>Discuss changes of structure and function in the first month of life</li> <li>Interpret signs of respiratory distress</li> <li>Distinguish between manifestations of physiologic adaptation and signs or symptoms of developing pathology</li> </ul>	<ul style="list-style-type: none"> <li>Familiarize with assessment techniques and measurements</li> <li>Apply knowledge of reference values to clinical situations</li> <li>Apply special hygiene requirements and relevant guidelines</li> </ul>		<p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Workshops</p> <p>Simulation training</p> <p>Performing procedures with patients under competent guidance</p> <p>Clinical internship/work based learning</p>	<p>MCQ</p> <p>Long case</p> <p>Clinical internship evaluation</p> <p>DOPS</p> <p>Portfolio</p>	<p>4</p>	<p>Assess 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients assessed alone</p>
<p>2. Special physiological aspects/ vulnerability</p>	<ul style="list-style-type: none"> <li>Discuss the special respiratory structure and function in this age group, i.e. compliant and soft rib cage, tidal breathing near closing volume, flat diaphragms, collapsible airways, weak abdominal muscles, obligatory nose breathing</li> <li>Discuss risk for gastroesophageal-reflux, bone fracture and intracranial haemorrhage, susceptibility to infection, hypothermia and exhaustion</li> <li>Discuss the effects of various body positions on respiratory mechanics, distribution of ventilation, cardiovascular changes as well as their therapeutic effects and risks</li> <li>Explain the special hygiene requirements</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate careful handling of premature and mature newborns with special consideration of functional specificities and high vulnerability</li> <li>Develop an integrated diagnostic picture of compromised respiratory functions</li> <li>Follow relevant hygiene requirements</li> </ul>	<ul style="list-style-type: none"> <li>Show willingness to acquire a special “physiologic thinking” appropriate for this age group</li> <li>Show willingness to adapt diagnostic/therapeutic approaches to developing risk and emergency situations</li> </ul>	<p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Workshops</p> <p>Simulation training</p> <p>Performing procedures with patients under competent guidance</p>	<p>MCQ</p> <p>Long case</p> <p>Short case</p> <p>DOPS</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	<p>4</p>	<p>Handle 10 patients under supervision for diagnostic and therapeutic purposes with special consideration of vulnerability and complication risk and when competency is demonstrated, a minimum of 10 patients handled alone</p>
<p>3. Treatment strategies</p>	<ul style="list-style-type: none"> <li>Discuss the mechanisms and effects of manual and mechanical therapeutic techniques including risks and potential side effects</li> <li>Summarise the complex environment of a neonatal ICU (NICU) including monitoring and treatment techniques.</li> <li>Explain the special hygiene requirements</li> </ul>	<ul style="list-style-type: none"> <li>Translate knowledge into appropriate handling, effective and safe therapeutic management, continuous monitoring and special caution</li> <li>Prioritize the situation of the newborn and the thereby offered therapeutic windows over personal timetable and working routine</li> <li>Assess efficacy and effectiveness of treatment</li> <li>Participate in discussions with entire multidisciplinary team (MDT) to integrate physiotherapeutic interventions into an individual treatment plan for the newborn taking into account the need for “minimal handling”</li> <li>Demonstrate safe handling of artificial airways, tubes and lines in various treatment situations</li> <li>Apply appropriate hygiene measures</li> </ul>	<ul style="list-style-type: none"> <li>Show willingness to observe relevant hygiene measures</li> <li>Strive to inform parents of treatment plan and explain purpose of intervention</li> <li>Scholar 1.1 and 1.2</li> </ul>	<p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Workshops</p> <p>Case-based discussions</p> <p>Case conferences</p> <p>Clinical internship</p> <p>Performing procedures under</p>	<p>Long case</p> <p>DOPS</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	<p>4</p>	<p>Assess and manage at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients managed alone</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
		<ul style="list-style-type: none"> <li>Record assessments, treatment(s) and outcomes consistent with professional and medico-legal requirements</li> <li>Acquire sufficient experience for understanding the complex environment of a NICU including monitoring and treatment techniques</li> </ul>		experienced guidance			
4. Monitoring during treatment	<ul style="list-style-type: none"> <li>Recall and discuss, focusing on the theoretical background of techniques, including normal range of values and implication of abnormal values</li> <li>Discuss the perceived obstacles to mobilisation caused by the different monitoring including electrocardiogram (ECG), arterial lines, O<sub>2</sub>-CO<sub>2</sub> monitoring, and intracranial pressure</li> <li>Recall patient safety measures including equipment for assessment and treatment</li> <li>Distinguish between monitoring artefacts and signs of deterioration</li> <li>Recognize signs of ineffective pain relief</li> </ul>	<ul style="list-style-type: none"> <li>Monitor patient during treatment to detect signs of non-tolerance including patient distress – grimace, agitation, increased blood pressure, heart rate, diminished O<sub>2</sub> saturation, ventilator asynchrony</li> <li>Adjust settings of upper and lower limits of the alarms based on patient's condition, aim of the treatment and local protocols in place</li> <li>Modify/adapt physiotherapy interventions according to monitoring</li> <li>React to any extreme adverse situations encountered</li> <li>Record patient's progression and adapt use of techniques and equipment accordingly</li> </ul>	<ul style="list-style-type: none"> <li>Show willingness to modify therapeutic intervention according to monitoring instead of applying standard therapeutic procedures</li> <li>Strive to ensure patients safety at all times by applying adequate precautions to vital equipment (secure the endotracheal tube, drains, perfusions)</li> </ul>	<ul style="list-style-type: none"> <li>Self-directed learning</li> <li>Lectures</li> <li>Learning hands-on under experienced guidance</li> <li>Workshops</li> <li>Clinical internship</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>Long case</li> <li>Short case</li> <li>DOPS</li> <li>Clinical internship evaluation</li> <li>Portfolio</li> </ul>	4	Monitor at least 10 patients under supervision including interpretation of results and modify treatment accordingly and when competency is demonstrated, a minimum of 10 patients monitored alone
5. Summarising the evidence	<ul style="list-style-type: none"> <li>Review relevant evidence-based literature</li> <li>Analyse current guidelines</li> <li>Describe research methodology</li> <li>Distinguish between different levels of evidence</li> </ul>	<ul style="list-style-type: none"> <li>Translate findings from literature review and guidelines into patient care</li> <li>Review research papers and highlight implications for clinical practice</li> <li>Act in response to an ongoing learning process</li> </ul>	<ul style="list-style-type: none"> <li>Scholar: 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	<ul style="list-style-type: none"> <li>Self-directed learning</li> <li>Repeated appraisal of scientific articles</li> </ul>	<ul style="list-style-type: none"> <li>Case based discussion</li> <li>MCQ</li> <li>Portfolio</li> </ul>	4	Discuss 5 cases and relate to current scientific evidence, participate in 2 seminars on evidence-based medicine (EBM), discuss 2 guidelines

#### Module 4 Techniques for airway clearance in the paediatric patient

##### Mandatory

Module Competency	<i>To explain the rationale for airway clearance techniques and select and perform the appropriate treatment for each patient.</i>						
CanMEDS Roles	 <p><i>In this module the following CanMEDS roles are identified: Specifically for 'Attitudes' the following roles are identified: Communicator (point 3.1 and all subitems under point 4), Scholar 1.1 and 1.2, Other attitudes specifically relevant for certain subitems within this module are listed below</i></p>						
1. Rationale and indications for airway clearance in the paediatric patient	<ul style="list-style-type: none"> <li>Describe the physiology of normal airway clearance mechanisms in children</li> <li>Discuss pathological mechanisms of airway clearance and identify respiratory pathologies which may affect natural airway clearance</li> <li>Explain the factors that influence airway clearance in different disease states</li> <li>Explain rationale for use of airway clearance techniques (ACT) in paediatric patients</li> <li>Discuss other opportunities for airway clearance with regards to forced/slow expiration techniques at different lung volumes</li> <li>Summarise indications and contraindication for use of ACT in paediatric patients with reference to their age</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate effectiveness of ACT</li> <li>Evaluate the benefit of ACT in each disease state</li> <li>Apply the age appropriate techniques for the patient</li> </ul>		<ul style="list-style-type: none"> <li>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</li> <li>Formal learning: (ERS school courses or equivalent)</li> <li>Learning with other professionals:</li> </ul>	<ul style="list-style-type: none"> <li>Logbook of patient's/portfolio centre</li> <li>MCQ</li> </ul>	4	Manage and treat airway clearance in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients managed alone

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Summarise up to date advances in physiology</li> <li>Identify factors affecting normal airway clearance</li> </ul>			participate in case-based discussions			
2. Body positioning for secretion clearance	<ul style="list-style-type: none"> <li>Summarise the mechanism of action for body position in secretion clearance in children</li> <li>Discuss the benefits and pitfalls for using body position to enhance airway clearance in paediatric patients</li> <li>Explain selection of body positioning in relation to airway anatomy</li> <li>Describe the indications and contraindications for use of body positioning for secretion clearance in paediatric patients</li> </ul>	<ul style="list-style-type: none"> <li>Apply and evaluate the indications for the use of body position (gravity assisted <b>drainage positions</b>) as a method of airway clearance</li> <li>Adjust body positioning to patient's pathology and co-morbidities</li> <li>Demonstrate how and teach positioning for self-management to patients and family</li> <li>Evaluate patient tolerance of body positioning</li> </ul>	<ul style="list-style-type: none"> <li>Recognise limitations of body positioning and consider use of other methods in combination</li> <li>Recognise limitations in management or diagnosis and display willingness to refer appropriately for specialist management</li> </ul>	<ul style="list-style-type: none"> <li>Self-directed learning, literature search and appraisal</li> <li>Courses, watching videos</li> <li>Work based learning/ Clinical internships</li> <li>Learning with other professionals: participate in case-based discussions</li> </ul>	<ul style="list-style-type: none"> <li>Practical exam</li> <li>MCQ</li> <li>DOPS</li> </ul>	4	
3. Forced expiration and breathing techniques for airway clearance	<ul style="list-style-type: none"> <li>Describe forced expiratory technique (FET), active cycle of breathing techniques (ACBT), autogenic drainage (AD)</li> <li>Describe rationale for FET, ACBT, AD to facilitate mobilisation of secretions</li> <li>Justify use of FET, ACBT, AD</li> <li>Review the evidence for the use of FET, ACBT, AD to mobilise secretions base in respiratory disease</li> <li>Describe the indications and contraindications for the use of FET, ACBT, AD in paediatric patients</li> <li>Describe how the FET, ACBT, AD can be modified to be effective in the paediatric patient</li> </ul>	<ul style="list-style-type: none"> <li>Match the treatment to the patients age and intellectual understanding level</li> <li>Design and evaluate treatment using FET, ACBT, AD which may include designing a game to incorporate the treatment programme</li> <li>Demonstrate how to perform assessment to identify patients who may benefit from FET, ACBT, AD</li> <li>Demonstrate clearly how to instruct patients and their parents and ensure correct performance and understanding for each technique</li> <li>Measure sputum expectoration and evaluate the consistency, texture and colour</li> <li>Evaluate patients and their family's tolerance of treatment therapy</li> <li>Design appropriate goals and rewards to enhance adherence from the patient</li> </ul>		<ul style="list-style-type: none"> <li>Self-directed learning, literature search and appraisal</li> <li>Courses, watching videos</li> <li>Work based learning / Clinical internships</li> <li>Case- based discussions</li> </ul>	<ul style="list-style-type: none"> <li>Practical exam</li> <li>MCQ</li> <li>Portfolio</li> <li>Clinical log book</li> <li>DOPS</li> <li>Mini clinical evaluation exercise (Mini-CEX)</li> </ul>	4	
4. Manual chest wall techniques	<ul style="list-style-type: none"> <li>Describe manual chest wall techniques (clapping, shaking and vibrations), manually assisted cough</li> <li>Summarise the mechanism of action for manual techniques (clapping, shaking and vibrations,) manually assisted coughing, effect of slow expiration with glottis opened in lateral posture (ELTGOL) in children</li> <li>Discuss the benefits and pitfalls for using ACT (e.g. manual techniques, assisted coughing) in children and identify the age of the child who will benefit from each technique</li> <li>Describe how these techniques can be modified or combined to enhance airway clearance in children and with regards to their pathology</li> <li>Select technique based on evidence and appropriateness of the patient's clinical context</li> <li>Design a treatment program incorporating your treatment of choice taking into account the patients age and clinical context</li> </ul>	<ul style="list-style-type: none"> <li>Match the treatment to the patients age and intellectual understanding level</li> <li>Demonstrate how to assess the appropriateness of each technique in the clinical context</li> <li>Perform patient assessment to identify patients who may benefit from manual techniques, assisted coughing, ELTGOL</li> <li>Evaluate the effectiveness of your chosen treatment program with regards to your patient. Effectiveness may be evaluated for example by sputum production, improvements in O<sub>2</sub> saturation, lung function, decreased O<sub>2</sub> requirement, decreased breathlessness etc.</li> <li>Evaluates patient tolerance of treatment therapy</li> <li>Demonstrate to the patient air stacking and glossopharyngeal breathing (GPB)</li> <li>Design appropriate rewards to enhance adherence from the patient</li> </ul>		<ul style="list-style-type: none"> <li>Self-directed learning, literature search and appraisal</li> <li>Management of patients in clinical practice</li> <li>Learning with other professionals: participate in case-based discussions</li> <li>Courses, watching videos</li> </ul>	<ul style="list-style-type: none"> <li>Practical exam</li> <li>MCQ</li> <li>Mini-CEX</li> <li>Portfolio</li> <li>Clinical log book</li> <li>DOPS</li> <li>Mini-CEX</li> </ul>	4	
5. Increasing lung volumes for airway clearance	<ul style="list-style-type: none"> <li>Describe manual hyperinflation, air stacking and GPB, intermittent positive pressure breathing</li> <li>Discuss the benefits and pitfalls for using manual hyperinflation, air stacking and GPB to enhance</li> </ul>	<ul style="list-style-type: none"> <li>Match the treatment to the patients age and intellectual understanding level</li> <li>Demonstrate how to assess the appropriateness of each technique in the clinical context</li> </ul>	<ul style="list-style-type: none"> <li>Recognise limitations in management or diagnosis and display willingness to refer appropriately for specialist management</li> </ul>	<ul style="list-style-type: none"> <li>Self-directed learning: literature search with appraisal of a scientific article</li> </ul>		4	

