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**UEMS/ENETS NEN Specialist Logbook**

The logbook is divided into the following sections:

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The trainee must have knowledge and understanding both the diagnostic and therapeutic management. The relevant trainer should endorse by signing and dating, when the trainee has achieved competency in each field.



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# ***Section ENDOCRINOLOGY***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of CS (typical, atypical) and its related complications (e.g. CHD) |  |
| Symptoms, diagnosis (biochemical, imaging) and management of insulinoma |  |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of gastrinoma (ZES) |  |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of VIPoma |  |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of glucagonoma |  |
| Rare syndromes (somatostatinoma, CCK) |  |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of Cushing’s syndrome |  |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of hypercalcemia (PTHrP-related/unrelated) |  |
| Symptoms/signs, biochemical diagnosis, and management of SIADH and electrolyte abnormalities |  |
| Symptoms/signs, diagnosis (biochemical, imaging) and management of GH-secreting tumors (pituitary (acromegaly) or ectopic GH/GHRH secretion) |  |
| *Familial Endocrine Neoplasia Syndromes-related to NENs* |  |
| Symptoms/signs, diagnosis (biochemical, imaging), management of MEN1. Screening, surveillance, and follow-up protocols at all ages |  |
| Symptoms/signs, diagnosis (biochemical, imaging), management of VHL. Screening, surveillance, and follow-up protocols at all ages |  |
| Symptoms/signs, biochemical diagnosis, management of NF1/Tuberous sclerosis. Screening, surveillance, and follow-up protocols |  |
| *Endocrine conditions related to NENs* |  |
| Symptoms/signs, diagnosis, and management of pituitary, adrenal or thyroid dysfunction/insufficiency related to different NENs location or therapies |  |
| Symptoms/signs, diagnosis, and management of diabetes mellitus, related/unrelated to NENs location and/or therapies |  |
| Management of sex-related consequences (menstrual problems/fertility/contraception, counselling) of NENs location or therapies (chemotherapy, biological, PRRT, MTT) |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. CS: Carcinoid syndrome including typical, atypical, carcinoid crisis and medical management of carcinoid heart disease (CHD) |
| 1. Insulinoma: glucose, insulin, C-peptide, IGF1, cortisol |
| 1. ZES: Zollinger Ellison Syndrome: secretin test |
| 1. VIP: Vasointestinal Peptide: |
| 1. PTHrP: Parathyroid hormone related peptide: |
| 1. SIADH: Syndrome of inappropriate ADH (antidiuretic hormone) secretion |
| 1. MEN1: Multiple Endocrine Neoplasia Type 1 |
| 1. VHL: Von Hippel Lindau disease |
| 1. NF1: Neurofibromatosis type 1 |
| 1. NF-pNENs: Non-functioning pancreatic neuroendocrine neoplasms |
| 1. NF-pNENs related markers: CgA (chromogranin A), calcitonin, NSE (neuron specific enolase) |
| 1. F-pNENs: Functioning pancreatic neuroendocrine neoplasms |
| 1. GH/GHRH: Growth hormone (acromegaly); Growth hormone-releasing hormone (ectopic acromegaly) |
| 1. Cushing's and ACTH/CRH secreting NENs: ACTH, adrenocorticotropic hormone or corticotropin; CRH, Corticotropin-releasing hormone |
| 1. CCK: Cholecystokinin |
| 1. PRRT: Peptide Receptor Radionuclide Therapy |
| 1. MTT: Molecular Targeted Therapy |

