APRIL 2022

HEPATOPANCREATICOBILIARY (HPB) SUBSPECIALITY MALAYSIA

TRAINING STANDARDS

CONTENT

DEFINITION

HEPATO-PANCREATO-BILIARY (HPB) SURGEON

HPB surgeon is an expert surgeon who has obtained additional training and experience in the multidisciplinary approach to the diagnosis, treatment, and rehabilitation of HPB patients and devotes a major portion of his or her professional practice to these activities as well as HPB education and advancement of knowledge in the field.

HEPATO-PANCREATO-BILIARY (HPB) TRAINING

HPB training program that provides core knowledge and expertise to prepare its graduates to be expert HPB surgeons who interact with a multidisciplinary team to provide comprehensive care for HPB patients as well as leadership in the surgical, medical and lay communities in matters pertaining to HPB disease.

HEPATO-PANCREATO-BILIARY (HPB) FELLOW/TRAINEE

General Surgeon who is selected to pursue HPB Fellowship to become HPB surgeon.

NATIONAL HPB TRAINING COMMITTEE

A team of senior HPB surgeons from MOH & MOHE in-charge of policy making, implementation of the fellowship training with monitoring and assessment of the fellow.

INTRODUCTION

Hepatopancreaticobiliary or HPB Surgery is a dedicated tertiary care service which provides comprehensive clinical care to patients with diseases of the liver, pancreas, and biliary systems. Surgical conditions involving liver, pancreas and biliary systems generally requires high complex surgeries which are known for its high morbidity and mortality rates. It requires long hour of procedures with highest variations in its anatomy and individuals with strong personality, capable of handling severe bleeding from deep cavity.

DR MANISEKAR SUBRAMANIAM
NATIONAL HEAD OF HPB SERVICES, MINISTRY OF HEALTH (MOH), MALAYSIA

The HPB services in Malaysia roots from the initial development in General Surgical fraternity. Following independence, the federal capital became the hive of intense development activities. Mr A.M. Ismail was appointed as Senior Orthopaedic Surgeon in 1958 followed by Mr K.L. Lam as Ear, Nose and Throat Surgeon in 1959 and Mr SM Alhady as State Surgeon in 1961**.** Having worked in the modern Straits Settlement hospitals, they were now in promotion to a nineteenth century institution where desperate remedial measures were rapidly taken. Temporary operation theatres were built for orthopaedics in 1963 and for general surgery in 1965. Stores nearby the OT's were converted into an intensive care unit with facilities for haemodialysis. With the help of surgeons, institutions and government of Britain, USA, Australia, Canada and Japan, training programmes were initiated locally and abroad. This is has resulted in formation of surgical gastroenterology unit, which was established in 1961 ;neurosurgery unit in 1963;urology unit and pediatric surgery unit in 1967. The plastic and reconstructive surgery unit was established in 1970.

HPB surgery in Malaysia was pioneered by the legendary Datuk Dr Manickavasagar Balasegaram. His interest in hepatic surgery was stimulated by the high incidence of malignancy especially primary hepatomas and the annual increase in severe blunt liver injuries in Seremban during 1970s. His contribution and work on anatomical study of the liver, latest diagnostic aids, and major resections were internationally recognized. Majority of pancreas and biliary work were done by various general surgeons at that time, but liver surgery moved from Seremban with Prof Datuk Bala to KLGH (currently known as Hospital Kuala Lumpur). HKL remained the major

referral centre for surgical services in Malaysia at that time including HPB surgery. In 1999, National Liver Centre was established in Hospital Selayang. This first paperless hospital was the brainchild of Tan Sri Ismail Merican, the Director General of Health at that time. The first liver transplant was conducted in Hospital Selayang in the year 2002.

Over the years, number of HPB centers were established in MOH & MOHE hospitals nationwide to cater for the increasing number of patients from different regions in Malaysia. This leads to the need to train more HPB surgeons to cater for the increasing demand of the evolving practice of medicine in HPB surgery. Before the year 2000, the fellowship training were mainly observership with very few surgeons had the opportunity of hands on training, ranging from 6 months to 1 year of overseas attachment. From the year 2000 onwards, MOH has developed structured MOH Fellowship Training for HPB Surgery which consist of 3 years of training, 2 years in Malaysia and 1 year overseas with strict entry and exit criteria. On the other hand, the university hospitals under MOHE had their own training programme. To maintain an equal standard and quality of trained HPB surgeons, Malaysian Medical Council in 2018 have instructed to harmonize the training between MOH and MOHE facilities. Below are the objectives and recommendation of the Subspecialty Subcommittee for Education during the MEC 6/2020 on 13 May 2020:

1. To develop the specific standards for subspeciality training in HPB

2. To develop the specific competencies to be achieved by the trainees at various stages of subspecialty training

3. To establish the standards for the selection of candidates specific to subspeciality programme

4. To establish the standards for subspeciality training facilities

5. To establish the standards for subspeciality trainers

6. To recommend changes to standards of the subspeciality training relevant to the evolving changes in medical practice

NATIONAL HPB TRAINING COMMITTEE

The National HPB Training Committee is responsible to ensure the competency of the future HPB surgeons. Fellows and trainers are in constant communication with the committee thru various meetings and educational activities. Fellows are encouraged to approach the training committee if need of any advice, support or complaint. Trainers are required to give regular real time feedback to the committee if situation demands.

The committee consist of leaders and prominent figures in HPB fraternity in the country. Selection to the committee is exclusive and under the prerogative of the national head of HPB service with advise from its senior most members.

COMMITTEE

DR MANISEKAR SUBRAMANIAM *(Head)*
National Head of HPB services Malaysia
Hospital Sultanah Bahiyah, Alor Setar, Kedah

DR NIK AZIM BIN NIK ABDULLAH
Hospital Umum Sarawak, Kuching, Sarawak

DR SURYATI BINTI MOKHTAR
Hospital Selayang, Selangor

ASSC PROF DR YOONG BOON KIONG
University Malaya Medical Centre, KL

PROF DATO' RAZMAN JARMIN
University Kebangsaan Malaysia Medical Centre, KL

DR LEOW VOON MENG
Universiti Sains Malaysia, AMDI, Penang

TRAINING OBJECTIVE

The objectives of HPB Subspeciality Fellowship Program in Malaysia is to provide fellows in training with the following:


1.Knowledge, Clinical Experience & Technical Skills


2.Training in Research


3.Training in Education


4.Leadership in HPB Diseases

1. KNOWLEDGE, CLINICAL EXPERIENCE AND TECHNICAL SKILLS

a) Knowledge, clinical experience and technical skills to provide comprehensive, state of the art care to HPB patients

b) Knowledge and experience in the interpretation of HPB imaging studies, including ultrasound, computerized tomography, magnetic resonance imaging, cholangiography, pancreatography, and angiography

c) Knowledge and experience to determine disease stage and natural history as well as treatment options for individual HPB patients at the time of diagnosis and throughout the course of the disease

d) Broad knowledge of nonsurgical treatment options including endoscopic, interventional radiologic, oncologic and medical therapies. This requirement includes an understanding of disease biology, indications for and complications of multimodality therapy

e) Experience and technical skill in performing complex HPB operations, including new techniques

f) Experience and technical skill in performing palliative surgical procedures and knowledge of nonsurgical palliative options

g) Knowledge of HPB tumor biology, epidemiology, tumor markers and tumor pathology

2. TRAINING IN RESEARCH

a) Knowledge of the design and implementation of a prospective data base.

b) Knowledge of the design and conduct of prospective clinical trials.

c) Knowledge of the interface between basic science and clinical care to facilitate translational research.

d) Knowledge of statistical methods to properly evaluate the results of published research studies.

3. TRAINING IN EDUCATION

a) Knowledge and skills to train students and residents in the multidisciplinary management of HPB patients.

b) Knowledge and skills to train non-physicians (physician assistants, nurse practitioners, etc.) in specialized HPB care.

c) Skills to organize and conduct HPB-related public education programs.

4. LEADERSHIP IN HPB DISEASE

a) Skills to develop and support institutional programs related to HPB malignancies including a tumor registry

b) Skills to develop and support institutional policies regarding HPB surgery training

c) Skills to develop and support multidisciplinary conferences on HPB disease, patient care and research

d) Skills to develop and support psychosocial and rehabilitative programs for HPB patients.

TRAINING STRUCTURE

Duration of HPB Subspeciality Training in Malaysia is a **MINIMUM of 3 years** locally with options of going abroad during the 3rd year. Trainees will be rotated **ANNUALLY** in high volume hospitals within MOH & MOHE facilities. Accepted trainees (see **ENTRY CRITERIA**) will need to equip themselves with necessary skills and knowledge for successful completion of programme (see **EXIT CRITERIA**).

Listed below are the provisions of the HPB Subspeciality programme and the responsibility of the trainees:

a) An adequate opportunity to interact with interventional radiologists, gastroenterologists, hepatologists, transplant surgeons, oncologists and pathologists. These experiences may be obtained by formally structured multidisciplinary conferences or informal discussions pertaining to cases. Trainees will be taught the appropriate approach to interacting and communicating with referring physicians and non HPB surgeons as well as to perform consultations for HPB patients

b) Initial outpatient assessment, preoperative decision making, perioperative management, and patient follow-up are essential to the training experience. To the greatest extent possible, HPB fellows should participate in the preoperative evaluation, assessment, treatment planning, and postoperative care of patients

c) Clinical experience alone is insufficient education in HPB surgery. HPB trainees must participate in program consisting of conferences, lectures, debate series, and/or journal club, covering not only clinical surgical problems but also nonsurgical, basic science, clinical research, and ethical problems.

d) The HPB surgery trainees are advised to perform duty as a gazetted General Surgeons. HPB trainees' clinical responsibilities must be in accordance with the guidelines of National General Surgical services and MOH. In other words, HPB surgery fellowship program should complement the centres general surgery work while developing a focus of excellence in HPB management

e) Each HPB surgery trainee must participate in the critical or key portions of a **MINIMUM of 100 major HPB operative procedures.** This operative

experience may be graded; however, at the completion of the fellowship the HPB trainee is expected to be able to perform major HPB operations independently. **MINIMUM** numbers for specific disease-site categories are: **Pancreatic operations – 30, Hepatic operations - 25, Complex biliary operations – 20**

f) Experience in minor procedures such as liver biopsy, pancreatic biopsy and cholecystectomy are expected but are not considered to be major HPB operative procedures.

g) Experience in Endoscopic Retrograde Cholangiopancreatography intraoperative ultrasound & tumor ablation are required and experience in minimally invasive HPB surgical procedures and liver transplant is highly desirable.

h) HPB trainees should have opportunities to design and implement clinical research protocols, and be sufficiently familiar with statistical methods to properly evaluate research results. Each HPB fellow must **COMPLETE** a clinical research on human subjects, as a pre requisite to take the Exit Exam.

i) Trainees need to attend the 3 monthly Journal Club Meeting and present the latest evidences in the field of HPB which will improve the delivery of the HPB services.

j) Trainees will be assessed every 6 months using the Supervisor-Trainee Assessment Report (STAR). This assessment will be conducted during the Journal Club Meeting. Please refer to Appendix for the STAR Format.

ENTRY REQUIREMENT

a) Interested candidates must be at least 2 years post gazettement in General Surgery before they can apply for the HPB subspeciality training post.

b) Interested candidates will first need to apply for Hadiah Latihan Persekutuan (HLP, for MOH candidates) or thru their head of service (MOHE candidates).

c) Candidates will be then vetted in an interview by the National HPB Training Committee & successful candidates will then be placed in HPB centres for fellowship training.

d) Future HPB trainees are advised to have at least 1 month of attachment and working experience with HPB surgeons nationwide as an exposure prior to application of their training.

EXIT CRITERIA

EARLY EXIT

During the first 3 months, it had been agreed that the trainee can quit the training within that period and also the trainer can terminate (consensus decision with National HPB Committee) the training during that period if the candidate is deemed not fit to continue

COMPLETION OF TRAINING

At the end of 3 years, the trainers need to verify whether the trainees performance in training is satisfactory and allowed to go for exit assessment. The exit assessment will be conducted in a viva format and trainees will be assessed by senior consultants in MOH, MOHE & invited overseas faculties. It will be conducted in one of the major HPB centers in Malaysia and the date will be informed in advance to the candidates. Overall assessment duration is about 3-4 hours.