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<p>airway clearance in children and identify from what age children who will benefit from each technique</p> <ul style="list-style-type: none"> <li>Describe how these techniques can be modified or combined to enhance airway clearance in children and the child's pathology</li> <li>Review the evidence base for the use of manual hyperinflation, air stacking and glossopharyngeal to enhance airway clearance in obstructive and restrictive lung disease in children.</li> <li>Select technique based on evidence and appropriateness of the patient's clinical context</li> </ul>	<ul style="list-style-type: none"> <li>Perform patient assessment to identify patients who may benefit from manual hyperinflation, air stacking and GPB</li> <li>Evaluate the effectiveness of your chosen treatment program with regards to your patient. Effectiveness may be evaluated for example by sputum production, improvements in O<sub>2</sub> saturation, lung function (where appropriate), decreased O<sub>2</sub> requirement, decreased breathlessness, decreased heart rate etc.</li> <li>Evaluates patient tolerance of treatment or therapy</li> <li>Demonstrate to the appropriate patient air stacking and GPB</li> <li>Design appropriate rewards to enhance adherence from the patient</li> <li>Design a treatment program incorporating your treatment of choice taking into account the patient's age and clinical context</li> </ul>		<p>related to the clinical presentation of a patient currently being managed</p> <p>Formal learning: (ERS school courses or equivalent)</p> <p>Learning with other professionals: participate in case-based discussions</p> <p>Clinical internship</p>			
6. Devices for airway clearance	<ul style="list-style-type: none"> <li>Describe positive expiratory pressure (PEP), oscillatory PEP, intrapulmonary percussive ventilation (IPV), high frequency chest wall oscillations (HFCWO), in/exsufflation assisted-cough, non-invasive ventilation (NIV) and give examples of oscillatory PEP devices</li> <li>Summarise the mechanism of action for PEP, oscillatory PEP, IPV, HFCWO, NIV, in/exsufflation assisted-cough with regards to ACT in children</li> <li>Discuss the clinical benefits and pitfalls for PEP, oscillatory PEP, IPV, HFCWO, NIV, in/exsufflation assisted-cough to enhance airway clearance in children</li> <li>Describe how these techniques can be modified or combined to enhance airway clearance</li> <li>Review the evidence base for the use of PEP, oscillatory PEP, IPV, NIV, HFCWO, in/exsufflation assisted-cough in respiratory disease in adults and children</li> </ul>	<ul style="list-style-type: none"> <li>Assess the appropriateness of each technique in the clinical context including taking into account the age, preference and intellectual understanding level of the patient and caregiver</li> <li>Evaluate patient tolerance of treatment therapy</li> <li>Choose (oscillatory) PEP resistance in relation to patient's condition, age and tolerance</li> <li>Select positive and negative pressure in/exsufflation assisted-cough according to patient's condition and tolerance</li> <li>Select settings for NIV to assist airway clearance according to patient's condition and tolerance e.g. based on estimated predicted values for vital capacity</li> <li>Demonstrate selection of interfaces for in/exsufflation assisted-cough and NIV their application</li> <li>Identify vest size for HFCWO and hygiene issues</li> <li>Match the choice of treatment to the patient's condition</li> <li>Teach patients and their family technique, equipment handling and care</li> <li>Select technique based on evidence and appropriateness of the patient's clinical context and age</li> <li>Design a treatment program incorporating treatment of choice taking into account the patient's clinical context, understanding and age</li> <li>Evaluate the effectiveness of the chosen treatment program with regards to your patient. Effectiveness may be evaluated for example by sputum production, improvements in O<sub>2</sub> saturation, lung function, decreased O<sub>2</sub> requirement, decreased breathlessness, and improved functional capacity etc.</li> <li>Evaluate patient's adherence and facilitate optimal adherence</li> </ul>	<ul style="list-style-type: none"> <li>Pay attention to hygiene measures when applying devices</li> <li>Recognise limitations in management or diagnosis and display willingness to refer appropriately for specialist management</li> </ul>	<p>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p> <p>Formal learning: (ERS school NIV courses or equivalent)</p> <p>Learning with other professionals: participate in case-based discussions</p> <p>Courses, E-learning</p>	<p>Practical exam</p> <p>MCQ</p> <p>Mini-CEX</p> <p>Portfolio</p> <p>Clinical log book</p> <p>DOPS</p>	4	

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
7. Aerosol therapy and humidification	<ul style="list-style-type: none"> <li>List the aerosol medications that maybe used to enhance airway clearance and age appropriate doses</li> <li>Identify aerosol treatments that are specific to a disease pathology</li> <li>Discuss the different methods of aerosol therapy delivery in relation to the paediatric patients age and clinical context</li> <li>Discuss the indications and contraindications for aerosol therapy as an adjunct to airway clearance</li> <li>Describe the different methods of delivery for aerosol therapy as an adjunct to airway clearance</li> <li>Justify the use of therapy with the relevant evidence in children</li> <li>Select appropriate timings for aerosol therapy</li> <li>Describe the role of humidification in enhancing airway clearance</li> <li>Explain how humidification works</li> <li>Identify when humidification is indicated</li> <li>List the contraindications to humidification</li> <li>Discuss the different forms of humidification available to the respiratory physiotherapist for the paediatric patient</li> <li>Explain the hypertonic saline as a treatment and assess sputum production in the paediatric patient</li> </ul>	<ul style="list-style-type: none"> <li>Assess the effectiveness of aerosol therapy &amp; humidification</li> <li>Perform bronchoconstriction and bronchodilation trials appropriate to the patients age and clinical context in order to evaluate the effects of the aerosol therapy</li> <li>Perform hypertonic saline as a treatment and assess sputum production in the paediatric patient</li> <li>perform different methods of aerosol delivery nebulisation therapy</li> <li>Identify appropriate patients who may benefit from aerosol therapy or humidification as an adjunct to airway clearance</li> <li>Examine the effect of giving DNase for secretion clearance in patients with Cystic Fibrosis (CF)</li> <li>Initiate humidified O<sub>2</sub> therapy</li> <li>Initiate aerosol therapy at appropriate times for effective airway clearance</li> <li>Select appropriate timings and delivery method for aerosol therapy</li> </ul>	<ul style="list-style-type: none"> <li>Clearly explain the risks and benefits of different therapeutic options of aerosol therapy and humidification to the patient patients, carers and family</li> <li>Communicator 1.1</li> <li>Collaborator 1.1-1.3</li> </ul>	<p>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p> <p>Formal learning: (ERS school courses or equivalent)</p> <p>Learning with other professionals: participate in case-based discussions</p> <p>Courses, watching videos</p> <p>Clinical internship</p>	<p>Practical exam</p> <p>MCQ</p> <p>Mini-CEX</p> <p>Portfolio</p> <p>Clinical log book</p> <p>DOPS</p>	4	<p>Assess, treat and evaluate at least 10 patients with humidification or aerosol therapy under supervision and when competency is demonstrated, a minimum of 10 patients assessed, treated and evaluated alone</p>
8. Airway suctioning	<ul style="list-style-type: none"> <li>Explain rationale and mechanism of action for airway suctioning</li> <li>Describe how to perform airway suction in children</li> <li>Describe airway suctioning procedure in line with local protocols</li> <li>Differentiate between the different types of airway suction</li> <li>Differentiate between artificial airways that can be used for airway suctioning</li> <li>Define the indications and contraindications of airway suctioning and artificial airways</li> <li>Evaluate the risks and emergency of airway suctioning</li> </ul>	<ul style="list-style-type: none"> <li>Adhering to local protocols, perform patient assessment to identify need for airway suctioning.</li> <li>Demonstrate the insertion of artificial airways into the mannequin form</li> <li>Demonstrate nasal pharyngeal, oral suction and deep suction initially on a mannequin and then on a paediatric patient</li> </ul>	<ul style="list-style-type: none"> <li>Communicator 1.1</li> <li>Collaborator 1.1-1.3</li> </ul>	<p>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p> <p>Formal learning: (ERS school courses or equivalent)</p> <p>Learning with other professionals: participate in case-based discussions</p> <p>Watching videos and Simulation</p>	<p>MCQ</p> <p>Simulation</p> <p>Portfolio</p> <p>Clinical log book</p>	4	<p>Observe and evaluate airway suction in at least 10 patients under supervision and when competency is demonstrated, a minimum of 10 patients observed and evaluated alone</p> <p>Perform airway suction on a mannequin (or patient, if allowed by local regulations) at least 10 times with external assessment</p>
9. Exercise as a technique for airway clearance	<ul style="list-style-type: none"> <li>Describe the role of exercise therapy for airway clearance in children</li> <li>Summarise the mechanism of action for exercise therapy for airway clearance in children</li> <li>Discuss the benefits and pitfalls for exercise therapy for airway clearance</li> </ul>	<ul style="list-style-type: none"> <li>Perform patient assessment to identify the appropriateness for exercise therapy in the clinical context</li> <li>Select appropriate exercise therapy and intensity for airway clearance and the patients age and physical ability</li> </ul>	<ul style="list-style-type: none"> <li>Communicator 1.1</li> <li>Collaborator 1.1-1.3</li> <li>Professional 1.1</li> </ul>	<p>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p>	<p>Practical exam</p> <p>MCQ</p> <p>Mini-CEX</p> <p>Portfolio</p>	4	

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Review the evidence base for the use of exercise therapy for airway clearance in respiratory conditions in children</li> <li>Describe the indications and contraindications for use of exercise as an ACT in children</li> <li>Design an exercise/play treatment programme for airway clearance appropriate for the child and their clinical condition and context</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate the exercise programme based on patient assessment of sputum production, lung function, patient feedback, and exacerbations</li> </ul>		<p>Formal learning: (ERS school courses or equivalent)</p> <p>Learning with other professionals: participate in case-based discussions</p>	<p>Clinical log book</p> <p>DOPS</p>		
10. Self-management techniques/education for airway clearance	<ul style="list-style-type: none"> <li>Summarise the impact of self-management techniques/education</li> <li>Describe the risks of secretion retention and benefits of simple therapeutic interventions</li> <li>Discuss the barriers to self-management</li> <li>Justify treatment modalities for the patient and their condition</li> </ul>	<ul style="list-style-type: none"> <li>Perform a patient assessment to identify the barriers to patients and family adherence in self-management</li> <li>Teach patients, their families and carers how to self-manage secretion clearance at home</li> <li>Design and execute self-management programs for patients with secretion encumbrance</li> </ul>	<ul style="list-style-type: none"> <li>Clearly communicate the purpose of self-management to the patient and their carers and family</li> <li>Display sensitivity in communicating the consequences of lack of airway clearance in their condition</li> <li>Involve patient and their carers in decision making when discussing self-management</li> <li>Negotiate concordance to the treatment with patients and their families</li> <li>Health advocate 1.2 and 1.3</li> </ul>	<p>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p> <p>Case based discussion</p> <p>Formal learning: (ERS school courses or equivalent)</p> <p>Learning with other professionals: participate in case-based discussions</p> <p>Watching videos and Simulation</p>	<p>MCQ</p> <p>Case based examination</p> <p>Simulation</p>	3	
11. Summarising the evidence and reference to evidence-based documents	<ul style="list-style-type: none"> <li>Review research evidence on ACT in different conditions in children</li> <li>Analyse international and national guidelines to consider new evidence and remain up to date</li> <li>Describe the methodology of producing clinical guidelines for airway clearance</li> <li>Distinguish between types of evidence-based practice publications (i.e. recommendations, guidelines, position papers)</li> <li>Explain the legal implications in evidence-based practice</li> <li>Critically review research paper and discuss implication for practice and limitations</li> <li>Demonstrate evidence of keeping up to date with advances in the field</li> </ul>	<ul style="list-style-type: none"> <li>Apply recommendations from evidence-based publications to patient care</li> </ul>	<ul style="list-style-type: none"> <li>Scholar: 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	<p>Self-directed learning: appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p> <p>Case based discussion</p> <p>Literature review</p>	<p>MCQ</p> <p>Case based examination</p>	2	<p>Discussion of 5 cases using evidence-based practice</p> <p>Participation in 2 seminars on evidence-based practice</p>

### Module 5 Respiratory muscle training (RMT), breathing strategies and techniques for lung expansion

Mandatory

Module Competency

*Explain rationale and perform RMT, breathing strategies and techniques for lung expansion.*

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
<p>CanMEDS Roles</p> 	<p>In this module the following CanMEDS roles are identified: Specifically for 'Attitudes' the following roles are identified: Communicator (point 3.1 and all subitems under point 4). Other attitudes specifically relevant for certain subitems within this module are listed below.</p>						
1. Rationale and indications	<ul style="list-style-type: none"> <li>Recall normal breathing and discuss changes during growth and development</li> <li>Identify abnormalities in breathing pattern and respiratory effort</li> <li>Recall the rationale for use of lung expansion</li> <li>Modify this rationale based on age and maturity – i.e. from preterm to adolescent</li> </ul>	<ul style="list-style-type: none"> <li>Observe and examine breathing pattern and respiratory muscle effort</li> <li>Assess breathing pattern and respiratory muscles to identify need/indication for RMT, breathing strategies and lung expansion techniques</li> </ul>	<ul style="list-style-type: none"> <li>Scholar 1.1 &amp; 1.2</li> </ul>	<p>Formal learning through courses</p> <p>Work-based learning/ Clinical internships</p>	<p>MCQ</p> <p>Portfolio</p> <p>Objective structured clinical examination (OSCE)</p>	4	Discuss at least 10 cases and relate to current scientific evidence
2. Respiratory muscle training (RMT)	<ul style="list-style-type: none"> <li>Recall respiratory muscle assessment from module 2 item 8</li> <li>Recall which benefits can be expected from RMT</li> <li>Describe characteristics of inspiratory/ RMT including devices</li> <li>Compare effects, indications, advantages and disadvantages of different training types</li> <li>Identify training types relevant to age, understanding and compliance of paediatric patients</li> <li>Discuss basic limitations and lack of applicability of RMT in paediatric patients based on age, understanding and potential for cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Identify patients who may benefit from RMT</li> <li>Obtain relevant information on the social background and environment of children and adolescents in order to set up an implementable treatment plan</li> <li>Design individually tailored RMT programs</li> <li>Assess and re-assess the efficacy of treatment</li> </ul>		<p>Formal learning through courses</p> <p>Work-based learning/ Clinical internships</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation</p> <p>Case-based examination</p> <p>Portfolio</p>	4	Manage at least 10 patients with respiratory muscle weakness of different ages under supervision and when competency is demonstrated manage another 10 alone.
3. Breathing strategies and breathing exercises	<ul style="list-style-type: none"> <li>Outline breathing strategies and exercises to manage patient's breathlessness at rest and during exercises (e.g. leaning forward, pursed lips breathing and active expiration)</li> <li>Discuss rationale for breathing strategies and exercises for management of breathlessness and breathing pattern retraining</li> <li>Describe body positions that relieve breathlessness and summarise the mechanism of action</li> <li>List the indication for positions that relieve breathlessness</li> <li>Discuss basic limitations and lack of applicability of breathing strategies and breathing exercises in paediatric patients based on age, understanding and potential for cooperation</li> <li>Discuss breathing strategies for dysfunctional breathing (for example hyperventilation syndrome, dysfunctional cough)</li> </ul>	<ul style="list-style-type: none"> <li>Identify patients with abnormal breathing</li> <li>Clinically assess patients with abnormal breathing; dysfunctional breathing, hyperventilation etc.</li> <li>Perform tests/(psychosocial) assessments to identify reasons for abnormal breathing pattern</li> <li>Assess end tidal CO<sub>2</sub></li> <li>Develop a range of different breathing exercises and strategies based on age and maturity of patient, possible cooperation or lack thereof with special approaches for new-borns, infants and young children</li> <li>Prescribe individually tailored breathing retraining programs, inclusive of breathing exercises and relaxation techniques when indicated, based on the patient's condition, assessment, age and cognitive ability</li> <li>Demonstrate, instruct, supervise and motivate patients to perform appropriate strategies and exercises with the correct techniques</li> <li>Apply and evaluate the indications for the use of body positioning to relieve breathlessness</li> <li>Assess and reassess the efficacy of the treatment</li> </ul>		<p>Work-based learning</p> <p>Formal learning through courses</p> <p>Clinical internships</p>	<p>Oral/Written exam</p> <p>Clinical internship evaluation,</p> <p>Portfolio</p>	4	Manage at least 10 patients with abnormal breathing covering the paediatric age range
4. Techniques for lung expansion	<ul style="list-style-type: none"> <li>Describe age appropriate techniques for lung expansion</li> </ul>	<ul style="list-style-type: none"> <li>Assess the appropriateness of each technique across the paediatric age range</li> </ul>		<p>Formal learning through courses</p>	<p>Oral/Written exam</p>	4	Manage at least 5 patients using lung expansion

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Discuss the benefits and risks for using lung expansion techniques</li> <li>Review the evidence base for the use of lung expansion techniques</li> <li>Determine need and eligibility of patient for lung expansion</li> <li>Distinguish between passive and active lung expansion techniques, based on age of patient and ability to cooperate</li> </ul>	<ul style="list-style-type: none"> <li>Identify patients who may benefit from lung expansion techniques</li> <li>Select the appropriate technique based on evidence for the underlying pathology and condition and the results of the diagnostic tests</li> <li>Evaluate patient's tolerance of treatment</li> <li>Evaluate the effectiveness of the chosen treatment</li> </ul>		Work-based learning Clinical internship	Clinical internship evaluation  Case based (long/short case) examination		techniques covering the paediatric age range
5. Summarising the evidence and reference to evidence-based documents	<ul style="list-style-type: none"> <li>Appraise scientific evidence and evidence-based guidelines</li> <li>Evaluate level of evidence according to widely accepted tools for quality assessment</li> <li>Employ the relevant key words (medical subject headings-terms) to allow for a comprehensive search of the literature.</li> <li>Analyse guidelines</li> <li>Recognise legal implications</li> <li>Appraise the special situation of a paediatric patient and the possibilities/limitations that stem from age, developmental stage, obtainable cooperation or lack thereof and parental/psychosocial background</li> </ul>	<ul style="list-style-type: none"> <li>Perform in response to an ongoing learning process</li> <li>Interpret and apply recommendations from evidence-based literature to patient care</li> </ul>	<ul style="list-style-type: none"> <li>Scholar 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	Self-directed learning  Literature search and appraisal  Interpretation of evidence-based studies and guidelines in interaction with experienced guidance	MCQ  SAQ  Case based (long/short case) examination	2	Discuss 5 cases in relation to current knowledge from EBM Discuss 2 guidelines Participate in 2 seminars on EBM

