



**MALAYSIAN MEDICAL COUNCIL**

**SPECIALTY-SPECIFIC REQUIREMENTS (SSR)**

**(GENETIC PATHOLOGY)**

Prepared By:

Specialty Education Subcommittee (SEC)  
of the Medical Education Committee (MEC),  
Malaysian Medical Council

Approved by the Malaysian Medical Council:

21st March 2023

## Preface

1. The Specialty-Specific Requirements (SSR) pertain to requirements within each specialty and specify the minimum requirements pertaining to the training curriculum, trainers, educational resources and head of programme.
2. The Specialty-Specific Requirements (SSR) are intricately linked to the MMC Malaysian Standards for Medical Specialist Training 2019, and the Standards and SSR must be read and applied together.

<b>Specialty-Specific Minimum Requirements for Training Curriculum (Based on Area 1.2.4 of Malaysian Standards for Medical Specialist Training) - Genetic Pathology</b>					
<b>Specialty-Specific Requirements</b> (Reference Standard)	<b>Criteria</b>				
1) Minimum entry requirements for postgraduate training (Standard 3.1.)	<ul style="list-style-type: none"> <li>i. Fully registered with the Malaysian Medical Council with a current annual practicing certificate</li> <li>ii. Successful entry evaluation to programme</li> </ul>				
2) Minimum duration of training programme (Standard 1.2.4 - Table 2)	Completion of a minimum of 48 months of specialised training in the specialty programme.				
3) Structure of training (rotation/modules) (Standard 1.2.4 - Table 3 & Table 4)  Training overview	<p>The programme should encompass rotations in General Pathology and in-depth specialised training in Genetic Pathology.</p> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">Scope/Content</th> <th style="text-align: center;">Minimum Duration (Weeks)</th> </tr> </thead> <tbody> <tr> <td style="height: 40px;"> </td> <td> </td> </tr> </tbody> </table>	Scope/Content	Minimum Duration (Weeks)		
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Training					

rotation/modules and case mix	General Pathology (Genetic Pathology, Medical Microbiology, Anatomical Pathology, Chemical Pathology, Hematology)	48				
	Medical Genetics, Genomics and Epigenomics	120				
	Genetic Counselling, Population Genetics, Bioinformatics, Genetic Ethics, Laboratory Quality Management System	20				
4) Assessments  (Standard 2.2.1)	<p>Assessments should</p> <ul style="list-style-type: none"> <li>i. Employ appropriate methods and levels that are well-aligned with learning outcomes. These include a variety of methods and tools such as written assessments, clinical assessments, supervisor’s report, logbook, attendance, training attended, practice diary, research report, formative assessment, communication skills including methods appropriate to assess ethics and professionalism.</li> <li>ii. Include formative and summative assessments throughout each rotation, semester, or year of study.</li> <li>iii. Include clear criteria for progression to next year of study.</li> <li>iv. Include an exit exam.</li> </ul>					
5) Additional requirements for completion of training  (Standard 1.2.4)	<ul style="list-style-type: none"> <li>i. Completion of graduate-level research or clinical audit project.</li> <li>ii. Completion of the required minimum core procedures (may include technical or interpretative skills) in the following areas:</li> </ul> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Areas</th> <th style="text-align: center;">Cases</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Cytogenetics</td> <td style="text-align: center;">300</td> </tr> </tbody> </table>		Areas	Cases	Cytogenetics	300
Areas	Cases					
Cytogenetics	300					

	Molecular cytogenetics	100
	Molecular genetics & cancer genetics	100
	Quality assurance	2 external quality assessment cases (in areas such as cytogenetics or molecular cytogenetics or molecular genetics)
6) List of competencies to be acquired upon completion of training  (Standard 1.1.4)	<ul style="list-style-type: none"> <li>i. Demonstrate knowledge and understanding in genetic pathology.</li> <li>ii. Analyse, interpret and correlate clinical cases to genetic pathology.</li> <li>iii. Critically evaluate and discuss diagnostic genetic findings with patients, family members and healthcare providers involved in patient care.</li> <li>iv. Conduct audit and quality assurance activities to improve genetic laboratory services.</li> <li>v. Identify occupational health hazards and safety requirements for the safe provision of genetic laboratory services.</li> <li>vi. Critically evaluate research findings and to contribute towards medical research, education and training in genetic pathology.</li> </ul>	

**Note : These criteria represent the minimum standards. Each educational programme provider may exercise their autonomy to state criteria above and beyond these minimum standards.**

Specialty-Specific Minimum Requirements for Training Centres and Head of Programme (Based on Areas 3-6 of Malaysian Standards for Medical Specialist Training) - Genetic Pathology		
Item No	Specialty-Specific Requirements (Reference Standard)	Criteria
4	Trainer-to-trainee ratio (Standard 3.1.3)	1:4
5	Minimum qualifications and experience of trainers (Standard 4.1.2)	<ul style="list-style-type: none"> <li>i. Registered with National Specialist Register</li> <li>ii. Attended Training-of-Trainer course.</li> </ul>
6	Minimum requirements for educational resources (Standard 5.1.1)	<ul style="list-style-type: none"> <li>i. Physical facilities: <ul style="list-style-type: none"> <li>a. Genetic laboratory</li> <li>b. Genetic clinic</li> <li>c. Seminar/ tutorial rooms</li> <li>d. Trainee workspace</li> <li>e. Computer room with internet facilities</li> <li>f. Library of reference books or journals (physical and/or virtual)</li> </ul> </li> <li>ii. Equipment</li> </ul> <p>The diagnostic facilities and equipment requirement of the programme training centres must <b>collectively</b> be able to accommodate the following minimum requirement:</p>

		<b>Equipment</b>	<b>Quantity</b>
		Workstations-PC with software for cytogenetic karyotyping and analysis	1
		Fluorescence Microscope with FISH capturing and analysis software system	1
		Extraction workstation	1
		Polymerase chain reaction (PCR) thermocycler	1
		Microarray	1
		Genetic analyser for DNA Sequencing and multiple ligation-dependent probe amplification (MLPA) fragment analysis	1
		Multiple Ligation-dependent Probe Amplification (MLPA)	1
		Next Generation Sequencing (NGS) machine	1
		Biosafety cabinet	1
		Medical lab refrigerator 4°C	1
		Medical lab freezer -20°C	1

Biomedical Freezer -80°C	1
Brightfield Microscope	1
Automated DNA Extraction Machine	1
Real-time PCR machine	1
Nanodrop spectrophotometer	1
Electrophoresis Gel System	1
Sequencer	1
Chamber Hybridization Oven Hybridization Instrument	1

iii. Case Load

The case load of the programme training centres must **collectively** be able to accommodate the following minimum requirements for each trainee:

(Note: Specimens may be shared between trainees)

Areas	Minimum Quantity (specimens/trainee/year)
Cytogenetics	75



		Molecular cytogenetics	25
		Molecular genetics and cancer genetics	25
7	Minimum qualifications and experience of Head of Programme  (Standard 6.2.2)	<ul style="list-style-type: none"> <li>i. 5 years of working experience in the field of genetics</li> <li>ii. Experience in administration and/or academic management</li> </ul>	

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## ACKNOWLEDGEMENT

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