The 7 stations assessed and the format of the assessment are as below

a) Clinical assessment – consist of 3-4 short cases each in liver, pancreas and biliary disease

b) Radiology & pathology station – multiple radiological & pathological specimen images will be displayed for rapid diagnosis and management

c) Log book assessment – In depth assessment of operative and endoscopy procedure performed during fellowship

d) Thesis/ dissertation - discussion of the research that was conducted during the fellowship

e) Mortality review – Case discussion of 2 HPB related mortalities

f) Journal appraisal – Critical appraisal of 2 journal articles

g) Ethics in surgery – Discussion about ethical issues encountered in day to day practice

The results will be announced shortly on the same day after a meeting involving the examiners and trainers. After achieving the required standards, passing candidates will be placed at major HPB centers to be allowed to perform and manage patients independently for a period of time before placement to other regional centers. Completing this exit assessment, these surgeons can then apply to be registered with The National Specialist Registry for HPB subspeciality

Candidates who failed to achieve the required standard will be rotated again for more training & learning experience and will be allowed to sit for the assessment once deemed fit in the following year.

TRAINING CENTER AND TRAINER

A) TRAINING CENTER

The delivery and administration of HPB Subspecialty Training program will be supported by appropriate resources including clinical, physical, and technical resources to provide trainees with educational experiences needed to achieve the educational objectives. Trainees will be rotated between the 3 MOH/MOHE hospitals.

Below are the recognised hospitals for HPB Subspecialty Training,

a) Hospital Selayang
b) Hospital Sultanah Bahiyah, Alor Setar
c) Hospital Umum Sarawak, Kuching
d) University Malaya Medical Centre, Kuala Lumpur
e) University Kebangsaan Hospital Medical Centre, Kuala Lumpur
f) Hospital Sultanah Aminah, Johor Bahru
g) Hospital Queen Elizabeth, Kota Kinabalu

To credential a hospital as HPB Subspecialty Training centre, the hospital should possess a minimum casemix of HPB cases as below:

A) 75 or more major HPB surgeries per year consecutively for no less than 2 years (Jeyarajah et al.) which includes as below:

1. 35 or more major hepatic/gallbladder procedures

    (i) 20 or more major anatomical hepatectomy procedures (involving resection of 3 or more segments) & lateral segmentectomy

    (ii) Minor non-anatomical resection I.e Non anatomical resection

    (iii) Radical Cholecystectomy

2. 15 or more complex biliary procedures

    (i) Bile-duct resection and reconstruction

(ii) Bile-duct reconstruction without resection i.e Roux-en-Y hepaticojejunostomy

3. 25 or more major pancreatic procedures.

(i) Pancreatoduodenectomy

(ii) Total or partial pancreatectomy

(iii) Drainage procedure eg Puestow, Frey's procedure or cysto-enterostomy

4. For transplant surgery, 30 or more liver transplantation procedures per year

B) TRAINERS

The National HPB Training Committee is responsible to identify potential trainers. Criteria to be accepted as a trainer as below:

1. An institution/hospital offering the HPB fellowship training programme preferably should have 2 Consultant trainers with a MAXIMUM Trainer to Trainee ratio of 1:2

2. Consultant trainers must demonstrate evidence of scholarly activity in HPB Disease as evidenced by participation in Basic Science Research, Clinical Research Protocols, presentations in local, regional or national meetings and or publications in a peer reviewed journal

3. A Trainers qualification, training and experiences in the subspecialty area to be evaluated by the National HPB Training Committee prior to being appointed as Trainers.

4. The Trainers must formally evaluate each HPB fellow's progress at least 6 monthly and to rectify any deficiencies encountered.

5. Reports to be submitted to the National HPB Training committee throughout their training. The committee's responsibility is to assess feedback from Trainees and Trainers regularly to further improve the fellowship programme

PROGRAMME MONITORING, REVIEW AND CONTINUAL QUALITY IMPROVEMENT

The HPB Subspecialty Fellowship program will be evaluated and reviewed in annual basis to improve the quality of the training program. National HPB Training Committee will convene for an Annual Assessment Meeting together with other trainers during the exit exam, to evaluate the following aspects of the training program:

1) QUALITY OF EACH HPB TRAINING CENTRE INCLUDING:

a) A functional physical facility that can support the training of HPB Subspecialty Fellows

b) A healthy trainer-to-trainee ratio

c) A healthy HPB casemix to meet the requirements of HPB Subspecialty Training

d) The presence of functional supporting departments eg. Radiological Department (both diagnostic and interventional), Oncological Department etc to aid the multidisciplinary participation of fellows

e) The fulfilment of target workload, both in- and out-patient, to meet the requirement of fellowship training

2) FEEDBACK OF HPB SUBSPECIALTY FELLOWSHIP TRAINEES

3) FEEDBACK OF HPB SUBSPECIALTY FELLOWSHIP TRAINERS

4) INCORPORATION OF EVOLVING/DEVELOPING TECHNOLOGIES AND SURGICAL ADVANCEMENTS INTO EXISTING CURRICULUMS IN ORDER TO MEET THE EVOLVING NEEDS OF HPB SURGICAL SERVICES

5) A NOMINATION OF NEW HPB SUBSPECIALTY FELLOWSHIP TRAINING CENTRE / TRAINERS WHEN THE REQUIREMENTS ARE MET

6) RECORD KEEPING OF ASSESSMENT FORM OF TRAINEES

Audits and feedbacks will be collected and organised by Chief Trainer in each training centre prior to the Annual Assessment Meeting. Chief Trainer usually the Head of Department/Unit of HPB in each respective training centre and also the member of the National HPB Training Committee, unless otherwise elected.

Upon conclusion of each annual program evaluation meeting, proposed modifications and improvements of HPB Subspecialty Fellowship program will be documented in the amendments of the existing training curriculums. Updated curriculums will then be disseminated to every training centres for the reference of both the Trainers and the trainees.

REFERENCE

1) Curriculum for Hepato-Pancreto-Biliary Surgery Fellowships Education and Training Committee, IHPBA (International Hepato-Pancreato-Biliary Association), 2008

2) AHPBA (Americas Hepato-Pancreato-Biliary Association) Certification Requirement: HPB Surgical Fellowship, April 2019

3) ANZHPBA (Australian & New Zealand Hepatic, Pancreatic & Biliary Association) , Fellowship in HPB Surgery: Education & Training 2009

4) Training paradigms in Hepato-Pancreatico-Biliary Surgery: An Overview of the Different Fellowship Pathways, Jeyarajah et al, J Gastrointest Surg 2021

HPB SURGERY SUBSPECIALITY MALAYSIA TRAINING

LOG BOOK AND CORE PROCEDURES

LATEST PHOTO

Name:

Address:

Date of Birth:

Nationality:

Basic Medical Qualification:

Medical School:

Postgraduate Qualifications:

Institution:

A) TRAINING ROTATION

PERIOD	TRAINING CENTRE	CONSULTANTS
e.g 1/7/2022-30/6/2022	Hosp Selayang	Ms Suryati Mokhtar

