

**NUCLEAR MEDICINE & PET FELLOWSHIP ATTACHMENT  
PROGRAMME IN SGH**

| Components                                       | Information  |
|--|--|
| 1. <b>Division/ Department</b>                   | Radiological Sciences/ Department of Nuclear Medicine & Molecular Imaging  |
| 2. <b>Title of Programme</b>                     | Fellowship Training in Nuclear Medicine & PET  |
| 3. <b>Relevant Registrations</b>                 | <ul style="list-style-type: none"> <li>• Temporary Registration with Singapore Medical Council (SMC)</li> <li>• Training employment pass application with Ministry of Manpower, Singapore (MOM)<br/>(upon successful Temporary Registration with Singapore Medical Council)</li> </ul>   |
| 4. <b>Overview</b><br>4.1 Background information | <p>The Fellowship Programme run by the Department of Nuclear Medicine &amp; Molecular Imaging offers specialty training in general nuclear medicine procedures and hybrid imaging (SPECT-CT and PET-CT). Clinical Fellows will also receive training in radionuclide therapy and theranostics.</p> <p>The Programme can be individualized to provide training in any of these procedures of particular interest to each Clinical Fellow.</p>   |
| 4.2 Goal/ aim(s)                                 | <p>The goals of the Fellowship are to train nuclear medicine physicians to be competent in:</p> <ol style="list-style-type: none"> <li>1) the clinical applications and interpretation of general nuclear medicine imaging and PET-CT imaging</li> <li>2) the therapeutic applications of radioisotopes and theranostics</li> </ol>  |
| 4.3 Duration                                     | 6 – 12 months  |
| 4.4 Hyperlinks/URL Sites                         | <a href="http://www.sgh.com.sg">www.sgh.com.sg</a>   |
| 5. <b>Target Audience</b>                        | Nuclear medicine physicians practising in areas where training opportunities in advanced nuclear medicine imaging or radionuclide therapy are not available.   |
| 5.1 Pre-requisite /eligibility requirement(s)    | <p>General requirements for Temporary Registration for training (required by SMC):</p> <ul style="list-style-type: none"> <li>• A basic medical degree from an accredited medical university or medical school</li> <li>• Passed the relevant national licensing examination in the country of conferment of basic degree, where applicable</li> <li>• Evidence of at least 12 months houseman-ship / internship with a certificate of satisfactory completion of houseman-ship or equivalent</li> <li>• Been registered as a medical practitioner in the country where he is currently practising</li> <li>• Been certified to be of good standing by the Medical Council or the relevant national authority</li> </ul> <p>Note: the doctor should be in active clinical practice for the 3 years preceding the application for medical registration.</p> <p>In addition to the above criteria, <b>Clinical Fellow</b> must:</p> <ol style="list-style-type: none"> <li>a) Have a minimum of 3 years of relevant working experience as a medical officer (or equivalent)</li> </ol> |

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|   | <p>b) Fulfil English Language requirements of SMC if the medium of instruction for the basic medical qualification is not in English</p> <p>c) Preferably have obtained a postgraduate diploma or degree in his country or overseas</p> <p>d) As a Clinical Fellow, the doctor will be allowed to be involved in patient care and make entries in patients' case note, communicate care plans to patients and fellow healthcare professionals, and perform procedures under <u>direct</u> supervision or Level 1 supervision</p> <p><b>Department's requirement, if any (only for Clinical Fellow in this subspecialty):</b></p> <ol style="list-style-type: none"> <li>1) successfully completed a Nuclear Medicine residency or obtained an equivalent post-graduate qualification in Nuclear Medicine</li> <li>2) at least 2 years' experience working in a Nuclear Medicine Department</li> </ol> |
| <p><b>6. Learning Objectives</b></p>      | <p>After completing the Programme, the Clinical Fellow will be able to:</p> <ul style="list-style-type: none"> <li>• Advise medical colleagues on the appropriate use of nuclear medicine procedures</li> <li>• Supervise and interpret general nuclear medicine studies and PET-CT studies</li> <li>• Manage patients with benign thyroid disease and thyroid carcinoma treated with radioiodine</li> <li>• Be familiar with other forms of radionuclide therapy eg. Y-90 selective internal radiation therapy, Peptide Receptor Radionuclide Therapy, PSMA-Targeted Radioligand Therapy</li> </ul>  |
| <p><b>7. Course/Training Syllabus</b></p> | <p>The Programme covers the following topics:</p> <ul style="list-style-type: none"> <li>- Radiation physics, radiopharmacy and radiation protection</li> <li>- Clinical applications of general nuclear medicine techniques including SPECT-CT</li> <li>- Utility of PET-CT in clinical oncology, neurology and cardiology</li> <li>- Radionuclide therapy: radioiodine (I-131), Y-90 selective internal radiation therapy, Peptide Receptor Radionuclide Therapy, PSMA-Targeted Radioligand Therapy, Radiosynovectomy, Radium Ra-223 dichloride</li> </ul> <p>Clinical Fellows will be given ample opportunity to participate in academic activities eg. Case conferences, multidisciplinary meetings and journal club meetings.</p>  |
| <p><b>8. Training Method</b></p>          | <p><b>Method of Supervision:</b><br/>Direct observation and feedback. Clinical Fellow will be supervised by an assigned supervisor at all times.</p> <p><b>Observed Only:</b><br/>Clinical Fellows will have opportunities to observe the following procedures:</p> <ol style="list-style-type: none"> <li>1) Y-90 selective internal radiation therapy, Peptide Receptor Radionuclide Therapy, PSMA-Targeted Radioligand Therapy, Radiosynovectomy, Radium Ra-223 dichloride</li> <li>2) Technologists performing patient preparation, positioning, scanning and image processing</li> <li>3) Daily production and QC of radiopharmaceuticals (optional)</li> </ol>  |