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# ***Section GASTROENTEROLOGY***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Diagnostic work-up in newly diagnosed oesophageal NEN |  |
| Treatment of options in localized / advanced oesophageal NENs |  |
| Diagnosis of different types of gastric NENs |  |
| Follow-up of type I and type II gastric NENs |  |
| Diagnostic work-up in newly diagnosed type III gastric NEN |  |
| Indications for endoscopic resection of type I gastric NEN and pre-resection diagnostic work-up |  |
| Endoscopic treatment options (EMR/ESD) in type I gastric NENs |  |
| Indications for surgical resection of type I gastric NEN and pre-resection diagnostic work-up |  |
| Diagnosis of different types of duodenal NENs |  |
| Diagnostic work-up in newly diagnosed duodenal NEN |  |
| Indication for endoscopic follow-up vs endoscopic resection vs surgical resection in duodenal NENs |  |
| Endoscopic treatment options in duodenal NENs |  |
| Differential diagnosis of hypergastrinaemia |  |
| Diagnosis and management of gastrinomas |  |
| Indications for EUS in p NEN |  |
| Management of severe diarrhoea in advanced VIPomas |  |
| Indications for follow-up vs resection in non-functional p NENs |  |
| Differential diagnosis of over and occult GI bleeding in GEP-NENs |  |
| Differential diagnosis of diarrhoea in small intestinal NENs |  |
| Differential diagnosis of abdominal pain in small intestinal NENs |  |
| Indications for endoscopic assessment of small bowel, in small intestinal NENs |  |
| Differential diagnosis of ascites in GEP-NEN patients |  |
| Diagnosis of hepatic failure in patients with advanced GEP-NEN |  |
| Management of complications of portal hypertension in patients with advanced GEP-NEN |  |
| Indications and contraindications of loco-regional treatments of hepatic metastases in GEP-NEN |  |
| Management of complications of loco-reginal treatments of hepatic metastases in GEP-NEN |  |
| Optimal follow-up strategy, post resection, in GEP-NEN |  |
| Indications for completion right hemicolectomy in appendiceal NEN and pre-resection work-up |  |
| Diagnostic work-up in newly diagnosed colonic NEN |  |
| Diagnostic work-up in newly diagnosed rectal NEN |  |
| Indication and types for endoscopic resection (EMR/ESD/FTER) in rectal NENs |  |
| Indications and types of surgical resection in rectal NENs |  |
| Endoscopic assessment for identification of primary in advanced NENs of unknown primary |  |
| Diagnosis and management of malnutrition in GEP-NENs |  |
| Identification and management of GI adverse effects of systemic treatment options of GEP-NEN |  |
| Novel endoscopic treatments in p NEN (Radiofrequency Ablation) |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. Oesophageal NEN (Neuro-Endocrine Neoplasms) |
| 1. Gastric NEN |
| 1. Duodenal NEN |
| 1. Gastrinoma |
| 1. Small intestinal NEN |
| 1. Pancreatic NEN |
| 1. Appendiceal NEN |
| 1. Diarrhoea |
| 1. Abdominal pain |
| 1. Jaundice |
| 1. Ascites |
| 1. Hepatic failure |
| 1. Gastro-intestinal varices |
| 1. Small intestinal bacterial overgrowth (SIBO) |
| 1. Mesenteric ischaemia |
| 1. Bile salt malabsorption |
| 1. Steatorrhoea |
| 1. EUS (Endoscopic Ultrasound) |
| 1. Wireless small bowel endoscopy (WSBE) |
| 1. Double-balloon enteroscopy (DBE) |
| 1. Endoscopic mucosal resection (EMR) |
| 1. Endoscopic submucosal dissection (ESD) |
| 1. Full thickness endoscopic resection (FTER) |