B) SUMMARY OF HPB SURGERY/CORE PROCEDURE EXPERIENCE (CONSOLIDATED)

Surgical Procedure	Status			
	Surgeon	Assistant	Observe	Supervise
HEPATIC RESECTION				
(R) Hemihepatectomy				
(L) Hemihepatectomy				
Extended (R) Hemihepatectomy				
Extended (L) Hemihepatectomy				
(L) Lateral Hepatic Resection				
Segmental/ Central Hepatic Resection				
Non-anatomical Hepatic Resection				
MIS Hepatectomy (Major)				
MIS Hepatectomy (Minor)				
CHOLECYSTECTOMY				
Open chole +/- cholangiogram				
Laparoscopic chole +/- cholangiogram				
Robotic cholecystectomy + ICG usage				
Radical Cholecystectomy				

BILIARY				
Bile Duct Exploration				
Radical Choledochectomy				
Excision of Choledochal Cyst				
Choledochoscopy –Intraoperative				
Choledochoscopy – Percutaneous				
BILIARY BYPASS				
Choledchojejunostomy				
Hepaticojejunostomy				
Transduodenal Ampullectomy				
Revision of Bilio-Enteric Anastomosis				
PANCREATIC RESECTION				
Central pancreatectomy				
Distal pancreatectomy				
Laparoscopic distal pancreatectomy				
Total pancreatectomy				
Whipple's Pancreaticoduodenectomy				
Pylorus Preserving Pancreaticoduodenectomy				
Open PPPD + portal vein resection (PVR)				
Robotic PPPD				
Laparoscopic PPPD				
Laparoscopic PPPD + PVR				
Hepaticopancreaticoduodenectomy				
Double bypass				
Pancreatic debridement, necrosectomy/ VARD				
Puestow's Pancreaticojejunostomy				
Frey procedure				

TRAUMA SURGERY				
Hepatic Debridement & Haemostasis				
TRANSPLANT WORK				
Liver procurement				
Liver Transplant – Cadaveric				
Liver Transplant - Live donor				
Multiorgan Donor (kidney)				
Non HPB (General surgery procedures)				
TOTAL				

C) CONSOLIDATED RECORD OF ENDOSCOPY EXPERIENCE

PROCEDURE	TOTAL
OGDS	
COLONOSCOPY	
ERCP	
ESOPHAGEAL/DUODENAL/COLONIC STENTING	
CYSTGASTROSTOMY	

D) LISTS OF PAPER/ POSTERS/ PUBLICATION/WRITE UPS DURING TRAINING PERIOD

YEAR/TITLE/AUTHORS

E) CONFERENCES/ WORKSHOPS ATTENDED DURING TRAINING PERIOD

YEAR	CONFERENCE

SUPERVISOR-TRAINEE ASSESSMENT REPORT (STAR)

ASSESSMENT YEAR 1 (1/2) DATE:

1) TRAINEE DETAILS

NAME		IC	
TRAINING START DATE		TRAINING END DATE	
ROTATION	HOSPITAL	DURATION (DATE)	SUPERVISOR
YEAR 1			
YEAR 2			
YEAR 3			

2) CLINICAL (WORK BASED ASSESSMENT)

	EXCELLENT	COMPETENT	INCOMPETENT
Able to diagnose and formulate complete management plan for patients			
Punctuality to attend ward rounds, clinic, OT and endoscopy			
Operative skills			
Endoscopy skills			

Comment

3) ATTITUDE

	EXCELLENT	COMPETENT	INCOMPETENT
Able to take responsibility & proactive			
Communication with patients, peers & staffs			
Leadership & management skills			
Professionalism			
Training of staffs & team members			

4) RESEARCH & CONFERENCE

	EXCELLENT	COMPETENT	INCOMPETENT
Research progress			
Presentation in Journal Clubs/ Conference			

6) Performance discussed with trainee? YES / NO

7) Trainee's comment

8) Supervisors comment

Supervisor: **Date:**

SUPERVISOR-TRAINEE ASSESSMENT REPORT (STAR)

ASSESSMENT YEAR 1 (2/2) DATE:

1) TRAINEE DETAILS

NAME		IC	
TRAINING START DATE		TRAINING END DATE	
ROTATION	HOSPITAL	DURATION (DATE)	SUPERVISOR
YEAR 1			
YEAR 2			
YEAR 3			

2) CLINICAL (WORK BASED ASSESSMENT)

	EXCELLENT	COMPETENT	INCOMPETENT
Able to diagnose and formulate complete management plan for patients			
Punctuality to attend ward rounds, clinic, OT and endoscopy			
Operative skills			
Endoscopy skills			

Comment

3) ATTITUDE

	EXCELLENT	COMPETENT	INCOMPETENT
Able to take responsibility & proactive			
Communication with patients, peers & staffs			
Leadership & management skills			
Professionalism			
Training of staffs & team members			

4) RESEARCH & CONFERENCE

	EXCELLENT	COMPETENT	INCOMPETENT
Research progress			
Presentation in Journal Clubs/ Conference			

6) Performance discussed with trainee? YES / NO

7) Trainee's comment

8) Supervisors comment

Supervisor: **Date:**

SUPERVISOR-TRAINEE ASSESSMENT REPORT (STAR)

ASSESSMENT YEAR 2 (1/2) DATE:

1) TRAINEE DETAILS

NAME		IC	
TRAINING START DATE		TRAINING END DATE	
ROTATION	HOSPITAL	DURATION (DATE)	SUPERVISOR
YEAR 1			
YEAR 2			
YEAR 3			

2) CLINICAL (WORK BASED ASSESSMENT)

	EXCELLENT	COMPETENT	INCOMPETENT
Able to diagnose and formulate complete management plan for patients			
Punctuality to attend ward rounds, clinic, OT and endoscopy			
Operative skills			
Endoscopy skills			

Comment

3) ATTITUDE

	EXCELLENT	COMPETENT	INCOMPETENT
Able to take responsibility & proactive			
Communication with patients, peers & staffs			
Leadership & management skills			
Professionalism			
Training of staffs & team members			

4) RESEARCH & CONFERENCE

	EXCELLENT	COMPETENT	INCOMPETENT
Research progress			
Presentation in Journal Clubs/ Conference			

6) Performance discussed with trainee? YES / NO

7) Trainee's comment

8) Supervisors comment

Supervisor: **Date:**

SUPERVISOR-TRAINEE ASSESSMENT REPORT (STAR)