## Module 6 Exercise training and physical activity

### Mandatory

Module Competency	<i>To explain physiological response to exercise in health and disease and the rationale for exercise training and physical activity interventions. To use standardised measures for assessing exercise or functional capacity and be able to prescribe a programme of exercise training or physical activity appropriate and modified to suit individual needs.</i>						
CanMEDS Roles 	<i>In this module the following CanMEDS roles are identified: Specifically for 'Attitudes' the following roles are identified: Communicator (all items under point 1), Collaborator role (all items under points 1 - 3) is mainly relevant for assessment that are not performed by physiotherapist but by other health care providers. Other attitudes specifically relevant for certain subitems within this module are listed below.</i>						
1. Rationale and principles of physical activity and exercise training	<ul style="list-style-type: none"> <li>Define and differentiate between physical activity and exercise</li> <li>Describe different types and recommended patterns of physical activity and exercise at different stages during childhood (e.g. American College of Sports Medicine on physical activity in health and disease)</li> <li>Recall basic exercise physiology including cardiovascular and respiratory responses and adaptations to exercise</li> <li>Explain the impact of different cardiorespiratory disorders on physical activity and exercise capacity in children (including ventilatory limitations, gas exchange, cardiac limitations, peripheral and respiratory muscle dysfunction)</li> </ul>		<ul style="list-style-type: none"> <li>Scholar 1.1 and 1.2</li> </ul>	Courses  Case based discussion (face to face) and in online environment	MCQ  Oral Oral/Written examinations  Portfolio  Case-based examination	4	

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Explain, with reference to published evidence, the therapeutic options available in respect of abnormal physical activity or exercise capacity findings in children with respiratory disorders</li> <li>Describe characteristics of aerobic training (endurance and interval) resistance training, flexibility and balance training in children with respiratory disorders</li> <li>Explain the determinants of strength/weakness, fatigability, power of human muscle and the adaptations to strength training in children</li> <li>Discuss how deconditioning and prolonged bed rest affect patient's function</li> <li>Summarise the anticipated effects, indications, advantages and disadvantages of different training modalities in different disease severities based on current guidelines (e.g. American thoracic society or ERS)</li> <li>Infer the rationale for increasing activity or exercise training in patients with lung diseases by taking into account these abnormalities and deficits in exercise capacity or functional performance</li> </ul>						
2. Assessment of physical activity and physical fitness	<ul style="list-style-type: none"> <li>Discuss the clinical purpose and indications for measuring physical activity and exercise capacity in children of different age groups</li> <li>Describe methods for assessing physical activity in children (e.g. recall, observation, activity monitors, diaries, video analysis), exercise capacity (e.g. cardiorespiratory exercise test, 6-minute walk test, shuttle walk tests, functional tests of performance), muscle strength (Module 1) and endurance (e.g. dynamometry, 1-repetition maximum), balance (e.g. force plates and Berg Balance Scale) and flexibility.</li> <li>Describe the strengths and limitations of different physical activity and exercise capacity measurement techniques used in children of all ages</li> <li>Explain the differences in selection, application and interpretation of appropriate exercise and physical activity testing procedures in children of different ages and comorbidities (including heart disease, diabetes, osteoporosis, obesity, cachexia)</li> <li>Explain how to interpret measures of physical activity, maximal and submaximal exercise capacity, strength, balance and flexibility in children</li> <li>Recognise adverse events in response to exercise</li> </ul>	<ul style="list-style-type: none"> <li>Select and administrate appropriate physical activity, exercise capacity, strength, balance and flexibility measures in children of different ages</li> <li>Differentiate real signals from artefact in different objective physical activity, exercise capacity, strength, balance and flexibility measures</li> <li>Interpret different types of physical activity, exercise capacity, strength, balance and flexibility measures in children of different ages, particularly in relation to their role in directing or evaluating pharmacological and non-pharmacological treatments</li> <li>Perform and interpret measures of physical activity (e.g. pedometer, accelerometer, activity log, diary)</li> <li>Perform and interpret measures of exercise capacity (e.g. lab based assessments, six-minute walk test, shuttle walk test (incremental and endurance), measurement of peripheral muscle strength using maximal voluntary efforts, validated balance and flexibility test)</li> </ul>	<p><b>Module specific attitudes:</b></p> <ul style="list-style-type: none"> <li>Demonstrate an understanding of the complexities of behaviour change concerning the assessment of physical activity and identify the barriers and potential solutions to optimize adherence to individual needs</li> </ul>	<p>Work-based environment:</p> <p>Portfolio</p> <p>Exercise protocols</p> <p>Case-based discussions</p> <p>Clinical internships</p>	<p>MCQ</p> <p>DOPS</p> <p>Portfolio</p> <p>Case-based examination</p> <p>Clinical internship evaluation</p>	4	<p>Assess the indication and prescription for exercise training and/or physical activity programs in at least 5 paediatric patients under supervision and when competency is demonstrated, a minimum of 5 patients assessed alone. (whole module)</p> <p>Interpret exercise limitations in at least 10 maximal exercise test protocols. Observe at least 5 maximal exercise tests</p>
3. Exercise prescription in children with respiratory disorders	<ul style="list-style-type: none"> <li>Describe the components of effective exercise training, including specificity, type of exercise, frequency, intensity, duration, time and progression of training</li> <li>Describe general principles and precautions of exercise training in children with respiratory disorders of all ages</li> <li>Describe exercise training in children during different clinical circumstances (e.g. stable, exacerbated or pre/post-operative)</li> </ul>	<ul style="list-style-type: none"> <li>Link physical activity, exercise capacity, strength, balance and flexibility impairments to therapeutic implications in rehabilitation and respiratory physiotherapy</li> <li>Demonstrate competence in using findings from objective standardised exercise tests for prescribing an appropriate exercise programme and evaluating the response to that exercise programme</li> </ul>	<ul style="list-style-type: none"> <li>Display sensitivity to the child's tolerance, preferences, goals and difficulties in the application of intensity, frequency, duration, time, type of exercise and progression of training</li> </ul>	<p>Work-based environment:</p> <p>Management of patients in the clinical setting (such as management of a patient to maintain an improved physical fitness on a long-term basis, or</p>	<p>MCQ</p> <p>Portfolio</p> <p>Case-based examination</p>	4	<p>Provide exercise training prescription (and evaluation of that prescription) in at least 5 paediatric patients under supervision and when competency is demonstrated, a minimum of 5 patients assessed alone. (whole module)</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Identify modifications in exercise training that would suit the interests, goals and motivations of children of different ages and gender, who may benefit from different types and settings of exercise training</li> <li>Recognize comorbid physical or psychological conditions that may be hindering the performance of or the benefits from exercise training (including heart disease, diabetes, osteoporosis, obesity, incontinence)</li> <li>Describe indications and contraindications to exercise training for children with respiratory disorders and comorbid physical or psychological conditions.</li> <li>Explain appropriate modifications to exercise testing and prescription in relation to risk factors such as musculoskeletal or cardiorespiratory frailty or vulnerability, co-morbidities, motivation</li> <li>Explain the principles and role of behaviour change theories in optimising adherence to exercise interventions.</li> <li>Explain the clinical significance of changes in exercise capacity, strength, balance and flexibility measures after pharmacological and non-pharmacological treatments</li> <li>Explain how objective standardised exercise tests may be used to evaluate the response to an exercise programme and progress the prescription</li> </ul>	<ul style="list-style-type: none"> <li>Deliver effective exercise prescription, including specificity, type of exercise, frequency, intensity, duration, time and progression of training</li> <li>Perform and modify exercise training to suit the goals, interests, motivations and clinical status of children of different ages and gender.</li> <li>Identify indications and contraindications to exercise training for children with respiratory disorders and comorbid physical or psychological conditions</li> <li>Perform and modify exercise training according to musculoskeletal or cardiorespiratory risk factors, co-morbidities or motivation</li> <li>Apply knowledge about the complexities of behaviour change to identify barriers and potential solutions to optimize adherence to physical activity and exercise training programmes</li> <li>Use objective measures to evaluate the response to the intervention and control the intensity and progression of the training</li> </ul>		<p>Management of a patient with comorbidity and decreased physical fitness)</p> <p>Controlled environment:</p> <p>Courses</p> <p>Case based discussion (face to face) and in online environment</p>			Interpret exercise limitations in at least 10 maximal exercise test protocols. Observe at least 5 maximal exercise tests
4. Adjuncts to exercise training or physical activity (O <sub>2</sub> therapy, NIV, breathing strategies, walking aids)	<ul style="list-style-type: none"> <li>Explain the physiological principles, rationale and role of adjuncts to exercise training in order to facilitate or optimise performance in children with severe respiratory disorders (e.g. supplemental O<sub>2</sub>, NIV, breathing strategies, and walking aids)</li> <li>Explain how and when and which adjuncts to apply in optimising exercise training or physical activity in children with respiratory disorders</li> <li>Describe the strengths and limitations of the different adjuncts to exercise training and physical activity in different clinical circumstances.</li> <li>Describe any safety regulations in the use or storage of adjuncts (e.g. using O<sub>2</sub> or NIV at home) and the mechanisms for reducing risk</li> <li>Describe, with reference to the evidence base, how different adjuncts to exercise training or physical activity may enhance exercise capacity</li> <li>Describe how objective measures may be used to evaluate any benefits from the use of adjuncts in exercise training or physical activity in different clinical circumstances</li> <li>Identify indications and contraindications to the use of adjuncts during exercise or physical activity for children with respiratory disorders and comorbid physical or psychological conditions</li> </ul>	<ul style="list-style-type: none"> <li>Identify paediatric patients who might benefit from the use of adjuncts during exercise or physical activity</li> <li>Identify and select appropriate and evidence-based adjuncts for use during exercise or physical activity in children with respiratory disorders</li> <li>Apply, modify or combine adjuncts for use during exercise or physical activity in children of different ages in different clinical circumstances</li> <li>Demonstrate competence in risk assessment and avoidance in the use of adjuncts during exercise or physical activity (including educating patients and their families in use of the techniques, equipment handling and infection control)</li> <li>Use objective measures to evaluate the tolerance and response to the adjuncts during exercise or physical activity intervention and control the intensity and progression of the training</li> </ul>	<ul style="list-style-type: none"> <li>Recognize the possible impact of exercise training with adjuncts on patient's lifestyle and safety</li> <li>Display sensitivity to the child's tolerance, preferences and difficulties in the use of adjuncts during exercise or physical activity and recognise limitations in the effectiveness of exercise training in patients using adjuncts</li> </ul>	<p>Work-based environment:</p> <p>Management of patients in the clinical setting (such as manage a patient with long-term O<sub>2</sub>therapy in exercise training)</p>	<p>MCQ</p> <p>Portfolio</p> <p>Case-based examination</p>	4	Provide exercise training prescription and/or physical activity programmes (and evaluation of that programme) with and appropriate adjunct in at least 5 paediatric patients under supervision and when competency is demonstrated, a minimum of 5 patients assessed alone (whole module)
5. Enhancing physical activity	<ul style="list-style-type: none"> <li>Describe the therapeutic methods available for enhancing physical activity; activity counselling, theory based behavioural medicine interventions, activity monitors, training logs, and exercise</li> </ul>	<ul style="list-style-type: none"> <li>Link physical activity impairments to therapeutic implications in rehabilitation and respiratory physiotherapy</li> </ul>	<ul style="list-style-type: none"> <li>Display sensitivity to the child's tolerance, preferences and difficulties in physical activity</li> <li>Collaborator: 3.1</li> </ul>	<p>Work-based environment:</p>	<p>MCQ</p> <p>Portfolio</p>	4	Provide a physical activity programmes (and evaluation of that programme) in at least 5 paediatric patients

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<p>programs to enhance daily physical activity in children with respiratory disorders</p> <ul style="list-style-type: none"> <li>Compare suitable methods of enhancing physical activity in children during different clinical circumstances (e.g. stable, exacerbated or pre/post-operative) and general principles and precautions of physical activity in children with respiratory disorders of all ages</li> <li>Identify modifications in physical activity that would suit the goals, interests and motivations of children of different ages and gender, who may benefit from different types and settings of physical activity</li> <li>Recognize comorbid physical or psychological conditions that may be hindering physical activity (including heart disease, diabetes, osteoporosis, obesity, incontinence) and recommend appropriate modifications</li> <li>Explain the principles and role of behaviour change theories and motivational tools in optimising adherence to physical activity interventions.</li> <li>Explain the clinical significance of changes in physical activity measures after pharmacological and non-pharmacological treatments</li> </ul>	<ul style="list-style-type: none"> <li>Use findings from objective standardised physical activity tests for prescribing an appropriate physical activity programme and evaluating the response to that programme</li> <li>Select and apply the most appropriate physical activity intervention for each individual (activity counselling, theory based behavioural medicine intervention, activity monitor, training log, exercise program)</li> <li>Demonstrate competence in modifying physical activity to suit the goals, interests, motivations and clinical status of children of different ages and gender</li> <li>Demonstrate competence in modifying physical activity according to musculoskeletal or cardiorespiratory risk factors, co-morbidities or motivation</li> <li>Use knowledge about the complexities of behaviour change to identify barriers and potential solutions to optimize adherence to physical activity programmes</li> <li>Use objective measures to evaluate the response to the intervention and control the intensity and progression of the training</li> </ul>	<ul style="list-style-type: none"> <li>Health advocate: 1.2</li> </ul> <p><b>Module specific attitudes:</b></p> <ul style="list-style-type: none"> <li>Collaborate with the MDT to discuss physical and psychological barriers to physical activity in patients and the proposed individual physical activity strategies for the patient. (e.g. context of school and hobbies)</li> </ul>	Management of a patient with decreased physical activity	Case-based examination		<p>under supervision and when competency is demonstrated, a minimum of 5 patients assessed alone (whole module)</p> <p>Interpret physical activity limitations in at least 10 paediatric patients with respiratory disorders</p>
6. Summarising the evidence and reference to evidence-based documents	<ul style="list-style-type: none"> <li>Appraise scientific evidence and evidence-based guidelines</li> <li>Distinguish between types of evidence-based publications (i.e. recommendations, guidelines, position papers)</li> <li>Evaluate level of evidence of applied interventions by reading and implementing the results of systematic reviews</li> <li>Conduct critical literature appraisal by quality review</li> <li>Interpret and apply recommendations from evidence-based publications in physical activity and exercise to patients</li> <li>Use systematic methods for critical appraisal of evidence</li> <li>Assimilate the relevant evidence in each clinical circumstance to deliver effective therapeutic treatments</li> </ul>	<ul style="list-style-type: none"> <li>Interpret and apply recommendations from evidence-based literature to patient care</li> </ul>	<ul style="list-style-type: none"> <li>Scholar: 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	<p>Formal learning in a controlled environment:</p> <p>Courses</p> <p>Case based discussion (face to face) and in online environment</p> <p>Appraisal of a scientific article related to clinical work</p>	MCQ Case-based examination	2	<p>Discuss 5 cases using evidence-based practice</p> <p>Participation in at least 2 seminars using evidence-based practice approach</p>

**Module 7 Peri operative physiotherapy in a spontaneously breathing patient** (for invasively ventilated patients, see module 11)

Mandatory

Module Competency

*To explain the effects of major surgical interventions and other risk factors on respiratory function. To apply therapeutic options for the pre- and post-operative period*