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|---|--|----------------------|---|----------------------|-------------|---------------|-------------|-----------------|--------------------|-------------|-------------------------|--------------------|-------------|----------------------------|--|-------------|---|----------------------|-------------|--------------|---------------------------|-------------|--|--------------------------|-------------|--|-------------------|----------|
|   | <p><b>Hands-On Experience:</b><br/>Clinical Fellows will perform or assist in the following procedures under supervision:</p> <ol style="list-style-type: none"> <li>1) Attend to patients scheduled for nuclear medicine studies, including history taking, screening for the appropriateness of the study and, if needed, modifying the procedure according to that patient's need, radiotracer injection and drafting preliminary scan reports</li> <li>2) Ward rounds and radioiodine therapy clinics</li> </ol>   |                      |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
|   | <p><b>TRAINING ACTIVITIES &amp; METHODOLOGY</b></p>  |                      |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
|   | <table border="1"> <thead> <tr> <th style="background-color: #D3D3D3;">Name of activity</th> <th style="background-color: #D3D3D3;">Frequency / No. of sessions / Length of session</th> <th style="background-color: #D3D3D3;">Teaching methodology</th> </tr> </thead> <tbody> <tr> <td>Ward rounds</td> <td>Daily/ 1 hour</td> <td>Interactive</td> </tr> <tr> <td>Therapy clinics</td> <td>Daily/ 2 – 3 hours</td> <td>Interactive</td> </tr> <tr> <td>Scan reporting sessions</td> <td>Daily/ 2 – 3 hours</td> <td>Interactive</td> </tr> <tr> <td>Multidisciplinary meetings</td> <td>4 days per week/ 1 – 2 hours per session</td> <td>Interactive</td> </tr> <tr> <td>Nuclear medicine clinical case conference</td> <td>Once a week/ 2 hours</td> <td>Interactive</td> </tr> <tr> <td>Journal club</td> <td>Once a month/ 1 - 2 hours</td> <td>Interactive</td> </tr> <tr> <td>Nuclear medicine didactic lecture series</td> <td>Once a week/ 1 – 2 hours</td> <td>Interactive</td> </tr> <tr> <td>Short-term research project (optional)</td> <td>2 – 4 hours/ week</td> <td>Research</td> </tr> </tbody> </table> | Name of activity     | Frequency / No. of sessions / Length of session | Teaching methodology | Ward rounds | Daily/ 1 hour | Interactive | Therapy clinics | Daily/ 2 – 3 hours | Interactive | Scan reporting sessions | Daily/ 2 – 3 hours | Interactive | Multidisciplinary meetings | 4 days per week/ 1 – 2 hours per session | Interactive | Nuclear medicine clinical case conference | Once a week/ 2 hours | Interactive | Journal club | Once a month/ 1 - 2 hours | Interactive | Nuclear medicine didactic lecture series | Once a week/ 1 – 2 hours | Interactive | Short-term research project (optional) | 2 – 4 hours/ week | Research |
| Name of activity                          | Frequency / No. of sessions / Length of session  | Teaching methodology |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Ward rounds                               | Daily/ 1 hour  | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Therapy clinics                           | Daily/ 2 – 3 hours   | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Scan reporting sessions                   | Daily/ 2 – 3 hours   | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Multidisciplinary meetings                | 4 days per week/ 1 – 2 hours per session   | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Nuclear medicine clinical case conference | Once a week/ 2 hours   | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Journal club                              | Once a month/ 1 - 2 hours  | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Nuclear medicine didactic lecture series  | Once a week/ 1 – 2 hours   | Interactive          |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |
| Short-term research project (optional)    | 2 – 4 hours/ week  | Research             |   |                      |             |               |             |                 |                    |             |                         |                    |             |                            |  |             |   |                      |             |              |                           |             |  |                          |             |  |                   |          |