ASSESSMENT YEAR 2 (2/2) DATE:

1) TRAINEE DETAILS

NAME		IC	
TRAINING START DATE		TRAINING END DATE	
ROTATION	HOSPITAL	DURATION (DATE)	SUPERVISOR
YEAR 1			
YEAR 2			
YEAR 3			

2) CLINICAL (WORK BASED ASSESSMENT)

	EXCELLENT	COMPETENT	INCOMPETENT
Able to diagnose and formulate complete management plan for patients			
Punctuality to attend ward rounds, clinic, OT and endoscopy			
Operative skills			
Endoscopy skills			

Comment

3) ATTITUDE

	EXCELLENT	COMPETENT	INCOMPETENT
Able to take responsibility & proactive			
Communication with patients, peers & staffs			
Leadership & management skills			
Professionalism			
Training of staffs & team members			

4) RESEARCH & CONFERENCE

	EXCELLENT	COMPETENT	INCOMPETENT
Research progress			
Presentation in Journal Clubs/ Conference			

6) Performance discussed with trainee? YES / NO

7) Trainee's comment

8) Supervisors comment

Supervisor: **Date:**

SUPERVISOR-TRAINEE ASSESSMENT REPORT (STAR)

ASSESSMENT YEAR 3 (1/2) DATE:

1) TRAINEE DETAILS

NAME		IC	
TRAINING START DATE		TRAINING END DATE	
ROTATION	HOSPITAL	DURATION (DATE)	SUPERVISOR
YEAR 1			
YEAR 2			
YEAR 3			

2) CLINICAL (WORK BASED ASSESSMENT)

	EXCELLENT	COMPETENT	INCOMPETENT
Able to diagnose and formulate complete management plan for patients			
Punctuality to attend ward rounds, clinic, OT and endoscopy			
Operative skills			
Endoscopy skills			

Comment

3) ATTITUDE

	EXCELLENT	COMPETENT	INCOMPETENT
Able to take responsibility & proactive			
Communication with patients, peers & staffs			
Leadership & management skills			
Professionalism			
Training of staffs & team members			

4) RESEARCH & CONFERENCE

	EXCELLENT	COMPETENT	INCOMPETENT
Research progress			
Presentation in Journal Clubs/ Conference			

6) Performance discussed with trainee? YES / NO

7) Trainee's comment

8) Supervisors comment

Supervisor: **Date:**

SUPERVISOR-TRAINEE ASSESSMENT REPORT (STAR)

ASSESSMENT YEAR 3 (2/2) DATE:

1) TRAINEE DETAILS

NAME		IC	
TRAINING START DATE		TRAINING END DATE	
ROTATION	HOSPITAL	DURATION (DATE)	SUPERVISOR
YEAR 1			
YEAR 2			
YEAR 3			

2) CLINICAL (WORK BASED ASSESSMENT)

	EXCELLENT	COMPETENT	INCOMPETENT
Able to diagnose and formulate complete management plan for patients			
Punctuality to attend ward rounds, clinic, OT and endoscopy			
Operative skills			
Endoscopy skills			

Comment

3) ATTITUDE

	EXCELLENT	COMPETENT	INCOMPETENT
Able to take responsibility & proactive			
Communication with patients, peers & staffs			
Leadership & management skills			
Professionalism			
Training of staffs & team members			

4) RESEARCH & CONFERENCE

	EXCELLENT	COMPETENT	INCOMPETENT
Research progress			
Presentation in Journal Clubs/ Conference			

6) Performance discussed with trainee? YES / NO

7) Trainee's comment

8) Supervisors comment

Supervisor: **Date:**

CURRICULUM FOR HEPATO-PANCREATO-BILIARY SURGERY FELLOWSHIPS

Education and Training Committee
INTERNATIONAL HEPATO-PANCREATO-BILIARY ASSOCIATION
2008

1. Introduction

- The purpose of Fellowship education in Hepato-Pancreato-Biliary (HPB) Surgery is to provide a structured educational and training experience necessary to achieve expertise in HBP surgery
- This curriculum provides:
  - HPB Surgery Program Directors with a basis for instruction and evaluation of Fellows
  - Fellows with a guide to the study of HBP Surgery and an outline of the essential areas of knowledge and technical skills that need to be mastered.

2. Curriculum Structure

This Curriculum for Hepato-Pancreato-Biliary Surgery Fellowships should be considered by national and regional accreditation bodies responsible for establishing and maintaining a curriculum that describes the specific goals, detailed objectives, and core competencies that are relevant to their sub-specialty fellowships.

The present document will describe the distinct medical knowledge and technical skills required by a fellow to become an expert in HPB Surgery. This curriculum for a Hepato-Pancreato-Biliary Surgery Fellowship has been approved by the Council of The International Hepato-Pancreato-Biliary Association (IHPBA) on May 1, 2008.

3. Overview of the Curriculum for a Hepato-Pancreato-Biliary Surgery Fellowship

At the conclusion of the fellowship in HPB Surgery, the fellow will be able to provide comprehensive, state-of-the-art medical and surgical care to patients with surgical diseases/disorders of the liver, pancreas, biliary tract and duodenum. This expertise will include the ability to investigate, diagnose, recommend appropriate treatment options, perform operative procedures, and provide the pre- peri- and late postoperative care. To achieve this goal, this curriculum provides a guide to the topics for study and the knowledge and skills required to become an HBP Surgeon.

This Curriculum consists of seven Major Units, some with Subunits:

Unit 1 – The Liver
- Anatomy, Embryology, Physiology, Testing
- Congenital and Acquired Non-neoplastic Liver Disease
- Neoplastic Liver Disease
- Liver Surgery

Unit 2 – The Biliary Tract including Gallbladder
- Anatomy, Embryology, Physiology, Testing
- Congenital and Acquired Non-neoplastic Biliary Disease
- Neoplastic Biliary Disease

Unit 3 – The Pancreas and Duodenum
- Anatomy, Embryology, Physiology, Testing
- Congenital and Acquired Non-neoplastic Pancreatic Disease
- Neoplastic Pancreatic Disease
- Diseases of the Duodenum

Unit 4 – Imaging

Unit 5 – Oncology

Unit 6 – Trauma

Unit 7 – Transplantation

Each Unit or Subunit is organized into 3 Sections:

1. **Objectives**: description of the topics the Fellow must understand and the specific knowledge to be acquired
2. **Content**: description of the specific areas of study necessary to achieve the unit objectives
3. **Clinical Skills**: description of the clinical activities and technical skills that are to be mastered