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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<p>CanMEDS Roles</p> 	<p>In this module the following CanMEDS roles are identified: <i>Specifically for 'Attitudes' the following roles are identified: Communicator (all items under point 1). Collaborator role (all items under points 1 - 3) is mainly relevant for assessment that are not performed by physiotherapist but by other health care providers. Other attitudes specifically relevant for certain subitems within this module are listed below.</i></p>						
<p>1. Principles of cardiorespiratory dysfunction following surgery</p>	<ul style="list-style-type: none"> <li>List the types of surgery that may affect respiratory function such as thoracotomy and pneumonectomy, congenital cardiac surgery, transplant in paediatric patients of all age groups</li> <li>Describe anatomic and physiological changes and dysfunction associated with thoracic and/or abdominal surgery and general anaesthesia</li> <li>Explain anatomical &amp; physiological differences between adults and paediatric patients as well as the consequences of these differences for post-operative assessment and care</li> <li>Recall the structure and function of the cardiorespiratory system in healthy children and identify how these may be altered or overwhelmed following surgery</li> <li>Describe the strengths and limitations of the appropriate different outcome measures available for measuring cardiorespiratory dysfunction following surgery, including atelectasis, secretion retention, loss of lung volumes, infection and pain</li> <li>Explain, with reference to published evidence, the clinical purpose and potential risks of different physiotherapy interventions for alleviating the problems associated with cardiorespiratory dysfunction following surgery in children</li> <li>Describe the potential risks and benefits of different physiotherapy interventions following thoracic or abdominal surgery in/of all age groups</li> <li>Explain how the effectiveness of therapeutic options may be evaluated in children following major surgery</li> </ul>		<ul style="list-style-type: none"> <li>Scholar: 1.1, 1.2</li> </ul>	<p><b>Formal learning –</b> Participation of a learner on a skills-based course on physiotherapy in surgery</p> <p>Watch videos and observation of clinical demonstration on how to assess a paediatric post-operative patient and decide on risk status of patients</p> <p>Review systematic respiratory assessment and treatment skills from modules 1-3</p> <p>Review chest radiograph interpretation skills</p>	<p>MCQ</p> <p>Case based examination</p>	<p>2</p>	<p>Observe pre- or post-operative clinical assessments in a minimum of 5 children, evaluating risk status and primary problems of patients</p>
<p>2. Assessment and monitoring of spontaneously breathing children following major surgery</p>	<ul style="list-style-type: none"> <li>Describe a logical, systematic approach for assessing physical and respiratory dysfunction in children before and after major surgery</li> <li>Utilise relevant skills from Module 1 (Assessment of paediatric patients with respiratory conditions) to identify cardiorespiratory dysfunction following surgery, including atelectasis, secretion retention, loss of lung volumes, infection and pain</li> <li>Define postoperative cardiorespiratory complications</li> <li>Describe the components of physical examination of the respiratory system, demonstrating understanding of the thoracic cage, surface lung markings, lung lobes and segments and muscles of respiration</li> </ul>	<ul style="list-style-type: none"> <li>Perform assessments before and after surgery, including reviewing medical records, interviewing the patient / family and completing an objective assessment, auscultation, review of chest radiographs, cough strength, breathing patterns, mucus retention, blood gas values and respiratory muscle function to detect respiratory dysfunction and complications in children</li> <li>Use findings from assessment to identify signs of physical and respiratory dysfunction in patients before and after abdominal or thoracic surgery through the accurate recognition and interpretation of normal and abnormal signs and symptoms within a patient's presentation</li> <li>Generate a prioritised list of clinical problems, a short term and long-term management plan and</li> </ul>		<p><b>Formal learning –</b> Participation of a learner on a skills-based course on physiotherapy in surgery</p> <p><b>Work based learning -</b> Assess a paediatric post-operative patient and decide on the status of patients and have a clear management plan</p>	<p>DOPS</p> <p>Case based examination</p> <p>Mini-CEX</p> <p>Simulation</p> <p>Multi source feedback</p> <p>Portfolio</p>	<p>4</p>	<p>Assessment of at least 5 patients under supervision and when competency is demonstrated, a minimum of 5 patients assessed alone.</p>

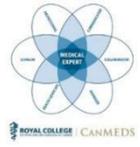
Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Explain how information gathered during assessment can be used to formulate a management plan</li> <li>Explain the primary signs and symptoms of respiratory dysfunction in paediatric patients, in particular the signs of respiratory distress in babies and infants</li> <li>Identify the risk factors for respiratory dysfunction in children following surgery and potential indications for physiotherapy</li> <li>Identify a prioritised list of clinical problems and establish a measurable baseline for evaluating response to physiotherapy interventions</li> <li>Explain how the effectiveness of therapeutic options may be evaluated in children following major surgery</li> <li>Explain, with reference to published evidence, the clinical purpose of specific physiotherapy interventions for alleviating the cardiorespiratory dysfunction identified above</li> </ul>	<ul style="list-style-type: none"> <li>establish a measurable baseline for evaluating response to physiotherapy interventions</li> <li>Use objective measures to evaluate any response to therapeutic interventions in order to modify or progress the treatment accordingly</li> <li>Maintain contemporaneous, comprehensive and legible medical records</li> </ul>					
3. Therapeutic options for the pre- or post-operative period	<ul style="list-style-type: none"> <li>Describe the findings of the pre- or post-operative assessment in terms of clinical or physical impairments that may be responsive to physiotherapy intervention</li> <li>Describe, with reference to published evidence, the specific physiotherapy interventions that may be applied to alleviate the prioritised list of clinical problems identified</li> <li>Identify pre- or post-operative therapeutic priorities as well as indications and contra-indications of techniques planned</li> <li>Compare and critically contrast various physiotherapy techniques and review objectives, rationale and limitations of each technique</li> <li>Explain how objective standardised measures may be used to establish a baseline and evaluate the response to any therapeutic intervention</li> <li>Explain the clinical significance of changes in clinical status measures after pharmacological and non-pharmacological treatments and how these may be used to guide any modification or progression of treatment</li> <li>Identify indications, contraindications and precautions to therapeutic interventions for children with respiratory disorders pre-or post-operatively</li> </ul>	<ul style="list-style-type: none"> <li>Identify appropriate physiotherapy intervention and develop a management plan based on the appropriate assessment and findings</li> <li>Use findings from objective standardised assessments to plan an appropriate therapeutic intervention</li> <li>Select and administrate appropriate therapeutic intervention and evaluate the response to that intervention (e.g. breathing techniques, ACT, coughing, RMT and mobilisation)</li> <li>Use objective measures to evaluate any response to therapeutic interventions in order to modify or progress the treatment accordingly</li> <li>Maintain contemporaneous, comprehensive and legible medical records</li> </ul>		<p><b>Formal learning –</b> Participation of a learner on a skills-based course on physiotherapy in surgery</p> <p><b>Work based learning -</b> Assess a paediatric pre-operative patient and decide on the status of patients and have a clear management plan</p>	<p>DOPS</p> <p>Case based examination</p> <p>Mini-CEX Simulation</p> <p>Multi source feedback</p> <p>Portfolio</p>	4	<p>Assess and treat at least 5 pre-operative patients under supervision and when competency is demonstrated, a minimum of 5 patients managed alone.</p> <p>Assess and treat at least 5 post-operative patients under supervision and when competency is demonstrated, a minimum of 5 patients managed alone</p>
4. Summarising the evidence and reference to evidence-based documents	<ul style="list-style-type: none"> <li>Describe the principles of critical appraisal</li> <li>Evaluate level of evidence according to widely accepted tools for quality assessment</li> <li>Assemble the available evidence for appropriate age groups and clinical populations</li> <li>Access, interpret and examine the relevant scientific evidence and evidence-based guidelines</li> <li>Conduct systematic search for evidence</li> <li>Conduct critical literature appraisal</li> </ul>	<ul style="list-style-type: none"> <li>Interpret and apply recommendations from evidence-based literature to patient care</li> </ul>	<ul style="list-style-type: none"> <li>Scholar 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	<p>Case based discussion (face to face) and in online environment</p> <p>Literature review</p> <p>Appraisal of a scientific article related to clinical work</p>	<p>MCQ</p> <p>Case based assessment</p>	2	<p>Evaluate pre- and postoperative service delivery in one hospital for patients needing abdominal and thoracic surgery and considering best available evidence discuss with MDT how services may be modified to optimize healthcare</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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	<ul style="list-style-type: none"> <li>Use systematic methods for critical appraisal of evidence</li> </ul>						
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**Module 8 Pharmacotherapy relevant to the physiotherapist**

Mandatory

Module Competency	To explain the rationale and effects of pharmacotherapy and monitor response and use of pharmacotherapy relevant to physiotherapy						
CanMEDS Roles	 <p>In this module the following CanMEDS roles are identified: <i>Specifically for 'Attitudes' the following roles are identified: Communicator (item 3.1), Collaborator (item 1.3), and health advocate (items 1.2-1.3). Other attitudes specifically relevant for certain subitems within this module are listed below.</i></p>						
1. Supplemental O <sub>2</sub> therapy in different situations	<ul style="list-style-type: none"> <li>Explain and discuss the physiology of gas exchange, transport and O<sub>2</sub> utilisation</li> <li>Explain and discuss the rationale and clinical significance of using supplementary O<sub>2</sub> therapy for acute and chronic hypoxaemia in children</li> <li>Summarise the benefits and risks of O<sub>2</sub> therapy in neonates and children</li> <li>Following the guidelines, define supplemental O<sub>2</sub> therapy in children</li> <li>Explain how to select titration for acute, long-term and ambulatory O<sub>2</sub> therapy</li> <li>Describe different delivery systems and sources for O<sub>2</sub> therapy in children</li> <li>Describe the safety regulations for storing and using O<sub>2</sub></li> <li>Discuss the methods and efficacy of humidification of O<sub>2</sub> therapy in children</li> <li>Describe methods of combining O<sub>2</sub> therapy with NIV</li> <li>Discuss the role of O<sub>2</sub> therapy in relation to pulmonary hypertension and pulmonary hypertensive crisis in children</li> <li>Describe what O<sub>2</sub> saturation you would expect in normal circulation and mixed circulation in children</li> </ul>	<ul style="list-style-type: none"> <li>Titrate O<sub>2</sub> therapy for acute, chronic and exercise induced hypoxaemia during physiotherapy treatment</li> <li>Monitor and review results of patient assessment to identify patients who may benefit from supplemental O<sub>2</sub> therapy</li> <li>Monitor and document patient response to supplemental O<sub>2</sub> by reviewing O<sub>2</sub> level during and after physiotherapy treatment, exercise and mobilisation</li> <li>According to local guidelines, assess the risks of supplement O<sub>2</sub> therapy for example excessive oxygenation, hypercapnia, fire risks</li> <li>Present current evidence for use of supplementary O<sub>2</sub> therapy in different situations</li> <li>Demonstrate how to manage a pulmonary hypertensive crisis with O<sub>2</sub> therapy</li> <li>Demonstrate how to target O<sub>2</sub> therapy in relation to mixed venous and arterial circulation in children with cardiac abnormalities</li> </ul>	<p><b>Module specific attitudes:</b></p> <ul style="list-style-type: none"> <li>Being able to explain in patient language and taking into account local legislation the correct use of O<sub>2</sub> therapy</li> <li>Consider and respect patient and family's choice in when discussing O<sub>2</sub> therapy, e.g. interface selection</li> </ul>	<p><i>Umbrella for all syllabus items</i></p> <p>Self-directed learning: literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed</p> <p>Formal learning: (ERS school courses or equivalent)</p>	<p>MCQ</p> <p>Portfolio</p> <p>Clinical log book</p> <p>DOPS</p>	4	<p>Explain diagnosis, treatment and management to 20 patients</p> <p>Discuss 20 patients in a case based discussion</p>
2. Aerosoltherapy	<ul style="list-style-type: none"> <li>Explain different groups of inhaled medication such as saline, long and short acting bronchodilators, muco-active medications, steroids and combined inhaled medications and discuss indications for using them</li> <li>Discuss timing of inhaled medication with regard to physiotherapy treatment</li> <li>List and discuss options for aerosol therapy medications and the appropriate dose dependent on the child's age and diagnosis</li> <li>Summarise the benefits and side effects of inhaled drugs in children</li> </ul>	<ul style="list-style-type: none"> <li>Monitor patient response to aerosol therapy and effects on physiotherapy treatment</li> <li>Monitor and review results of patient assessment to identify patients who may benefit from aerosol therapy</li> <li>Instruct patients to use aerosol therapy in preparation for physiotherapy intervention</li> <li>Adapt the appropriate delivery systems and interfaces (mask or mouth piece) to suit the patient's age and clinical diagnosis</li> <li>Demonstrate on a mannequin the method of delivery of surfactant therapy</li> </ul>		<p>Learning with other professionals: participate in case-based discussions</p>	<p>MCQ</p> <p>Portfolio</p> <p>Clinical log book</p> <p>DOPS</p>	4	<p>Explain diagnosis, treatment and management to 20 patients</p> <p>Discuss 20 patents in a case based discussion</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Discuss types of devices used for aerosol therapy for example nebulisers, metered dose inhalers, dry powder inhalers along with adjuncts such as spacers to improve deposition</li> <li>Describe indications to use aerosol therapy as an adjunct to physiotherapy intervention for example to improve exercise performance or chest clearance</li> <li>Discuss the indications for surfactant in neonates</li> <li>Describe the method of delivery of surfactant therapy and the implications of this on treatment times</li> <li>Summarise the benefits and mechanism of action for nitric oxide (NO) therapy in the intubated patient</li> <li>Describe the implications of NO use in children with regard to airway clearance treatment</li> <li>Present current evidence for use of aerosol therapy in relation to physiotherapy management</li> </ul>						
3. Influence of cardiorespiratory medication on physiotherapy treatment and rehabilitation	<ul style="list-style-type: none"> <li>Summarise types of cardiorespiratory medication (e.g. mucolytics, beta-adrenoreceptor blockers), their benefits and side effects relevant to physiotherapy such as reduced sputum viscosity, blood pressure or tachycardia</li> <li>Recognise impact of cardiorespiratory medication on physiotherapy treatment such as exercise performance or chest clearance</li> <li>Discuss patient's response to cardiorespiratory medication</li> <li>Recognise conditions which require cardiorespiratory medication</li> <li>Describe physiology and pathophysiology in relation to cardiorespiratory medication and its impact on physiotherapy treatment</li> </ul>	<ul style="list-style-type: none"> <li>Monitor and review patient's response to cardiorespiratory medication in response to exercise</li> </ul>			<p>MCQ</p> <p>Portfolio</p> <p>Clinical log book</p>	2	<p>Explain diagnosis, treatment and management to 20 patients</p> <p>Discuss 20 patients in a case based discussion</p>
4. Effects of anaesthesia and analgesia on physiotherapy treatment and rehabilitation	<ul style="list-style-type: none"> <li>Recall types of anaesthesia</li> <li>Discuss influence of anaesthesia on cardiovascular, respiratory, central and peripheral nervous systems</li> <li>Recognise the side effects of anaesthesia on cardio-vascular system, cough or hypoventilation.</li> <li>Discuss the impact and benefits of anaesthesia for physiotherapy and rehabilitation</li> <li>Discuss influence of anaesthesia on certain diseases of childhood e.g. neuromuscular disease</li> </ul>	<ul style="list-style-type: none"> <li>Assess cough and ventilation effectiveness in response to anaesthesia</li> <li>Monitor impact of anaesthesia on cardio-vascular function, mucociliary function, cough and lung volumes</li> <li>Monitor and analyse patient's response to anaesthesia with objective assessments for vital signs and patient's subjective perception.</li> <li>Co-ordinate use of analgesia with physiotherapy intervention, e.g. pain management to improve patient's cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Consider patient's and family feedback and subjective experience when considering anaesthesia e.g. pain management procedures</li> </ul>		<p>MCQ</p> <p>Portfolio</p> <p>Clinical log book</p>	2	<p>Explain diagnosis, treatment and management to 20 patients</p> <p>Discuss 20 patients in a case based</p>