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| <p><b>9. Assessment and Evaluation</b></p> | <p>Clinical Fellow will need to demonstrate their proficiency level based on the following competencies:</p> <p><b>1) Patient Care</b><br/>Clinical Fellows must demonstrate competency in:</p> <ol style="list-style-type: none"> <li>1. Recommending, planning, conducting, supervising, interpreting, and reporting diagnostic nuclear medicine procedures appropriate for the clinical problem or condition</li> <li>2. Correlating the nuclear medicine procedure with clinical information, laboratory, and other procedural or imaging studies</li> <li>3. Therapeutic administration of radiopharmaceuticals, including patient selection, evaluating risks and benefits, determining the administered dose, patient identity verification, obtaining informed consent, documenting pregnancy status, complying with national regulations regarding the medical use of radiopharmaceuticals, counselling patients and their families about radiation safety issues, and scheduling and performing post-therapy follow-up.</li> </ol> <p><b>2) Medical Knowledge</b><br/>Clinical Fellows should demonstrate competence in their knowledge of all topics included in the training curriculum.</p> <p><b>3) Practice-Based Learning and Improvement</b><br/>Clinical Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.</p> <p><b>4) Interpersonal and Communication Skills</b><br/>Clinical Fellows should:</p> <ul style="list-style-type: none"> <li>• Communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds</li> <li>• Communicate effectively with physicians and other healthcare professionals and work effectively as a member of a healthcare team</li> </ul> <p><b>5) Professionalism</b><br/>Clinical Fellows should show:</p> <ul style="list-style-type: none"> <li>• Compassion, integrity, and respect for others</li> <li>• Responsiveness to patient needs that supersedes self-interest</li> <li>• Respect for patient privacy and autonomy</li> <li>• Accountability to patients, society and the profession</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.</li> </ul> <hr/> <p><b>6) Systems-Based Practice</b><br/>Clinical Fellows should:</p> <ul style="list-style-type: none"> <li>Coordinate patient care within the health care system</li> <li>Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate</li> <li>Work in inter-professional teams to enhance patient safety and improve patient care quality</li> </ul>   |  |             |                               |            |                         |   |            |                            |  |
| 9.1 Assessment approaches                                      | <p><b>Formative assessment:</b></p> <ul style="list-style-type: none"> <li>Regular evaluation between Clinical Fellow and Supervisor / Head of Department</li> <li>All Clinical Fellows will be required to meet with the Programme Director or Supervisor at the beginning of the programme and on a 3 monthly basis to discuss their clinical progress</li> <li>Reflective journal- logbook recordings of training activities</li> </ul> <p><b>Summative assessment:</b><br/>Periodical assessment reports as required by Singapore Medical Council</p> <p><b>Feedback:</b></p> <ul style="list-style-type: none"> <li>End-of-training feedback form as required by Singapore Medical Council</li> <li>End-of-training feedback session with SGH-PGMI</li> </ul>   |  |             |                               |            |                         |   |            |                            |  |
| 9.2 Evaluation Process<br>9.2.1 General overall grading system | <p>The general overall grading system evaluates the Clinical Fellow's performance upon completion of the fellowship programme. All Clinical Fellow will be given a general overall grading status at the end of the fellowship programme based on the grading criteria requirements incorporating the six competencies based knowledge, skills and performance that Clinical Fellow must demonstrate throughout the programme.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Grading Status</th> <th style="background-color: #4F81BD; color: white;">Description</th> <th style="background-color: #4F81BD; color: white;">Grading Criteria Requirements</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><b>CMP</b></td> <td style="text-align: center;">Completes the programme</td> <td> <ul style="list-style-type: none"> <li>Satisfactory periodical evaluation by Supervisor</li> <li>Demonstrate proficiency in the 6 competencies</li> </ul> </td> </tr> <tr> <td style="text-align: center;"><b>USP</b></td> <td style="text-align: center;">Unsatisfactory performance</td> <td> <ul style="list-style-type: none"> <li>Adverse feedback from faculty, other staff or patients</li> <li>Failure to demonstrate proficiency in the 6 competencies</li> </ul> </td> </tr> </tbody> </table> | Grading Status   | Description | Grading Criteria Requirements | <b>CMP</b> | Completes the programme | <ul style="list-style-type: none"> <li>Satisfactory periodical evaluation by Supervisor</li> <li>Demonstrate proficiency in the 6 competencies</li> </ul> | <b>USP</b> | Unsatisfactory performance | <ul style="list-style-type: none"> <li>Adverse feedback from faculty, other staff or patients</li> <li>Failure to demonstrate proficiency in the 6 competencies</li> </ul> |
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| 9.2.2 Options for Clinical Fellow who was graded with a (USP) for unsatisfactory performance | Clinical Fellows who have attained a USP grade will not be awarded a certificate of successful completion of the programme.  |   |                                |   |            |                              |  |
| 9.3 Criteria for Early Termination   | <p>The attachment programme will be terminated early on the ground of the Clinical Fellow's poor performance, misdemeanour, misconduct, negligence or breach of any terms stipulated or referred to in the Fellowship Letter of Offer and Institution Terms and Conditions.</p> <p>The Clinical Fellow may also request to terminate the attachment programme for reasons such as serious illness or other personal obligations. The institution will review all requests for early termination with the Clinical Fellow and the Supervisor / Head of Department.</p>  |   |                                |   |            |                              |  |
| <b>10. Course Administration</b>   | <p>Type of Certification: Certificate of Training</p> <p>Training Fee: S\$3,210 per month</p> <p>Programme Funding source: Self-funded</p>   |   |                                |   |            |                              |  |
| <b>11. Number of Clinical Fellow to be accepted at any one time</b>                          | 2  |   |                                |   |            |                              |  |

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