Unit 1 – The Liver

A. Anatomy, Embryology, Physiology, Testing

1. Objectives: Upon completion of this unit the fellow will understand:
   a. Intrahepatic and extrahepatic anatomy of the liver and the relationship with the adjacent and surrounding structures
   b. The embryology of the liver and biliary tract and the potential anomalies
   c. The physiology of the liver
   d. Clinical hematologic and biochemical tests relevant to the liver and their indications and interpretation:
      (1) Tests of hepatocellular injury
      (2) Tests of liver function
   e. Hepatic imaging techniques and their indications and interpretation
   f. Implications of investigations and surgical procedures on the liver

2. Content:
   a. Embryology of the liver
      (1) Relationship to other foregut structures
   b. Extrahepatic anatomy of the liver
      (1) Lobes, sectors, segments
      (2) Nomenclature systems
      (3) Ligaments, fissures and incisures
      (4) Anomalies
   c. Anatomy of the porta
      (1) Portal vein, hepatic artery
      (2) Bile duct, gall bladder
      (3) Variants of normal and anomalies
      (4) Lymphatic drainage and nodal anatomy
      (5) Nerves
   d. Anatomy of the retrohepatic space
      (1) IVC and its branches
      (2) Adrenal, kidney, diaphragm
   e. Intrahepatic anatomy:
      (1) Hepatic veins and variants of normal
      (2) Portal triad structures and segmental anatomy
      (3) Histology of the normal liver
   f. Physiology of the liver
      (1) Bilirubin metabolism
      (2) Coagulation
      (3) Other clinically relevant metabolic pathways

g. Hematologic, biochemical, and histologic testing (assessment) of the liver
    (1) Transaminases and markers of cholestasis
    (2) Measures of liver function
        (a) Static – including INR (PT), Factors V and VII, bilirubin, albumin
        (b) Dynamic – including clearance tests , e.g. ICG, galactose, aminopyrine, lidocaine (MEGX)
    (3) Indicators of portal hypertension
    (4) Indications for liver biopsy
h. Imaging of the liver
    (1) Ultrasound (U/S) and Doppler, Computerized Tomography (CT) Scans, Magnetic Resonance Imaging (MRI) Scans
    (2) Nuclear tests: Proton Emission Tomographic (PET) Scans, Liver/Spleen scans, Biliary excretion (e.g. HIDA) Scans, RBC Scans
i. Application of investigations to hepatic surgery

3. Clinical Skills:
    a. Identify, recognize, and describe anatomic structures in and around the liver
        (1) By reading and interpreting images of the liver
        (2) Intraoperatively
    b. Perform and interpret intraoperative U/S of the liver and porta
    c. Perform liver biopsy – percutaneously, laparoscopic or open
    d. Identify anatomic anomalies and explain their embryologic origin
    e. Understand the indications for and be able to interpret the hematologic and biochemical tests and explain the underlying physiology
    f. Interpret the dynamic tests of liver function
    g. Apply the relative advantages and disadvantages to the application of the different modalities of hepatic imaging
    h. Determine the appropriate abdominal wall incisions for open procedures on the liver
    i. Determine the appropriate port site placements and patient positions for laparoscopic procedures on the liver, and the relative indications for each and the need for a hand-port
    j. Evaluate liver function and portal hypertension (including Child's score and its variations)
    k. Assess the overall risk and the hepatic risk of surgery by recognizing the implications of abnormalities of liver hematologic and biochemical testing on both hepatic and non-hepatic procedures.
    l. Develop a detailed operative strategy for liver resections based on preoperative assessment and imaging

<u>B. Congenital and Acquired Non-neoplastic Liver Disease</u>

1. Objectives: Upon completion of this unit the fellow will understand:
    a. The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the liver.

b. The investigative procedures available to efficiently diagnose the disease/ disorder.
c. The treatment options available for the condition and the results, including the risks and benefits of the operative and non-operative procedures.
d. The pre, intra- and postoperative management, including the management of complications of therapy.

2. Content:
   a. Pediatric liver diseases
      (1) Biliary atresia and Allegille's syndrome
         (a) Presentation, evaluation and natural history
         (b) Treatment options and indications for intervention
   b. Liver cysts and abscesses
      (1) Solitary liver cysts
         (a) Presentation, evaluation and natural history
         (b) Distinguish from cystic neoplasm
         (c) Treatment options and indications for intervention
      (2) Polycystic liver disease
         (a) Associated abnormalities
         (b) Presentation, evaluation and natural history
         (c) Treatment options and indications for intervention
      (3) Pyogenic and fungal liver abscess
         (a) Potential bacterial and fungal pathogens and sources
         (b) Presentation, evaluation
         (c) Treatment and indications for surgical drainage
      (4) Other liver abscess including amoebic abscess, TB
         (a) Presentation, evaluation and natural history
         (b) Treatment options and indications for intervention

   c. Liver failure
      (1) Hepatitis and acute liver failure
         (a) Causes of acute liver failure
         (b) Investigation and prognosis
            i. Classification systems including King's College criteria
         (c) Treatment strategies
            i. Role of liver support systems
            ii. Role of liver transplantation
      (2) Cirrhosis and portal hypertension
         (a) Causes of cirrhosis, diagnosis and natural history, staging and treatment options (including indications for liver transplantation) for each
            i. Viral hepatitis B, C, D
            ii. Alcoholic liver disease
            iii. Non-alcoholic fatty liver disease and steatohepatitis
            iv. Autoimmune liver disease

a. Autoimmune chronic active hepatitis
b. Primary biliary cirrhosis
c. Primary sclerosing cholangitis

v. Hemochromatosis, Wilson's disease, alpha-1 antitrypsin deficiency
vi. Budd Chiari syndrome

(b) Portal hypertension

i. Pathophysiology
ii. Interpretation of hematologic and biochemical tests and imaging
iii. Non-operative treatment options and strategies
iv. Portosystemic decompression
a. Indications and sequellae
b. Risks and benefits of TIPS and surgical shunts
c. Types of surgical shunts
i) Relative indications
d. Sugiura procedure
v. Indications for liver transplantation

3. Clinical Skills:
   a. Diagnose and treat patients with cystic diseases of the liver
   b. Diagnose and manage patients with liver abscess(es)
   c. Perform laparoscopic and open drainage of liver cyst or abscess (unroofing, resection)
   d. Diagnose and classify acute and chronic liver failure.
   e. Diagnose, investigate and manage patient with portal hypertension
      (1) Perform portosystemic shunt – portocaval, mesocaval, splenorenal and their variants.
      (2) Perform the Sugiura procedure

C. Neoplastic Liver Disease

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the liver.
   b. The investigative procedures available to efficiently diagnose the disease/disorder.
   c. The staging of malignancies of the liver including histologic assessment
   d. The treatment options available for the neoplasm, and the results, including the risks and benefits of the operative and non-operative procedures.
   e. The pre, intra- and postoperative management, including the management of complications of therapy.
   f. The role of neoadjuvant and adjuvant therapy of malignant liver neoplasms.