### Module 9 Non-invasive ventilation for the respiratory physiotherapist

Mandatory

Module Competency	<i>To explain the rationale and to apply appropriately the use of NIV in the respiratory paediatric patient.</i>
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Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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<p>CanMEDS Roles</p> 	<p>In this module the following CanMEDS roles are identified: Specifically for 'Attitudes' the following roles are identified: Communicator (item 3.1 and all items under point 5), Collaborator (item 1.3), and leader (items 1.2-1.3). Other attitudes specifically relevant for certain subitems within this module are listed below.</p>						
<p>1. Definition and application of modalities and parameters, difference between acute ventilatory support (NIV and CPAP) and long-term ventilator support, limitations (effects and risks), indications and contraindications of NIV</p> <p>(For the purpose of this module ventilatory support relates to both NIV and CPAP)</p>	<ul style="list-style-type: none"> <li>List paediatric pathologies where NIV may be indicated and explain why</li> <li>Describe continuous positive airway pressure (CPAP) and NIV</li> <li>Review indications and application of ventilator support therapy according to the current guidelines in the field</li> <li>Summarise the mechanism of action for ventilator support and discuss physiological effects of ventilator support to the patient with regards to arterial blood gases (ABG), work of breathing, breathlessness and comfort</li> <li>Discuss the benefits and pitfalls of using non-invasive support versus invasive support</li> <li>Explain the indications for the provision of ventilator support in the acute and chronic setting with regard Bronchiolitis, neuromuscular disorders (NMD), chest wall deformity, heart failure, tracheobronchomalacia, CF and hypoxic respiratory failure</li> <li>Identify the palliative role of the use of ventilator support</li> <li>Discuss the differences and indications for CPAP, bi-level pressure (BPAP), adaptive servo ventilation and pressure support (PS), volume assured pressure support (VAPS) or/and volume support, continuous negative pressure ventilation (CNEP), negative pressure ventilation and high flow oxygen therapy (HFOT)</li> <li>Define parameter settings such as inspiratory positive airway pressure, expiratory positive airway pressure, PS, respiratory rate</li> <li>Define the modes of ventilation (spontaneous, timed, spontaneous timed, CPAP and VAPS).</li> <li>Define alarm parameter settings such as high pressure alarm, low pressure alarm, high flow, low flow, disconnect</li> <li>Summarise the absolute contra indications and relative contraindications for the use of ventilatory support in the paediatric patient</li> <li>Outline the factors predictive of failure of non-invasive ventilator support with regards to arterial blood gas tension, respiratory rate, breathlessness and hemodynamic stability</li> <li>Critique possibilities and limitations of treatment modalities with respect to the patient's comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>Identify the correct environment for initiating NIV depending on <ul style="list-style-type: none"> <li>indication for NIV (prophylactic, acute, chronic, palliative)</li> <li>level of dependency</li> <li>availability of adequate monitoring</li> <li>availability of correct skill mix</li> </ul> </li> <li>Identify when to withdraw NIV treatment</li> <li>Recognise when the patient requires invasive ventilation and refer appropriately</li> <li>Demonstrate the skills necessary to correctly apply the treatment</li> <li>Organize and co-ordinate patient sessions, taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times), efficient use of available resources</li> </ul>	<ul style="list-style-type: none"> <li>Scholar 1.1 and 1.2</li> <li>Ask and value patient and family feedback.</li> <li>Organize and co-ordinate patient sessions taking into consideration: <ul style="list-style-type: none"> <li>workload,</li> <li>clinical priorities</li> <li>other priorities (doctors' visits and exams, nursing priorities, meal times)</li> <li>the good use of available resources</li> </ul> </li> </ul>	<p><i>Umbrella for all syllabus items</i></p> <p><b>Self-directed learning</b> (NIV simulation, literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed)</p> <p><b>Formal learning</b> (ERS school NIV courses or equivalent to update both knowledge and skills)</p> <p><b>Learning with other professionals:</b> participate in case-based discussions</p>	<p><i>Umbrella for all syllabus items</i></p> <p><b>MCQ</b> (Knowledge based items)</p> <p><b>NIV simulator</b> (skill based assessment)</p> <p><b>Portfolio</b> (Knowledge and skill based) discussion of a variety of different clinical cases</p> <p>DOPS</p>	<p><i>Umbrella for all syllabus items</i></p> <p>4</p>	<p>Elaborate management plan and carry out treatments under supervision for a minimum of <b>10 patients of (half of them acute) and when competency is demonstrated, manage another 10 unsupervised.</b></p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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	<ul style="list-style-type: none"> <li>Review the evidence base for the use of ventilator support in the acute and chronic setting dependent on the patient's pathology</li> </ul>						
2 a. Devices	<ul style="list-style-type: none"> <li>Describe types of positive pressure airway therapy and different modes: e.g. CPAP, CPAP flow driver, CNEP, auto titrating CPAP, BPAP ventilation, negative pressure ventilation, HFOT and other NIV modes (for ex neutrally adjusted ventilatory assist)</li> <li>Describe the age that these devices can be used in paediatric patients: CPAP, CPAP flow driver, CNEP, auto titrating CPAP, BPAP ventilation, negative pressure ventilation, high flow O<sub>2</sub> therapy and other NIV modes</li> <li>Compare the mechanism of action of different modes of positive pressure therapy in respect to different machines</li> <li>Illustrate how to match positive pressure mode to patient's pathophysiology e.g. CPAP for obstructive sleep apnoea or tracheobronchial malacia, Bi-level for NMD with hypercapnia and HFOT for bronchiolitis</li> <li>Differentiate between which ventilators and settings will deliver a higher concentration of O<sub>2</sub> if required</li> <li>Describe how to initiate ventilatory support in children</li> <li>Discuss ventilation strategies in patients with obesity hypoventilation syndrome</li> <li>Discuss ventilation strategies in patients with NMD</li> <li>Review research evidence on NIV ventilators</li> <li>Discuss ventilator maintenance (filter changes)</li> </ul>	<ul style="list-style-type: none"> <li>Explain therapy to the patient and the family               <ul style="list-style-type: none"> <li>Choose most appropriate machine</li> <li>Demonstrate correct set up of the chosen equipment</li> </ul> </li> <li>Initiate treatment and adjust settings to patient's pathology, co-morbidities and ABG</li> <li>Evaluate patient tolerance of ventilator support and adjust settings as appropriate</li> <li>Ensure treatment objectives are achieved in terms of patient clinical evolution (e.g. improved ABG, reduced respiratory rate, better lung volumes normalized nocturnal oximetry, transcutaneous CO<sub>2</sub>, cardiorespiratory monitoring, abolished respiratory events etc.)</li> <li>Identify when the device or mode of ventilation needs to be changed and do so appropriately</li> <li>Teach patient and family how to manage the CPAP or ventilator for self-management in the long-term setting</li> <li>Ensure protocols regarding ventilator maintenance are adhered to</li> </ul>					
2 b. Monitoring equipment	<ul style="list-style-type: none"> <li>Describe the use of oximetry and CO<sub>2</sub> (capnography and transcutaneous) monitoring in acute and chronic ventilator support</li> <li>Review pros and cons of oximetry and CO<sub>2</sub> monitoring in acute and chronic ventilator support</li> <li>Discuss advantages and disadvantages of different systems available</li> <li>Review research evidence on monitoring equipment</li> </ul>	<ul style="list-style-type: none"> <li>Interpret oximetry and CO<sub>2</sub> monitoring</li> <li>Conduct "titration" to achieve appropriate settings for the patient</li> <li>Respect recommended hygiene measures</li> <li>Interpret night-time oximetry, capnography results and cardio respiratory monitoring to titrate positive airway pressure</li> <li>Detect asynchronies and residual respiratory events by observing the patient.</li> <li>Interpret data from built-in software of home ventilators</li> </ul>					
2 c. Interfaces	<ul style="list-style-type: none"> <li>Describe different types of positive pressure interfaces available for children including nasal masks, facemasks, nasal plugs, total facemasks helmets and mouthpieces and describe what interfaces may suit different patients and are more likely to be used depending on the child's age and diagnosis</li> <li>Explain why certain interfaces are more likely to be used in the acute set up as compared to long-term set up of ventilator support</li> <li>Differentiate between "vented" and "non-vented" masks</li> <li>Classify the benefits and potential side effects of each type of interface</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate and apply the indications for the chosen interface</li> <li>Adjust interface to patient's pathology, age, co-morbidities and to prevent midfacial hypoplasia</li> <li>Adapt parameters to type of interface (use of total face or helmet)</li> <li>Evaluate patient tolerance of the interface</li> <li>Where indicated, teach patient and family positioning of the interface for self-management</li> <li>Demonstrate options for pressure sore and facial deformation prevention management with regard to the interface of choice</li> <li>Identify when the interface needs to be changed and do so appropriately</li> </ul>	<ul style="list-style-type: none"> <li>Be aware of recommended hygiene measures</li> </ul>				

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Define the current options available to prevent or manage interface pressure sores and facial deformity</li> <li>Review research evidence on available interfaces</li> <li>Describe the indications and physiological reasons for mask management in children</li> </ul>	<ul style="list-style-type: none"> <li>Apply hygiene measures in accordance with protocol in place</li> </ul>					
2 d. Circuits	<ul style="list-style-type: none"> <li>List different types of circuit (double limb, single limb, 10mm,15mm and 22mm, leak and active expiratory valve) and how these may suit different patients</li> <li>Explain why certain circuits are more likely to be used in the acute set up compared to long-term set up of ventilator support and also the types of circuit that are more likely to be used when transferring patients from invasive to non-invasive support.</li> <li>Explain the effects of increased dead space in circuits and the effect of triggering in paediatric patients</li> <li>Discuss the benefits and pitfalls of each type of circuit</li> <li>Compare different positions within the circuit to deliver aerosol therapy</li> <li>Review research evidence on available NIV circuits</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate and apply the indications for the chosen circuit</li> <li>Adjust circuit to patient's pathology, age and co-morbidities</li> <li>Evaluate patient tolerance of the circuit</li> <li>Identify when the circuit needs to be changed and do so appropriately</li> <li>Identify the best position in the circuit for the entrainment of O<sub>2</sub> therapy when you need to give a high concentration of O<sub>2</sub> and a low concentration of O<sub>2</sub></li> <li>Appropriately evaluate and apply the addition of O<sub>2</sub> therapy to the circuit.</li> <li>Appropriately apply and evaluate the addition of aerosol therapy within the circuit</li> <li>Teach patient and family how to attach the circuit for self-management</li> </ul>	<ul style="list-style-type: none"> <li>Respect recommended hygiene measures</li> </ul>				
2 e. Humidification	<ul style="list-style-type: none"> <li>Explain the rationale for / importance of optimal humidification during NIV</li> <li>Distinguish between the different humidification (heat moisture exchangers (HME), cold water pass over, heated pass over humidification, counter flow heated humidification and internal and external systems) and how these may suit different patients</li> <li>Explain why certain types of humidification are more likely to be used in the acute set up compared to long-term set up of ventilator support</li> <li>Classify the benefits and potential side effects of each type of humidification</li> <li>Review research evidence on humidification systems</li> <li>Explain the effects of increased dead space with humidification and the effect of triggering in paediatric patients</li> </ul>	<ul style="list-style-type: none"> <li>Apply and evaluate the indications for the chosen humidification</li> <li>Adjust humidification if required to patient's pathology and co-morbidities</li> <li>Teach patient and family how to manage the humidification for self-management in the long-term setting</li> <li>Evaluate patient tolerance of humidification</li> <li>Demonstrate correct set up of the chosen humidification system</li> <li>Identify when the humidification system needs to be changed (appropriately)</li> <li>Respect recommended hygiene measures</li> </ul>	<ul style="list-style-type: none"> <li>Be aware of hygiene protocols in place</li> </ul>				
2 f. Compliance	<ul style="list-style-type: none"> <li>Recognise the concepts of compliance and adherence</li> <li>Assess patient compliance and reasons for poor and good compliance</li> </ul>	<ul style="list-style-type: none"> <li>Apply problem solving strategies for patients with compliance problems</li> <li>Identify cause of patients' lack of compliance. (airway dryness, mask intolerance)</li> <li>Where appropriate, collaborate with play specialists and other members of the MDT to assist adherence to treatment</li> </ul>	<ul style="list-style-type: none"> <li>Communicator 4.3</li> </ul>				
2 g. Algorithms	<ul style="list-style-type: none"> <li>Describe treatment algorithms in the management of acute respiratory failure in for example bronchiolitis and chronic hypercapnic respiratory failure due to NMD</li> </ul>	<ul style="list-style-type: none"> <li>Apply suitable algorithms</li> <li>Identify patients who can benefit from optimising treatment</li> <li>Correctly identify cases which could benefit from treatment optimization /individualization</li> </ul>					

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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	<ul style="list-style-type: none"> <li>Describe treatment algorithms in initiation of children in the long-term in-patient and out-patient initiation of ventilator support</li> </ul>						
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**Module 10 Physiotherapy related to immaturity, disability, deconditioning or immobility in the paediatric intensive care unit (PICU) and the prevention and resolution of related complications.**

Optional (Note: Focused on the critically ill patient treated within the ICU and related areas high dependency or intermediate units)