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# ***Section NUCLEAR MEDICINE***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Integration of clinical, pathological, and biochemical information with imaging (specifically NM imaging) as well as PRRT in a multidisciplinary team (MDT). |  |
| Appropriate algorithm (sequence) for imaging studies, particularly NM to reduce economic burden and unnecessary radiation exposure, particularly when using CT and NM. |  |
| Diagnostic accuracy and potential pitfalls of hybrid imaging using anatomical (CT, MRI) and functional imaging (PET) modalities. |  |
| Basics of NM Imaging:   * Patient preparation * Clinically relevant differences amongst commonly used radiopharmaceuticals (RP) * Radiation exposure |  |
| Clinical Indications for   * Somatostatin Receptor Imaging (SRI) using PET/CET, PET/MRI and SPECT/CT, * 18F- FDG – PET/CT * 18F- DOPA – PET/CT * 123I mIBG SPECT/CT * GLP-1 PET/CT or PET/MRI |  |
| Peptide Receptor Radionuclide Therapy (PRRT / Radioligand Therapy) - using beta/alfa emitters   * Patient preparation * Indications for RLT/PRRT * Contraindications of RLT/PRRT * Side effects – adverse effects (renal, haematologic, and others), complications, and their management * Response assessment (clinical, biochemical and imaging) * Potential drug interaction * Radiation protection rules, pertinent (minimum) radiation safety laws * Basics of internal dosimetry.   Transarterial radioembolization (TARE) or Selective Internal Radiation Therapy:   * Basics of properties of different radiopharmaceuticals for TARE/SIRT * Clinical indication * Contraindications of RLT/PRRT * Side effects – adverse events (renal, haematologic, and others), complications, and their management) * Basics of internal dosimetry |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. Functional, hybrid imaging (PET/CT, SPECT/CT, PET/MRI) |
| 1. Somatostatin Receptor Imaging – SRI |
| 1. FDG PET/CT or PET/MRI |
| 1. Response Assessment |
| 1. Peptide Receptor Radionuclide Therapy – PRRT / Radioligand Therapy-RT |
| 1. Patient selection based on SRI and/ or FDG PET |
| 1. Clinical indications of PPRT |
| 1. Toxicity (adverse events - AEs) and their management |
| 9. Radiation protection |

# ***Section ONCOLOGY***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Factors for patient treatment –WHO grading, primary tumor location, performance status, renal/hepatic function |  |
| Adjuvant treatment of NEN (NET/NEC): indications |  |
| Palliative treatment of NEN (NET/NEC): indications, principles. |  |
| Indications, mechanisms of action, contraindications, dosing, side-effects |  |
| Somatostatin analogues |  |
| Everolimus |  |
| Sunitinib |  |
| Chemotherapy (temozolomide/capecitabine, STZ, platinum/etoposide, oxaliplatin, irinotecan) |  |
| Other drugs (telotristate, interferon) |  |
| Assessment, grading, and reporting of side-effects of systemic therapy |  |
| Principles of PRRT; selection of patients, side-effects, kidney protection |  |
| Use of immunotherapy in NEN |  |
| Use of radiotherapy/chemoradiation in NEN |  |
| Principles of follow-up of NEN patients |  |
| Knowledge of major NEN trials |  |
| Supportive care of NEN; indications, principles |  |
| Quality of life assessment in NEN patients |  |
| Patient reported outcomes of treatment |  |
| Multidisciplinary management of NEN patients |  |
| Current unmet needs and future developments in NEN field |  |
| Most relevant key words (including explanation if an acronym) | |
| 1. Adjuvant treatment | |
| 1. Palliative treatment | |
| 1. Chemotherapy | |
| 1. Targeted therapy | |
| 1. Immunotherapy | |
| 1. Radiation/chemoradiation | |
| 1. Evaluation of treatment | |
| 1. Follow-up | |
| 1. Supportive treatment | |
| 1. Quality of life assessment | |
| 1. Patient reported outcomes | |
| 1. Multidisciplinary management of NEN patients | |

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# ***Section PATHOLOGY***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Principles of NEN diagnosis |  |
| Principles of NEN G3 criteria depending on organs |  |
| Tissue based biomarkers, diagnostic, prognostic and predictive |  |
| Indications for hormone staining (syndromes, CUP, clinical correlations) |  |
| Knowledge of classical histopathological pitfalls (small biopsies) |  |
| Histomorphological differential diagnosis depending on organ of origin |  |
| Grading of NEN |  |
| Histopathological staging of NEN |  |
| NEN somatic genetics based on organs of origin |  |
| NEC somatic genetics based on organs of origin |  |
| Principles of molecular classifications of NEN (RNA, DNA, methylation) |  |
| NEN Classification differences in different organ systems |  |
| Concepts and Definition of MiNEN |  |
| Concept of Adenocarcinoma with NE- differentiation |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. Hyperplasia |
| 1. Microadenoma, Tumorlet |
| 1. Histomorphological differentiation |
| 1. Prognostic and predictive tissue biomarkers, |
| 1. Molecular pathology |
| 1. Molecular classification |
| 1. Transcription factors |
| 1. Proliferation index |