2. Content:
   a. Benign neoplasms of the liver

(1) Presentation, investigation, diagnosis, and natural history of hemangioma, hamartoma, adenoma, focal nodular hyperplasia
(2) Histology and indications for biopsy
(3) Treatment options and indication for ablation or resection

b. Primary malignancies of the liver
   (1) Hepatocellular carcinoma (HCC)
      (a) Etiology, presentation, investigation, diagnosis, and natural history of HCC
      (b) Role of screening and staging systems for HCC
      Treatment options and the risk: benefit ratio for each: resection, transplantation, ablation, chemotherapy +/- embolization, radiation
   (2) Cholangiocarcinoma (intrahepatic or peripheral)
      (a) Diagnosis, investigation and staging
      (b) Treatment options including palliative procedures
   (3) Epithelioid hemangioendothelioma, lymphoma, sarcoma and other neoplasms
      (a) Diagnosis, investigation and staging
      (b) Treatment options
c. Secondary malignancies of the liver
   (1) Colorectal primary
      (a) Pathogenesis, staging of colorectal cancer
      (b) Investigation and staging
      (c) Treatment options
         i. Indications, and risk: benefit ratio of ablation / resection
         ii. Neo-adjuvant, downstaging, and adjuvant chemotherapy
   (2) Neuroendocrine and other primary
      (a) Investigation and staging
      (b) Treatment options
         i. Indications, and risk: benefit ratio ablation / resection
      (c) Neoadjuvant and adjuvant therapy

3. Clinical Skills:
   a. Evaluate patients with benign neoplasms of the liver, including interpretation of imaging and indications for biopsy
   b. Manage patients with benign hepatic neoplasms
   c. Evaluate patients with HCC, including screening for potential HCC and staging
   d. Evaluate patients with primary and secondary adenocarcinoma and other metastatic lesions of the liver including staging
   e. Manage patents with primary and secondary hepatic malignancies
   f. Participate in multidisciplinary tumor review conferences
   g. Perform liver resections
   h. Provide pre- and postoperative therapy following liver resection including the diagnosis and management of complications
   i. Recommend appropriate therapy for unresectable hepatic malignancies

j. Recommend appropriate adjuvant radiation and/or chemotherapy following resection for hepatic malignancies
k. Interact with Medical and Radiation Oncologists

D. Liver Surgery

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The types of and techniques for liver resections
   b. Preoperative patient assessment and the cumulative risks of the proposed procedure
   c. Preoperative management
   d. Intraoperative management during a liver resection
   e. Postoperative management including complications.

2. Content:
   a. Types of liver resection
      (1) Nomenclature of liver resections (Brisbane system)
      (2) Laparoscopic, laparoscopic-assisted, open laparotomy
      (3) Nonanatomic, segmental, lobectomy, extended lobectomy
      (4) Vascular control: none, Pringle maneuver, total vascular isolation
      (5) Vascular resection and reconstruction
      (6) Staged resections
      (7) Combination with ablation
   b. Preoperative assessment and the cumulative risks to the proposed procedure
      (1) Patient comorbidities (cardiopulmonary and other)
      (2) Hepatic risk
         (a) Assessment of liver function, portal hypertension
         (b) Volumetric assessment of liver remnant
         (c) Portal vein embolization
   c. Preoperative management
      (1) Prophylaxis against common complications
         (a) DVT, infection
      (2) Neuroendocrine hormonal blockade
      (3) Detailed operative plan based on preoperative imaging
   d. Liver resection
      (1) Anesthetic considerations
         (a) Agents, coagulation, CVP
      (2) Blood loss conservation including cell saver and blood product administration
      (3) Laparoscopic techniques
         (a) Patient and port placement
         (b) Hand port
      (4) Parenchymal transection techniques
         (a) Relative advantages and disadvantages
         (b) Normal, fatty, fibrotic and cirrhotic parenchyma
         (c) Laparoscopic or open use
      (5) Concomitant resection and reconstruction of the
         (a) Diaphragm

(b) IVC
(c) Portal vein
(d) Bile duct

e. Postoperative management
(1) Complications and management, including liver failure

3. Clinical Skills:
   a. Evaluate patients for liver surgery including the comorbidities and any underlying liver disease to determine risk
   b. Determine the need for portal vein embolization, staged resection or concomitant ablation
   c. Perform intraoperative staging of tumors including intraoperative U/S
   d. Perform liver resections using a variety of approaches and transection techniques
   e. Perform complex liver resections including bile duct, portal vein, IVC, diaphragm
   f. Manage the liver resection patient during the immediate, early and late post-operative periods and diagnose and treat complications of the resection

Unit 2 – The Biliary Tract including Gallbladder

A. Anatomy, Embryology, Physiology, Testing

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The anatomy of the biliary tract including the intra- and extrahepatic, hepatic duct, the gallbladder and cystic duct, the common bile duct, the ampulla of Vater, and their relationships with the adjacent and surrounding structures
   b. The embryology of the liver and biliary tract and the potential anomalies
   c. The physiology of bile metabolism and biliary tract epithelium
   d. Clinical biochemical tests relevant to the biliary tract and their interpretation
   e. Biliary imaging techniques and their indications and interpretation
   f. Implications of investigations on surgical procedures on the bile duct

2. Content:
   a. Embryology of the biliary tract
      (1) Relationship to liver, pancreas and other portal and foregut structures
   b. Anatomy of the hepatic duct and biliary plate
      (1) Segmental anatomy and variants of normal
      (2) Blood supply and lymphatic drainage
      (3) Relationship with other portal structures
   c. Anatomy of the gallbladder and cystic duct
      (1) Blood supply and lymphatic drainage
      (2) Variants of normal and anomalies
   d. Anatomy of the bile duct
      (1) Blood supply, lymphatic drainage and regional lymph nodes
      (2) Variants of normal and anomalies
      (3) Relationship with other portal structures and the pancreatic duct
      (4) Sphincter of Oddi and ampulla of Vater
   e. Bile metabolism and biliary physiology
      (1) Bile-salt dependent and independent bile production
      (2) Hormonal influences
      (3) Biliary epithelium and gallbladder function
      (4) Sphincter of Oddi motility
   f. Biochemical investigation
      (1) interpretation
   g. Imaging
      (1) Axial and body imaging techniques:
         (a) U/S, CT scan and MRI scan, including MRCP
      (2) Endoscopic U/S
      (3) Direct contrast imaging
         (a) Percutaneous transhepatic cholangiogram (PTC) and cholecystography and endoscopic retrograde cholangio-pancreatography (ERCP)
      (4) Endoscopic assessment of Ampulla of Vater