Module Competency	<p><i>The role of the physiotherapist in the PICU is to prevent and resolve respiratory complications related to mechanical ventilation as well as optimise musculoskeletal and neurological function and facilitate return of age appropriate functional abilities upon ICU discharge. PICU as defined here also covers the work done in the cardiac intensive care unit (CICU) and the NICU.</i></p> <p><i>To integrate information obtained from the clinical assessment of the critically ill patient with knowledge about the effects of intensive care and the risks and benefits of physiotherapy interventions. To apply such knowledge for identifying which aspects of the clinical presentation will be amenable to physiotherapy intervention and what factors should be considered when developing a management plan. To apply therapeutic options for the critically ill patient, assessing the response to each technique and adjusting the therapeutic plan accordingly.</i></p>
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CanMEDS Roles 	<p><i>In this module the following CanMEDS roles are identified: Specifically for 'Attitudes' the following roles are identified: Communicator (item 3.1), Collaborator (item 1.3), and Professional (items 1.3+3.1). Other attitudes specifically relevant for certain subitems within this module are listed below.</i></p>
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1. Rationale and indications, for physiotherapy related to immaturity, disability, deconditioning or immobility in the PICU	<ul style="list-style-type: none"> <li>Explain the primary indications for admission of babies and children to intensive care (including neonatal intensive care, congenital cardiac surgery, trauma, burns, acquired brain injury)</li> <li>Explain developmental milestones and the anatomical &amp; physiological structure and function of the neurological and musculoskeletal system in children of all ages in terms of their consequences for assessment, care and rehabilitation in the ICU</li> <li>Discuss the special requirements and musculoskeletal and neurological vulnerabilities of PICU patients, as well as the pathophysiology of deconditioning related to critical illness and risks caused by immobility and immaturity</li> <li>Identify how paediatric body systems may be altered or harmed by endotracheal intubation, mechanical ventilation, sedation and bed rest in children of all age groups: particularly in terms of neurological, musculoskeletal and psychological function</li> <li>Discuss the therapeutic possibilities, limitations and rationale behind the use of physiotherapy rehabilitation techniques and early mobilisation for prevention and treatment of adverse effects related to intensive care. Include equipment, evidence and progression</li> <li>Acquire a physiology-based knowledge about potential risks and side-effects that stem from physical, neurological and musculoskeletal dysfunction and physiotherapeutic interventions in babies and children in the ICU</li> </ul>	<ul style="list-style-type: none"> <li>Integrate information obtained from the clinical assessment with theoretical knowledge of normal development and disease processes and the risks and benefits of physiotherapy interventions in order to identify which aspects of the clinical presentation will be amenable to physiotherapy intervention and what factors should be considered when developing a management plan</li> <li>Select an appropriate logical, systematic approach to identify signs of musculoskeletal and neurological dysfunction through the accurate recognition and interpretation of normal and abnormal signs and symptoms within a child's presentation receiving intensive care. This will include reviewing medical records, interviewing the patient / family and completing objective assessments, including standardised functional or behavioural assessments to detect dysfunction or complications in children</li> <li>Select objective measures to evaluate any response to therapeutic interventions in order to modify or progress the treatment accordingly</li> <li>Demonstrate an ability to generate a prioritised list of clinical problems, a short term and long-term management plan and establish a measurable baseline for evaluating response to physiotherapy interventions</li> <li>Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times)</li> </ul>	<ul style="list-style-type: none"> <li>Scholar 1.1 &amp; 1.2</li> <li>Encourage the patient in his endeavours during the mobilisation sessions</li> </ul>	Self-directed learning Literature search and appraisal Lectures Case-based discussions Workshops Hands-on learning under experienced guidance Simulation training Clinical internship	Clinical evaluation DOPS Case based discussion Portfolio Clinical internship evaluation	4	Participate in 20 case-based discussions and/or case conferences and design physiotherapeutic approach for 10 patients  Analyse and interpret complications, contraindications and risks in 20 patients, including necessary modification of physiotherapeutic approach
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Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>• Explain hazards, precautions, contra-indications and risks for physiotherapy and rehabilitation interventions in children of different ages admitted to intensive care as well as the strategies for mitigating or minimising risk</li> <li>• Explain hazards, precautions, contra-indications and risks for therapeutic in the ICU (mechanical ventilation, artificial airway, medication, surgical and other treatments)</li> <li>• Identify the guidelines in place, the equipment and actions required in an “emergency situation” such as accidental tube removal, catheter removal, cardiac arrest, ventilator disconnection, falls</li> <li>• Recall effects of medications specific to intensive care such as cardiovascular medications (vasopressors and vasodilators etc.), sedatives, analgesics, muscle relaxants</li> <li>• Explain the hemodynamic and physiological effects of different modes of ventilation, particularly in relation to their consequences for physiotherapy management</li> <li>• Describe functional characteristics of ventilators and monitors, and the relationship of controls and alarm systems to their function</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain contemporaneous, comprehensive and legible medical records related to the rationale and indications for therapy</li> </ul>					
2. Assessment and monitoring during and after physiotherapy treatment related to immaturity, disability, deconditioning or immobility in the PICU	<ul style="list-style-type: none"> <li>• Recall the theoretical background of assessment techniques, including normal developmental milestones for children of all ages and the implications of abnormal findings for physiotherapy treatment</li> <li>• Describe various monitoring and assessment methods (O<sub>2</sub> saturation; ECG, heart rate, respiratory rate, blood pressure, CO<sub>2</sub>, level of consciousness) used to evaluate patients receiving mechanical ventilation</li> <li>• Describe a logical, systematic whole-body approach for assessing physical, neurological and musculoskeletal dysfunction in babies and children admitted to intensive care</li> <li>• Describe the strengths and limitations of different outcome measures for measuring physical, neurological and musculoskeletal dysfunction in critically ill children, including standardised instruments</li> <li>• Establish a measurable baseline for evaluating response to physiotherapy interventions</li> <li>• Identify and document a prioritised list of clinical problems and design an appropriate short term therapeutic plan and techniques as well as longer term progression of treatments</li> <li>• Review indications, contraindications, hazards and precautions that will preclude any therapy interventions in children of different ages, according to the current guidelines in the field and local protocols</li> <li>• Discuss any perceived impediments to mobilisation or therapy caused by the intensive</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate competence in administration of an appropriate logical, systematic approach to identify signs of musculoskeletal and neurological dysfunction in children of all ages receiving intensive care, through the accurate recognition and interpretation of normal and abnormal signs and symptoms. This will include reviewing medical records, interviewing the patient / family and completing objective assessments, including standardised functional or behavioural assessments to detect dysfunction or complications in children</li> <li>• Interpret findings from musculoskeletal and neurological assessment measures in children of different ages, particularly in relation to their role in directing or evaluating physiotherapy treatments</li> <li>• Generate a prioritised list of clinical problems, a short term and long-term management plan and establishing a measurable baseline for evaluating response to physiotherapy interventions</li> <li>• Use objective measures to evaluate any response to therapeutic interventions in order to modify or progress the treatment accordingly</li> <li>• Carefully assess the child throughout any therapeutic intervention for any adverse haemodynamic changes and terminate or modify treatment if necessary or start resuscitation protocol appropriately if required</li> <li>• Monitor patient during treatment to detect signs of pain, non-tolerance including pain, distress – grimace, agitation, increased blood pressure, changes in heart rate, diminished O<sub>2</sub> saturation, ventilator asynchrony modify treatment if necessary</li> </ul>	<ul style="list-style-type: none"> <li>• Show willingness to modify therapeutic intervention according to monitoring instead of applying standard therapeutic procedures</li> <li>• Professional: 2.2</li> </ul> <p><b>Module specific attitudes:</b></p> <ul style="list-style-type: none"> <li>• Ensure patients safety at all times by applying adequate precautions to vital equipment (secure the endotracheal tube, drains, perfusions)</li> </ul>	<p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Lectures</p> <p>Case-based discussions</p> <p>Workshops</p> <p>Hands-on learning under experienced guidance</p>	<p>Clinical evaluation</p> <p>DOPS</p> <p>Case based discussion</p> <p>Portfolio</p> <p>Clinical internship evaluation</p>	4	<p>Assess, monitor and create a treatment plan for a minimum of 20 paediatric patients under close senior supervision,</p> <p>Then assess monitor and create a treatment plan for a minimum of 20 paediatric patients independently</p> <p>In each case maintain contemporaneous, comprehensive and legible medical records</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<p>care monitoring including ECG, arterial lines, O<sub>2</sub>-CO<sub>2</sub> monitoring, and intracranial pressure, and review options to minimise risks</p> <ul style="list-style-type: none"> <li>• Discuss with the attending medical doctor the setting of upper and lower limits for the alarms in relation to different pathologies and the aim of the treatment</li> <li>• Recall patient safety measures including equipment for assessment and treatment and for initiating resuscitation in the event of significant acute deterioration</li> </ul>	<p>or start resuscitation protocol appropriately if required</p> <ul style="list-style-type: none"> <li>• React appropriately to modifications in clinical values (O<sub>2</sub> saturation, heart rate, blood pressure, pain) and distinguish between monitoring artefacts and signs of deterioration</li> <li>• Maintain contemporaneous, comprehensive and legible medical records related to the assessment findings and monitoring</li> </ul>					
<p>3. Body positioning treatment related to immaturity, disability, deconditioning or immobility in the PICU</p> <p><i>(Choosing and implementing a therapy intervention - Competence in technical skill set)</i></p>	<ul style="list-style-type: none"> <li>• Discuss the therapeutic effects and risks of positioning (supine head up 45°, side lying, sitting, prone) in the ICU for children of all ages</li> <li>• Explain effects of body positioning in children of all ages on neurological sequelae and the musculoskeletal system, respiratory mechanics, distribution of ventilation and perfusion and cardiovascular function</li> <li>• Evaluate potential risks and benefits involved in mobilisation or position changing including accidental catheter removal, endotracheal tube displacement or extubation, agitation and significant changes in blood pressure, heart rate, oxygenation, or comfort</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate competence in accurate assessment to identify the child's indications and suitability for different body positions</li> <li>• Demonstrate safety and competence in selecting and implementing techniques for changing body position, following any protocols or clinical pathways in use - particularly in relation to: <ul style="list-style-type: none"> <li>○ <b>The child's age</b> such as body positioning / 'kangaroo care' to facilitate parent-infant bonding in prematurity</li> <li>○ <b>the child's pathology</b> such as post-surgical, spinal fractures, head injury, pneumonia</li> <li>○ <b>clinical status</b> such as agitation, blood pressure, heart rate and rhythm,</li> <li>○ <b>equipment</b> including catheters, extracorporeal membrane oxygenation (ECMO), hemodiafiltration</li> <li>○ <b>pharmacology</b></li> </ul> </li> <li>• Ensure patient's comfort and safety (secure airway, catheters, adequate pain medication, sufficient staffing)</li> <li>• Monitor the child carefully during position changes and recognise clinical signs of non-tolerance, adapting ventilator settings and/or modifying position as necessary</li> <li>• Implement any local procedures or protocols for moving patients, in particular those who require moving into potentially more risky positions (e.g. prone positioning)</li> <li>• Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times)</li> <li>• Collaborate with nursing staff to plan the timing of treatments (examinations, administration of sedation, pain relief etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare families for possible side effects of the Prone Position</li> </ul>	<p>Assemble documentation pertaining to positioning in paediatric intensive care.</p> <p>Work based learning</p> <p>Case studies</p> <p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Learning hands-on under competent guidance</p> <p>Simulation training</p>	<p>MCQ</p> <p>Long case</p> <p>Short case</p> <p>OSCE</p> <p>DOPS</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	4	<p>Participate in the positioning of a minimum of 20 paediatric patients under close senior supervision,</p> <p>Then participate in positioning and monitoring a minimum of 20 paediatric patients independently</p> <p>In each case maintain contemporaneous, comprehensive and legible medical records</p>
4. Rehabilitation related to immaturity, disability, deconditioning or immobility in the PICU	<ul style="list-style-type: none"> <li>• Recall physiology of normal muscle activity and basic exercise physiology (module 4), including the effects of immobility on muscle function and the cardiovascular and respiratory systems</li> <li>• Explain the determinants of strength, power and weakness in human muscle and the adaptations to strength training in children of all ages</li> </ul>	<ul style="list-style-type: none"> <li>• Use findings from objective standardised assessments to plan an age appropriate rehabilitation intervention for optimising development, safe mobilisation, minimising postural harm and facilitating age appropriate physical function</li> <li>• Select and administrate an age appropriate rehabilitation intervention and evaluating the</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage children and families to participate as much as possible in the rehabilitation process</li> <li>• Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times)</li> </ul>	<p>Assemble documentation pertaining to paediatric rehabilitation in intensive care</p>	<p>Clinical evaluation</p> <p>Case based examination</p> <p>MCQ</p>	4	<p>Participate in the rehabilitation of a minimum of 20 paediatric patients in the PICU under close senior supervision,</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
<p>including mobilisation, exercise,</p> <p><i>(Choosing and implementing a therapy intervention - Competence in technical skill set implementing and progressing the treatments safely and evaluating effects)</i></p>	<ul style="list-style-type: none"> <li>Describe the findings of the systematic assessment in terms of clinical or physical impairments that may be responsive to physiotherapy intervention</li> <li>Discuss theoretical background, limitations indications, contraindications and risks as well as potential benefits of different paediatric rehabilitation techniques according to current evidence and guidelines in the field</li> <li>Outline the neurological and psychological effects of immobility, as well as the physiological basis of muscle dysfunction in critical illness</li> <li>Discuss the psychological and social effects of physical play, mobility and exercise</li> <li>Explain the rationale behind the use of exercise therapy: passive, active-assisted, active, resistive</li> <li>Explain how equipment may be utilised to optimise rehabilitation in a PICU, including toys, games, weights, cycle-ergometry and other rehabilitation props and appliances</li> <li>Identify the guidelines in place, the equipment and actions required in an “emergency situation” such as accidental tube removal, catheter removal, cardiac arrest, ventilator disconnection</li> </ul>	<p>response to that intervention (e.g. body positioning, mobilisation, upper or lower body strengthening) in terms of tolerance, level of cooperation, hemodynamic stability and level of oxygenation etc.</p> <ul style="list-style-type: none"> <li>Assess treatment efficacy, recognising clinical signs of non-tolerance and adapt ventilator settings and/or modify treatment in accordance with the child’s clinical status, pathology, safety, progress and local protocols in place. Terminate or withdraw treatment if necessary or start resuscitation protocol appropriately if required</li> <li>Adjust settings of upper and lower limits of the alarms based on the child’s condition, aim of the treatment and local protocols in place</li> <li>Identify the risks associated with rehabilitation and ensure adequate precautions are in place to ensure the child’s comfort and allow safe treatment (secure airway, catheters, arterial and venous lines adequate pain medication, adapt ventilation sufficient staffing) and adhere to relevant hygiene guidelines</li> <li>Safely handle artificial airways, tubes and lines in various treatment and rehabilitation situations</li> <li>Demonstrate familiarity with the equipment required in an emergency and the ability to react in an emergency situation such as pneumothorax, accidental extubation, catheter removal, and cardiac arrest - by calling attending medical staff and initiating mask ventilation or Basic Life Support (BLS) if necessary</li> <li>In each case provide information to allow patient to make informed decision on value of treatment options and maintain contemporaneous, comprehensive and legible medical records of treatment</li> <li>Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors’ visits and exams; nursing priorities, meal times)</li> </ul>		<p>Work based experience</p> <p>Practical workshops</p> <p>Case studies</p> <p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Case-based discussions</p> <p>Case conferences</p> <p>Clinical internship</p> <p>Performing procedures under guidance</p>	<p>Long case</p> <p>OSCE</p> <p>DOPS</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>		<p>Then when competency is demonstrated participate in the rehabilitation of another 20 paediatric patients independently</p> <p>In each case maintain contemporaneous, comprehensive and legible medical records</p>
<p>5. Summarising the evidence and reference to evidence-based documents</p>	<ul style="list-style-type: none"> <li>Keep up to date with scientific literature, conferences, consensus statements, workshops and educational meetings</li> <li>Explain how to conduct systematic literature searches and assemble the available evidence on physiotherapy treatment related to immaturity, disability, deconditioning or immobility in the PICU</li> <li>Describe the principles of critical appraisal and evaluate level of evidence according to widely accepted tools for quality assessment</li> <li>Access, interpret and examine the relevant scientific evidence and evidence-based guidelines using critical literature appraisal</li> <li>Refer to evidence-based articles on physiotherapy treatment related to immaturity, disability, deconditioning or immobility in the PICU</li> </ul>	<ul style="list-style-type: none"> <li>Assimilate the relevant evidence in each clinical circumstance to deliver effective therapeutic treatments</li> <li>Interpret the different findings and modify patient care to adopt evidence or expert opinion, in an ongoing learning process</li> <li>Be critical of the existing scientific evidence supporting rehabilitation in the ICU</li> </ul>	<ul style="list-style-type: none"> <li>Scholar: 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	<p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Case based discussions</p> <p>Interpretation of evidence-based studies and guidelines in interaction with experienced guidance</p>	<p>Clinical evaluation</p> <p>Case based discussion</p> <p>Critically Appraised Topic <a href="http://www.physio-pedia.com/Critically_Appraised_Topics">http://www.physio-pedia.com/Critically Appraised Topics</a></p>	<p>2</p>	<p>Evaluate physiotherapy service delivery in one hospital for children needing intensive care and in light of best available evidence discuss with MDT how services may be modified to optimize healthcare</p> <p>Discuss 5 cases in relation to current knowledge from EBM, participate in 2 seminars on EBM, discuss 2 guidelines</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
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	<ul style="list-style-type: none"> <li>Use systematic methods for critical appraisal of published evidence on physiotherapy treatment related to immaturity, disability, deconditioning or immobility in the PICU</li> </ul>						
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**Module 11 Respiratory physiotherapy related to mechanical ventilation and the prevention and resolution of respiratory complications in the intensive care unit**