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# ***Section RADIOLOGY***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Role of ultrasound with and without intravenous contrast |  |
| Risk and potential of CT imaging |  |
| Patient preparation for contrast enhanced CT |  |
| Role of multiphasic imaging with CT and MRI |  |
| Role of spectral CT |  |
| Risk and potential of MRI |  |
| Patient preparation for MRI |  |
| Role of liver specific contrast agent for MRI |  |
| Role of DWI in MRI |  |
| Role of CT and MRI in Hybrid imaging (SPECT/PET with integrated CT/MRI) |  |
| Imaging options in search for a (potential) primary NEN |  |
| Imaging options for liver metastases |  |
| Imaging options for pancreatic NEN including angiographic sampling |  |
| Therapy response assessment by radiology: RECIST and beyond |  |
| Interventional radiology: biopsy techniques and their requirements |  |
| Interventional radiology: percutaneous therapy options |  |
| Interventional radiology: transarterial therapy options |  |
| Follow-up intervals |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. Ultrasound / Sonography |
| 1. CT – computed tomography |
| 1. MRI – magnetic resonance imaging |
| 1. DWI – diffusion weighted imaging |
| 1. Liver specific contrast agent (MRI) |
| 1. Hybrid imaging |
| 1. Interventional radiology |
| 1. Biopsy |
| 1. Local tumor ablation |
| 1. Locoregional transarterial therapy |
| 1. Angiography |
| 1. RFA – radiofrequency ablation |
| 1. MWA – microwave ablation |
| 1. TAE – transarterial embolization |
| 1. TACE – transarterial chemoembolization |
| 1. TARE – transarterial radioembolization (SIRT – selective internal radiotherapy) |
| 1. Response assessment |
| 1. RECIST – response criteria in solid tumors (EORTC) |
| 1. Follow-up imaging |
| 1. Staging |

# ***Section SURGERY***

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| Knowledge in | Name and signature of trainer when competency achieved |
| Indications for surgical and non-surgical treatment of NEN |  |
| Assessment of staging and grading for planning of surgery in NEN |  |
| Ethical principles / consent for surgery |  |
| Perioperative management of patients with NEN |  |
| Principles of surgery in hereditary NEN (multiple tumors, multicentric tumors) |  |
| Principles of precision surgery in NEN |  |
| Complications of surgical procedures and their management in NEN patients |  |
| Management of stomas, fistulae, anastomotic leak, sepsis |  |
| Principles of surgery with curative intent |  |
| Principles of surgery with palliative intent |  |
| Surgical treatment of small bowel NEN |  |
| Resection options, in type I - III gastric NENs |  |
| Surgical treatment of pancreatic NEN |  |
| Surgical treatment of other gastrointestinal NEN |  |
| Surgical treatment of neuroendocrine liver metastases |  |
| Surgical treatment of non-hepatic distant metastases |  |
| Principles of neoadjuvant and adjuvant concepts |  |
| Long term outcome of surgical treatment in NEN |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. Surgery in small bowel NEN |
| 1. Surgery in pancreatic NEN |
| 1. Surgery in gastrointestinal (GI)-NEN |
| 1. Surgery for neuroendocrine liver metastases |
| 1. Long-term outcome of surgery in NEN |
| 1. Complications of surgery in NEN |
| 1. Postoperative management pf NEN patients |

# ***Section INTERDISCIPLINARY SKILLS***

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| Knowledge in | Name and signature trainer when competency achieved |
| Participation and leading multidisciplinary teams |  |
| Multimodality care |  |
| Deliberation on outcome with patients regarding treatment options |  |
| Palliative management (general, pain, gastro-intestinal obstruction, malignant ascites) |  |
| Nutrition / Hydration |  |
| End-of-Life care |  |
| Holistic needs assessment |  |
| Communication with relatives/friends/advocates/referring physicians/community service |  |
| Second opinion |  |
| Selection & enrolment into surveillance care |  |
| Principles of good clinical practice |  |
| Patient recruitment in clinical trials and research |  |

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| Most relevant key words (including explanation if an acronym) |
| 1. Palliative care |
| 1. Holistic needs |
| 1. Communication |
| 1. Good clinical practice |