Optional

Module Competency	<p><i>The role of the physiotherapist in the PICU is to maintain lung volume, improve oxygenation and ventilation, optimize secretion clearance as well as maximize musculoskeletal function and facilitate return of independent function upon ICU discharge. In some centres, the role may also include areas such as extubation / decannulation, ventilator weaning, lung recruitment and troubleshooting mechanical ventilation problems. PICU as defined here also covers the work done in the CICU and the NICU.</i></p> <p><i>To integrate information obtained from the clinical assessment of the critically ill patient with knowledge about the effects of intensive care and the risks and benefits of physiotherapy interventions. To apply such knowledge for identifying which aspects of the clinical presentation will be amenable to physiotherapy intervention and what factors should be considered when developing a management plan. To apply therapeutic options for the critically ill patient, assessing the response to each technique and adjusting the therapeutic plan accordingly.</i></p>						
CanMEDS Roles	 <p>In this module the following CanMEDS roles are identified: <i>Specifically for 'Attitudes' the following roles are identified: Communicator (item 3.1 &amp; all items under 5), Collaborator (item 1.3), and Leader (items 1.2 &amp; 1.3)). Other attitudes specifically relevant for certain subitems within this module are listed below.</i></p>						
1. The basics of paediatric mechanical ventilation modalities and parameters in different conditions	<ul style="list-style-type: none"> <li>Describe functional characteristics of paediatric ventilators and monitors, and the relationship of settings, controls and alarm systems to their function</li> <li>Define the different modes of paediatric ventilation including principles of volume pre-set versus pressure pre-set modes, lung protective ventilation, ECMO, use of NO and high frequency ventilation</li> <li>Describe effects and complications of mechanical ventilation (such as cardio-pulmonary-neuromuscular complications - mucociliary clearance, ventilator associated pneumonia, loss of lung volume, respiratory muscle weakness etc.</li> <li>Recall indications and contraindications of various gases that may be used for paediatric ventilation (e.g. Heliox, NO)</li> </ul>	<ul style="list-style-type: none"> <li>Apply initial ventilator settings according to medical prescription if within scope of practice</li> <li>Adapt different settings of ventilator according to the patient's individual needs to reach ventilatory targets</li> </ul>	<ul style="list-style-type: none"> <li>Ensure communication is maintained even if patient is non-reactive (induced coma/coma)</li> <li>Address patients' fears and anxieties in respect of the intensive care situation</li> </ul>		<p>Oral examination</p> <p>Case based discussion</p> <p>Mini-CEX</p> <p>Simulation</p> <p>DOPS</p> <p>Portfolio</p>	4	
2. Criteria for Intubation, extubation and weaning process	<ul style="list-style-type: none"> <li>Review the criteria for intubation of babies, infants and children</li> <li>Explain different strategies for avoiding invasive mechanical ventilation in children</li> <li>Summarise the procedures for paediatric intubation according to local guidelines</li> <li>Explain the precautions in place to ensure patient safety</li> <li>According to hospital protocol, discuss the criteria for successful weaning such as conscious state, haemodynamic stability, intact swallowing mechanism*) in relation to different pathologies*</li> </ul>	<ul style="list-style-type: none"> <li>Recognize signs of respiratory failure requiring mechanical ventilation and notify medical staff immediately</li> <li>Apply where appropriate strategies to avoid the necessity for invasive mechanical ventilation (NIV, High flow O<sub>2</sub>)</li> <li>Closely monitor the patient's status, recognize when these strategies are not effective</li> <li>Ensure precautions to ensure patient safety are in place (check equipment; pre-oxygenation)</li> </ul>	<ul style="list-style-type: none"> <li>Address patients' fears and anxieties in respect of the intensive care situation</li> <li>Use discretion when discussing patient's condition at bedside</li> </ul>	<p><b>Formal learning</b></p> <p>e.g. Participation at a skills-based course on monitoring of invasive mechanical ventilation</p> <p>E-Learning</p> <p>Practical workshops</p>	<p>MCQ</p> <p>Portfolio (overall for module – to be reviewed)</p> <p>DOPS</p>	4	<p>Manage a minimum of 10 patients (with different pathologies, either intubated or tracheotomised) on mechanical ventilation under supervision and when competency is demonstrated another 10</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Discuss the importance of the swallowing reflex in relation to successful extubation and, where required, ensure further evaluation and treatment by a qualified health professional</li> <li>Compare and contrast various strategies used to wean patients from ventilator support</li> <li>Discuss different approaches to establishing patient's readiness for extubation (CPAP, T-tube, bi-level positive pressure ventilation)</li> <li>Explain extubation procedures</li> <li>Discuss the appropriate post – extubation care taking into account clinical aspects and local hospital protocol</li> <li>Discuss management problems for difficult to wean patients</li> </ul>	<ul style="list-style-type: none"> <li>According to hospital protocol/guidelines, design an individual weaning regime in collaboration with medical and nursing staff</li> <li>Demonstrate competence in weaning strategies including adjusting ventilator settings appropriately</li> <li>Apply strategies to wean patients from ventilator support based on local protocol</li> <li>Apply strategies to wean patients from tracheostomy if local regulations permit</li> <li>Apply strategies to wean patients from mechanical ventilation via endotracheal tube or tracheostomy in accordance with local protocols</li> <li>Perform a spontaneous breathing trial (CPAP or T-tube)</li> <li>Evaluate a patient's readiness for extubation (based on patient's clinical parameters (respiratory rate, vital capacity, rapid shallow breathing index results swallowing reflex*),</li> <li>Extubate the patient respecting the hospital protocol</li> <li>Identify/anticipate potential risks for a mechanically ventilated patient in ICU</li> <li>Recognise signs of post extubation respiratory failure and take appropriate action</li> <li>Apply and adapt treatment to clinical evaluation</li> <li>Take into account potential risks with respect to specific situations post extubation (e.g. swallowing)</li> </ul>		<p>Experience modes of ventilation through mask ventilation</p> <p><b>Work-based learning –</b> Performing procedures with patients Review of literature Case conferences</p>			without supervision (to cover the module)
3. Rationale and indications for respiratory physiotherapy management of the critically ill child	<ul style="list-style-type: none"> <li>Explain the primary indications for admission of babies and children to intensive care (including neonatal intensive care, congenital cardiac surgery, trauma, burns, acquired brain injury)</li> <li>Discuss the special requirements and cardiorespiratory vulnerabilities of PICU patients, as well as the risks caused by prolonged mechanical ventilation and infection</li> <li>Explain anatomical &amp; physiological structure and function of the cardiorespiratory system in children of all ages in terms of their consequences for assessment, care and rehabilitation in the ICU</li> <li>Identify how the cardiorespiratory system may be altered or overwhelmed by endotracheal intubation, mechanical ventilation, sedation and bed rest: particularly in terms of pulmonary and cardiovascular function</li> <li>Recall the range of physiotherapy techniques available to manage clinical problems encountered</li> <li>Discuss the therapeutic possibilities, limitations and rationale behind the use of respiratory physiotherapy techniques (such as endotracheal and airway suction, lung recruitment techniques, body positioning) for prevention and treatment of adverse effects related to intensive care. Include equipment, evidence and progression</li> <li>Explain hazards, precautions and contraindications for respiratory physiotherapy interventions in children of different ages</li> </ul>	<ul style="list-style-type: none"> <li>Integrate information obtained from the clinical assessment with theoretical knowledge of disease processes and the risks and benefits of respiratory physiotherapy interventions in order to identify which aspects of the clinical presentation will be amenable to physiotherapy intervention and what factors should be considered when developing a management plan</li> <li>Select a logical, systematic approach to identify signs of cardiorespiratory dysfunction through the accurate recognition and interpretation of normal and abnormal signs and symptoms within a patient's presentation receiving intensive care (including reviewing medical records, interviewing the patient / family and completing an objective assessment, auscultation, review of chest radiographs, cough strength, breathing patterns, mucus retention, blood gas values and respiratory muscle function) to detect respiratory dysfunction and complications in children</li> <li>Select objective measures to evaluate any response to respiratory physiotherapy interventions in order to modify or progress the treatment accordingly</li> <li>Demonstrate an ability to generate a prioritised list of clinical problems, a short term and long-term management plan and establishing a measurable baseline for evaluating response to physiotherapy interventions</li> </ul>	<ul style="list-style-type: none"> <li>Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times)</li> </ul>	<p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Lectures</p> <p>Case-based discussions</p> <p>Workshops</p> <p>Hands-on learning under experienced guidance</p> <p>Simulation training</p> <p>Clinical internship</p>	<p>Clinical evaluation</p> <p>DOPS</p> <p>Case based discussion</p> <p>Portfolio</p> <p>MCQ</p> <p>Long case</p> <p>Clinical internship evaluation</p>	4	<p>Participate in 20 case-based discussions and/or case conferences and design physiotherapeutic approach for 10 patients</p> <p>Analyse and interpret complications, contraindications and risks in 20 patients, including necessary modification of physiotherapeutic approach</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>Recall effects of medications specific to intensive care such as cardiovascular medications (vasopressors, vasodilators sedatives, analgesics and muscle relaxants etc.)</li> <li>Explain the hemodynamic and physiological effects of different modes of ventilation, particularly in relation to their consequences for physiotherapy management</li> <li>Explain the principles and processes for weaning from different modes of mechanical ventilation in line with local guidelines and pathways.</li> </ul>	<ul style="list-style-type: none"> <li>Select objective measures to evaluate any response to therapeutic interventions in order to modify or progress the treatment accordingly</li> <li>Demonstrate an ability to assess the patient throughout any therapeutic intervention for any adverse haemodynamic changes and terminate or withdraw treatment if necessary or start resuscitation protocol appropriately if required</li> <li>Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times)</li> <li>Maintain contemporaneous, comprehensive and legible medical records related to the rationale and indications for therapy</li> </ul>					
4. Assessment and monitoring during and after respiratory physiotherapy management of the critically ill child	<ul style="list-style-type: none"> <li>Describe basic cardio-respiratory physiology in relation to the hemodynamic effects of mechanical ventilation</li> <li>Recall the theoretical background of assessment techniques, including normal ranges of physiological values in monitoring body systems for ventilated children of all ages and the implications of abnormal values for physiotherapy treatment</li> <li>Describe various monitoring and assessment methods (O<sub>2</sub> saturation; ECG, heart rate, respiratory rate, blood pressure, CO<sub>2</sub>, level of consciousness) used to evaluate patients receiving mechanical ventilation</li> <li>Describe a logical, systematic whole-body approach for assessing cardiorespiratory dysfunction in neonates, infants and children admitted to intensive care</li> <li>Describe the strengths and limitations of different outcome measures for measuring cardiorespiratory dysfunction in ventilated children, including atelectasis, secretion retention, loss of lung volume, infection and pain</li> <li>Establish a measurable baseline for evaluating response to physiotherapy interventions</li> <li>Identify and document a prioritised list of clinical problems and design an appropriate short term therapeutic plan and techniques as well as longer term progression of treatments</li> <li>Review indications, contraindications, hazards and precautions that will preclude any planned physiotherapy interventions in children of different ages, according to the current guidelines in the field and local protocols</li> <li>Identify potential consequences and risks of mechanical ventilation especially pertaining to treatment and handling of ventilated neonates, babies and children in ICU</li> <li>Discuss any perceived impediments to cardiorespiratory physiotherapy caused by lines and drains including ECG, arterial lines, chest</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate competence in administration of an appropriate logical, systematic whole-body assessment to identify cardiorespiratory dysfunction in children of different ages</li> <li>Demonstrate competence in accurately interpreting findings from cardiorespiratory assessment measures in children of different ages, particularly in relation to their role in directing or evaluating respiratory physiotherapy treatments</li> <li>Recognize consequences of mechanical ventilation on hemodynamics</li> <li>Monitor patient during treatment to detect signs of pain, non-tolerance including patient distress – grimace, agitation, increased blood pressure, heart rate, diminished O<sub>2</sub> saturation, ventilator asynchrony and review physiotherapy treatment plan with attending physician in the event of haemodynamic instability</li> <li>Use objective measures to evaluate any response to therapeutic interventions in order to modify or progress the treatment accordingly</li> <li>Adjust settings of upper and lower limits of the alarms based on the patient's condition, aim of the treatment and local protocols in place</li> <li>React appropriately to modifications in clinical values (O<sub>2</sub> saturation, heart rate, blood pressure, pain) and distinguish between monitoring artefacts and signs of deterioration</li> <li>Modify/adapt physiotherapy interventions according to monitoring e.g. increase fraction of inspired O<sub>2</sub>; adjust ventilator parameters, adapt sedation and or analgesia)</li> <li>Adapt monitoring and alarm settings if indicated or required for certain situations (exercise therapy, mobilisation etc.)</li> <li>Record patient's progression and adapt or delay treatment in consequence to patient's clinical status (modification of sedatives, cardiovascular medications or analgesics to ensure patient's safety and comfort)</li> </ul>	<ul style="list-style-type: none"> <li>Communicate to patients any detectable parameter changes that might create discomfort, fear or resistance</li> <li>Ensure effective collaboration between physiotherapists and nursing staff by notifying any irregularities (blood pressure, heart rate, respiratory rate, ECG) during treatment and parameter changes made accordingly</li> <li>Strive to ensure the child's safety at all times by applying adequate precautions to vital equipment (secure the endotracheal tube, drains, perfusions)</li> <li>Collaborate with nursing staff to plan the timing of treatments (examinations, administration of sedation, pain relief etc.)</li> </ul>	<p><i>Self-directed learning</i> <i>Lectures</i></p> <p><i>Learning hands-on under experienced guidance</i></p> <p><b>Workshops Self-directed learning</b> (literature search with appraisal of a scientific article related to the clinical presentation of a patient currently being managed, complete documentation procedure related to physiotherapy treatment, practical application)</p> <p><b>Formal learning</b> (participation in a skills-based course, workshops with practical application)</p> <p><b>Learning with other professionals:</b> participate in case-based discussions</p> <p>Complete documentation procedure related to physiotherapy treatment</p> <p>Practical application</p>	<p>MCQ</p> <p>Long case</p> <p>Short case</p> <p>DOPS</p> <p>Clinical internship evaluation</p> <p>Portfolio</p> <p>Oral examination</p> <p>Case based discussion</p> <p>Mini-CEX</p> <p>Simulation</p>	4	<p>Assess, monitor and create a treatment plan for a minimum of 20 paediatric patients under close senior supervision,</p> <p>Then when competency is demonstrated assess, monitor and create a treatment plan for a minimum of 20 paediatric patients independently</p> <p>In each case maintain contemporaneous, comprehensive and legible medical records</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<p>drains, O<sub>2</sub>-CO<sub>2</sub> monitoring, and intracranial pressure</p> <ul style="list-style-type: none"> <li>• Discuss with the attending medical doctor the setting of upper and lower limits for the ventilation and monitor alarms in relation to different pathologies and the aim of the treatment</li> <li>• Recall patient safety measures including equipment for assessment and treatment and for initiating resuscitation in the event of significant acute deterioration</li> </ul>	<ul style="list-style-type: none"> <li>• In the event of extreme adverse effects stop treatment - inform medical staff and apply appropriate action including initiating resuscitation if necessary (BLS for cardiac arrest-&gt; mask ventilation for accidental extubation etc.)</li> <li>• Maintain contemporaneous, comprehensive and legible medical records in relation to assessment and monitoring</li> </ul>					
5. Respiratory physiotherapy management of the critically ill child – selecting and implementing a therapy intervention	<ul style="list-style-type: none"> <li>• Describe the findings of the systematic assessment in terms of clinical or physical impairments that may be responsive to physiotherapy intervention, (for example atelectasis, secretion retention, loss of lung volume, infection and pain)</li> <li>• Describe the therapeutic priorities and identify potential risks, benefits, indications and contraindications of different physiotherapy interventions for children in ICU (e.g. body positioning, manual or ventilator lung inflation, endotracheal saline or mucolytic instillation, chest wall vibrations, endotracheal suction)</li> <li>• Recall patient safety measures including equipment for assessment and treatment</li> <li>• Explain, with reference to published evidence, the clinical purpose of different physiotherapy interventions for alleviating the problems associated with cardiorespiratory dysfunction in the PICU</li> <li>• Explain how objective standardised measures may be used to establish a baseline and evaluate the response to any therapeutic intervention</li> <li>• Review the normal values for the different clinical parameters monitored in ICU and recognise and respond appropriately to abnormalities</li> <li>• Explain the clinical significance of changes in clinical status measures during and after treatments and how these may be used to guide any modification or progression of treatment</li> <li>• Describe the different monitoring commonly used in ICU, including: ECG, Swann Ganz, arterial lines, O<sub>2</sub>-CO<sub>2</sub> monitoring, intracranial pressure) and as interpret changes in response to physiotherapy interventions</li> <li>• Discuss with the attending medical doctor the setting of upper and lower limits for the alarms in relation to different pathologies and the aim of the treatment</li> <li>• Discuss the perceived impediments to respiratory physiotherapy management caused by the different monitoring including ECG, Swann Ganz, arterial lines, O<sub>2</sub>-CO<sub>2</sub> monitoring, and intracranial pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Use findings from objective standardised assessments to plan an appropriate therapeutic intervention</li> <li>• Demonstrate competence in selecting and administering appropriate therapeutic intervention and evaluating the response to that intervention (e.g. body positioning, manual or ventilator lung inflation, endotracheal saline or mucolytic instillation, chest wall vibrations, endotracheal suction)</li> <li>• Apply appropriate physiotherapy techniques in response to clinical problems or pathologies encountered (e.g. V/Q mismatch, atelectasis, decreased mucociliary clearance, excessive secretions and clinical stability, pneumothorax, increased intracranial pressure, acute respiratory distress syndrome, asthma) and specific ventilator settings (e.g. protective ventilation, positive end expiratory pressure (PEEP) dependency)</li> <li>• Accurately identify indications, contraindications and precautions to therapeutic interventions for children in ICU and respond appropriately</li> <li>• Implement adequate precautions to allow safe treatment including securing vital equipment: endotracheal tube, arterial and venous lines, drains, check airway ties, adapt ventilation, adequate staffing and pain medication administered in advance</li> <li>• Monitor the patient during treatment to detect signs of non-tolerance including patient distress – grimace, agitation, increased blood pressure, heart rate, diminished O<sub>2</sub> saturation, ventilator asynchrony and modify treatment in accordance with the child's clinical status, pathology, safety, progress and local protocols in place</li> <li>• Terminate or withdraw treatment if necessary or start resuscitation protocol appropriately if required</li> <li>• Adjust settings of upper and lower limits of the alarms based on patient's condition, aim of the treatment and local protocols in place</li> <li>• Maintain contemporaneous, comprehensive and legible medical records in relation to treatment intervention and progression of treatment</li> <li>• Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss effects of equipment, procedures, noise, sleep disturbances, and communication barriers in children receiving mechanical ventilation</li> <li>• Using age appropriate language, clearly communicate with patients or family what they might expect to happen during the treatment, including any adverse events and the strategies to manage these</li> <li>• In collaboration with nursing staff establish methods of communication (such as eye/head movements, picture chart, written form, computer, phonation tube, etc.)</li> <li>• Involve patients and family in aspects of care in which they can participate</li> </ul>	<p>Assemble documentation pertaining to paediatric respiratory physiotherapy in ICU</p> <p>Suggested scientific literature</p> <p>Formal learning (required to gain knowledge of different monitoring systems)</p> <p>Work based learning to acquire skill in applying knowledge to treatment)</p> <p>Case studies</p> <p>Work based experience</p> <p>Practical workshops Case studies</p> <p>Self-directed learning</p> <p>Literature search and appraisal</p> <p>Case-based discussions</p> <p>Case conferences</p> <p>Clinical internship</p> <p>Performing procedures under guidance</p>	<p>Clinical evaluation</p> <p>Case based examination</p> <p>MCQ</p> <p>Long case</p> <p>OSCE</p> <p>DOPS</p> <p>Clinical internship evaluation</p> <p>Portfolio</p>	4	<p>Assess and treat minimum of 20 paediatric patients in the PICU under close senior supervision, Then when competency is demonstrated assess and treat another 20 paediatric patients independently In each case maintain contemporaneous, comprehensive and legible medical records</p>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
		priorities (medical doctors' visits and exams; nursing priorities, meal times)					
6. Body positioning in respiratory physiotherapy	<ul style="list-style-type: none"> <li>Discuss the therapeutic effects and risks of body positioning inpatients of all ages in the ICU (supine, head up 45°, side lying, sitting, prone) on haemodynamic, respiratory mechanics, distribution of ventilation, perfusion and cardiovascular function as well as mucus drainage, other therapeutic effects and risks</li> <li>Evaluate potential risks involved in mobilisation or position changing during respiratory physiotherapy including accidental catheter removal, endotracheal tube displacement or extubation, cardiac, hemodynamic and/or respiratory instability, agitation and significant changes in blood pressure, heart rate, oxygenation, or comfort</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate competence in accurate assessment to identify the patient's indications and suitability for different body positions</li> <li>Demonstrate safety and competence in selecting and implementing techniques for changing body position, following any protocols or clinical pathways in use - particularly in relation to: <ul style="list-style-type: none"> <li><b>The child's age</b> such as body positioning / 'kangaroo care' to facilitate parent-infant bonding in prematurity</li> <li><b>the child's pathology</b> such as post-surgical, spinal fractures, head injury, pneumonia</li> <li><b>clinical status</b> such as agitation, blood pressure, heart rate and rhythm,</li> <li><b>equipment</b> including catheters, ECMO, hemodiafiltration</li> <li><b>pharmacology</b></li> </ul> </li> <li>Ensure patient's comfort and safety (secure airway, catheters, adequate pain medication, sufficient staffing)</li> <li>Monitor the patient carefully during position changes and recognise clinical signs of non-tolerance, adapting ventilator settings and/or modifying position as necessary</li> <li>Demonstrate competence in implementing any local procedures or protocols for moving patients, in particular those who require moving into potentially more risky positions (e.g. prone positioning)</li> </ul>		<ul style="list-style-type: none"> <li>Assemble documentation pertaining to positioning in paediatric intensive care</li> <li>Work based learning</li> <li>Case studies</li> <li>Self-directed learning</li> <li>Literature search and appraisal</li> <li>Learning hands-on under competent guidance</li> <li>Simulation training</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>Long case</li> <li>Short case</li> <li>OSCE</li> <li>DOPS</li> <li>Clinical internship evaluation</li> <li>Portfolio</li> </ul>	4	<ul style="list-style-type: none"> <li>Participate in the positioning of a minimum of 20 paediatric patients under close senior supervision,</li> <li>Then participate in positioning and monitoring a minimum of 20 paediatric patients independently</li> <li>In each case maintain contemporaneous, comprehensive and legible medical records</li> </ul>
7. Management of artificial airways (tube, tracheostomy)	<ul style="list-style-type: none"> <li>Summarise the functional characteristics of the different endotracheal and tracheostomy tubes available and explain the indications for their use</li> <li>Explain benefits, precautions and risks related to different endotracheal and tracheostomy tubes and how respiratory physiotherapy interventions in children of different ages may be used to optimise lung function in their presence (e.g. weaning, decannulation, prevention of aspiration, tube or airway occlusion and infection)</li> <li>Describe the routine endotracheal tube and tracheostomy care and surveillance necessary for the prevention of complications secondary to the use of artificial airways (including cuff inflation, suctioning, humidification and stoma or oral care)</li> <li>Summarise the importance of hygiene for infection control and adherence to any local best practice guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Incorporate findings from objective or standardised assessments into selecting and administering appropriate therapeutic intervention for management of the artificial airway (e.g. weaning, humidification, manual or ventilator lung inflation, endotracheal saline or mucolytic instillation, chest wall vibrations, endotracheal suction)</li> <li>Perform necessary controls such as positioning of tube, cuff pressure, tube patency; tube fixation, mouth care, airway clearance</li> <li>Manipulate different tubes in collaboration with the nursing staff (endotracheal tube repositioning to prevent sores; management of tracheostomy tubes - with/without cuff, fenestrated /non-fenestrated, dual cannula)</li> <li>Ensure patient safety and comfort during treatment (secure arterial and venous lines, check airway ties adapt pain medication and/or sedation etc.)</li> <li>Maintain contemporaneous, comprehensive and legible medical records in relation to treatment intervention and progression of treatment</li> </ul>	<ul style="list-style-type: none"> <li>In collaboration with nursing staff establish methods of communication (such as speaking valves, eye/head movements, picture chart, written form, computer, phonation tube, etc.). Involve patients and family in aspects of care in which they can participate</li> <li>Organize and co-ordinate patient sessions taking into consideration workload, clinical priorities; other priorities (medical doctors' visits and exams; nursing priorities, meal times)</li> </ul>	<ul style="list-style-type: none"> <li>Assemble documentation pertaining to management of artificial airways in children</li> <li>Work based learning to acquire skill in applying knowledge to treatment</li> <li>Case-based discussions</li> <li>Practical workshops</li> <li>Self-directed learning, literature search and appraisal</li> <li>Clinical internship</li> <li>Performing procedures under guidance</li> </ul>	<ul style="list-style-type: none"> <li>Clinical evaluation</li> <li>Case based discussion</li> <li>Mini-CEX</li> <li>Simulation</li> <li>DOPS</li> <li>Portfolio</li> </ul>	4	<ul style="list-style-type: none"> <li>Manage artificial airways in 20 paediatric patients in the PICU under close senior supervision,</li> <li>Then when competency is demonstrated manage artificial airways in another 20 paediatric patients independently</li> <li>In each case maintain contemporaneous, comprehensive and legible medical records</li> </ul>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
8. Aerosol therapy, mucolytics and humidification	<ul style="list-style-type: none"> <li>List the aerosol medications and mucolytics that maybe used in intubated children of all ages</li> <li>Identify aerosol treatments and mucolytics that are specific to a disease pathology</li> <li>Discuss the indications and contraindications for aerosol therapy medications and mucolytics in intubated children of all ages</li> <li>Describe the different methods of delivery and positioning depending on the device and ventilator circuit used for aerosol therapy medications and mucolytics</li> <li>Describe the appropriate hygiene measures in relation to the equipment used</li> <li>Justify the use of therapy with the relevant evidence</li> <li>Select appropriate timings for aerosol therapy</li> <li>Describe normal airway humidity</li> <li>Explain the rationale for humidifying inspired air with regard to mechanical ventilation</li> <li>Describe various types of humidifiers such as HME; heated humidifiers (HH) indicating the pros and cons of each system</li> <li>Justify the use of each system in respect to clinical situations</li> </ul>	<ul style="list-style-type: none"> <li>Use findings from objective or standardised assessments to select and administer appropriate aerosol therapy, mucolytics or humidification for paediatric patients in ICU</li> <li>Appropriately apply and evaluate the addition of aerosol therapy within the circuit</li> <li>Monitor patient response to the aerosol therapy</li> <li>Change the aerosol system in accordance with hospital guidelines</li> <li>Apply appropriate hygiene measures</li> <li>Select appropriate humidification system HME/HH in respect of guidelines and hospital protocol</li> <li>Verify the efficacy of system in place (secretion quality; tube patency, filter resistance, humidifier temperature)</li> <li>Identify possible risks (temperature, condensation, filter blockage etc.)</li> <li>Change humidification system in accordance with hospital procedure (hygiene) adapt tubing etc.)</li> <li>Ensure patient safety (check equipment is working properly)</li> <li>Maintain contemporaneous, comprehensive and legible medical records in relation to aerosol therapy, mucolytics or humidification and progression of treatment</li> </ul>	<ul style="list-style-type: none"> <li>Show respect to patients' wishes or rights and acknowledge his/her opinions</li> <li>Use motivation techniques to maximize patient's compliance to procedure and treatments (such as relaxation techniques)</li> <li>At all times ensure patient comfort and security</li> </ul>	<ul style="list-style-type: none"> <li>Assemble documentation pertaining to aerosol therapy, mucolytics or humidification for paediatric patients in ICU</li> <li>Work based learning, performing procedures under guidance</li> <li>Case-based discussions</li> <li>Practical workshops</li> <li>Self-directed learning, literature search and appraisal</li> </ul>	<ul style="list-style-type: none"> <li>Oral examination</li> <li>Case based discussion</li> <li>Mini-CEX</li> <li>Simulation</li> <li>DOPS</li> <li>Portfolio</li> </ul>	4	<ul style="list-style-type: none"> <li>Select and administer aerosol therapy, mucolytics or humidification for 20 paediatric patients in the PICU under close senior supervision,</li> <li>Then when competency is demonstrated, select and administer aerosol therapy, mucolytics or humidification in another 20 paediatric patients independently</li> <li>In each case maintain contemporaneous, comprehensive and legible medical records</li> </ul>
9. Lung recruitment	<ul style="list-style-type: none"> <li>Explain rationale, benefits, precautions, contraindications and risks related to lung recruitment strategies in children of all ages and how they may be used to optimise lung function during respiratory physiotherapy (e.g. promote airway clearance, recruit areas of atelectasis, improve gas exchange and prevent complications)</li> <li>Explain differences in manual and ventilator hyperinflation techniques as well as the risks and benefits associated with each</li> <li>Explain equipment, procedures and techniques necessary to perform lung recruitment manoeuvres under different clinical circumstances</li> <li>Describe the techniques for incorporating manual hyperinflation techniques with chest wall compressions to facilitate effective airway clearance in ventilated children</li> </ul>	<ul style="list-style-type: none"> <li>Use findings from objective or standardised assessments to select and administer appropriate lung recruitment techniques, alone or in combination with airway clearance manoeuvres (e.g. chest wall compressions) or body positioning (side lying, sitting, prone positioning) for paediatric patients in ICU</li> <li>In accordance with the hospital protocols or current guidelines, apply the appropriate ventilator settings for paediatric recruitment techniques (inspiratory pressure, PEEP increments and limits)</li> <li>Identify the potential risks for the different techniques and ensure the benefits outweigh these in any decisions to use lung recruitment techniques</li> <li>Evaluate the effects of recruitment manoeuvres using objective measures (improved auscultation, improved O<sub>2</sub> saturation, ABG, chest radiograph) and modify or progress to improve efficacy, while ensuring patient safety</li> <li>Demonstrate competence in maintaining contemporaneous, comprehensive and legible medical records in relation to lung recruitment techniques and progression of treatment</li> </ul>		<ul style="list-style-type: none"> <li>Assemble documentation pertaining lung recruitment for paediatric patients in ICU</li> <li>Work based learning, performing procedures under guidance</li> <li>Case-based discussions &amp; Practical workshops</li> <li>Self-directed learning, literature search and appraisal</li> </ul>	<ul style="list-style-type: none"> <li>Oral examination</li> <li>Case based discussion</li> <li>Mini-CEX</li> <li>Simulation</li> <li>DOPS</li> <li>Portfolio</li> </ul>	4	<ul style="list-style-type: none"> <li>Select and administer lung recruitment techniques for 20 paediatric patients in the PICU under close senior supervision,</li> <li>Then when competency is demonstrated, select and administer lung recruitment techniques in another 20 paediatric patients independently</li> <li>In each case maintain contemporaneous, comprehensive and legible medical records</li> </ul>
10. Summarising the evidence and reference to evidence-based documents	<ul style="list-style-type: none"> <li>Discuss evidence from scientific literature, conferences, consensus statements, workshops and educational meetings</li> <li>Explain how to conduct systematic literature searches and assemble the available evidence on respiratory physiotherapy treatments in the PICU</li> </ul>	<ul style="list-style-type: none"> <li>Assimilate the relevant evidence in each clinical circumstance to deliver effective therapeutic treatments</li> <li>Interpret the different findings and modify patient care to adopt evidence or expert opinion, in an ongoing learning process</li> <li>Be critical of the existing scientific evidence supporting rehabilitation in the ICU</li> </ul>	<ul style="list-style-type: none"> <li>Scholar: 1.1, 1.2, 3.1, 3.3, 3.4</li> </ul>	<ul style="list-style-type: none"> <li>Self-directed learning Literature search and appraisal</li> <li>Case based discussions</li> </ul>	<ul style="list-style-type: none"> <li>Clinical evaluation</li> <li>Case based discussion</li> <li>Critically Appraised Topic</li> </ul>	2	<ul style="list-style-type: none"> <li>Evaluate physiotherapy service delivery in one hospital for children needing intensive care and in light of best available evidence discuss with MDT how services may be</li> </ul>

Syllabus item	Knowledge	Skills	Attitudes	Teaching and Learning Opportunities	Assessment methods	Level of Assessment	Minimum Clinical and Educational Exposure
	<ul style="list-style-type: none"> <li>• Describe the principles of critical appraisal and evaluate level of evidence according to widely accepted tools for quality assessment</li> <li>• Access, interpret and examine the relevant scientific evidence and evidence-based guidelines using critical literature appraisal</li> <li>• Refer to evidence-based articles on respiratory physiotherapy treatment in the PICU</li> <li>• Use systematic methods for critical appraisal of published evidence on respiratory physiotherapy treatment in the PICU</li> </ul>			<p>Interpretation of evidence-based studies and guidelines in interaction with experienced guidance</p>	<p><a href="http://www.physio-pedia.com/Critically_Appraised_Topics">http://www.physio-pedia.com/Critically_Appraised_Topics</a></p>		<p>modified to optimize healthcare</p> <p>Discuss 5 cases in relation to current knowledge from EBM, participate in 2 seminars on EBM, discuss 2 guidelines</p>