(5) Nuclear biliary excretion imaging (HIDA scan) – qualitative and quantitative (HIDA scan)

3. Clinical Skills:
   a. Identify and describe biliary tract structures (normal and abnormal)
      (1) By reading and interpreting images of the biliary tract
      (2) Intraoperatively
   b. Perform and interpret intraoperative U/S of the liver and biliary tract
   c. Identify anatomic anomalies and explain their embryologic origin
   d. Understand the indications for and be able to interpret the biochemical tests and explain the underlying physiology
   e. Apply understanding of the relative advantages and disadvantages of the different modalities of biliary tract imaging to determine optimal investigation
   f. Determine the abdominal wall incisions that are appropriate for open procedures on the biliary tract and the relative indications for each
   g. Determine the appropriate port site placements and patient positions that are useful for laparoscopic procedures on the biliary tract and the relative indications for each
   h. Develop a detailed operative strategy for biliary surgery based on preoperative assessment and imaging

B. Congenital and Non-neoplastic Biliary Disease

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the biliary tract including the gallbladder
   b. The investigative procedures available to efficiently diagnose of the disease/disorder
   c. The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
   d. The pre-, intra- and postoperative management, including the management of complications of therapy

2. Content:
   a. Congenital and pediatric
      (1) Choledochal cyst, Caroli's disease, congenital hepatic fibrosis, biliary atresia and Allegille's syndrome
         (a) Presentation, classification, evaluation and natural history
         (b) Treatment options and indications for intervention
   b. Gallstones
      (1) Pathogenesis
      (2) Presentation and investigation of
         (a) Biliary colic, cholecystitis, cholangitis, Mirrizzi's syndrome, gallstone ileus
      (3) Treatment: Percutaneous, laparoscopic and open
      (4) Cholecystectomy-related biliary injuries
         (a) Mechanism of injury & classification

(b) Associated injuries
(c) Management

c. Benign strictures
(1) Primary sclerosing cholangitis (PSC)
(a) Etiology, pathophysiology, natural history and non-operative management
(b) Complications and management
i. Screening for cholangiocarcinoma
ii. PTC with biliary drainage (PTBD), ERCP with endobiliary stent
iii. Resection
iv. Transplantation
(2) Posttraumatic and idiopathic
(a) Mechanism of injury and classification
(b) Management options

d. Intrahepatic stones
(1) Pathophysiology, presentation and investigation
(2) Common infectious bacteria
(3) Surgical options including liver resection and biliary access (Hutson) choledochojejunostomy, hepaticojejunostomy with transhepatic stents

3. Clinical Skills:
a. Investigate the jaundiced patient by determining the most efficient modalities, and interpret the results of biochemical testing and imaging
b. Apply understanding of the relative merits and disadvantages of non-operative biliary manipulation (PTBD and endoscopic stenting) to treat biliary tract obstruction.
c. Manage the patient with complex gallstone disease
d. Manage biliary injuries resulting from cholecystectomy and other trauma
e. Perform resection and reconstruction for choledochal cysts, intrahepatic stones, and benign strictures
f. Evaluate and manage the patient with the complications of PSC

C. Neoplastic Biliary Disease

1. Objectives: Upon completion of this unit the fellow will understand:
a. The presentation and natural history of benign and malignant neoplasms of the bile duct and gallbladder
b. The investigative procedures available to efficiently diagnosis the neoplasm.
c. The staging of adenocarcinoma of the bile duct and gallbladder including histologic assessment
d. The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
e. The pre-, intra- and postoperative management, including the management of complications of surgery.
f. The role of neoadjuvant and adjuvant chemo- and radiation therapy of malignant biliary neoplasms

2. Content:
    a. Gallbladder
        (1) Polyps
            (a) Presentation, natural history
            (b) Indications for resection
            (c) Principles of resection
        (2) Adenocarcinoma
            (a) Presentation, staging (including histology) and natural history
            (b) Investigation
            (c) Surgical options
                i. Extent and timing of resection
            (d) Chemo and radiotherapy
                ii. Neo- and/or adjuvant therapy
                iii. Definitive management
            (e) Palliative care options
    b. Bile duct
        (1) Adenoma of Ampulla of Vater
            (a) Presentation, natural history, investigation
            (b) Resection options
                1. Endoscopic, transduodenal resection and reconstruction
        (2) Adenocarcinoma
            (a) Location: Hilar (Klatskin), intrapancreatic, ampulla
            (b) Type – papillary, sclerosing
            (c) Presentation, investigation and staging, including laparoscopic staging
            (d) Resection and reconstruction – indications and contraindication
            (e) Palliative options
                1. PTBD or endoscopic stent
                2. Surgical bypass

3. Clinical Skills:
    a. Investigate and manage patients with gallbladder polyps and benign neoplasms of the ampulla of Vater
        (1) Perform extended cholecystectomy for potential oncologic indication
        (2) Perform transduodenal resection of the Ampulla of Vater with reconstruction of the bile and pancreatic ducts
    b. Investigate and manage patients with hilar cholangiocarcinoma
        (1) Perform extended resection of the biliary bifurcation with the caudate and ipsilateral lobes of the liver, portal lymphadenectomy, and biliary reconstruction
    c. Investigate and manage patients with distal bile duct tumors
        (1) Perform pancreatoduodenectomy
    d. Participate in multidisciplinary tumor review conferences

e. Provide postoperative management including the diagnosis and treatment of complications of biliary resection and/or bypass
f. Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interacts with Medical and Radiation Oncologists
g. Recommend appropriate therapy for unresectable carcinoma of the gall-bladder or bile duct

Unit 3 – The Pancreas & Duodenum

A. Anatomy, Embryology, Physiology, Testing

1. Objectives: Upon completion of this unit the fellow will understand:
    a. Anatomy of pancreas and its relationship with portal structures, retroperitoneal structures and the adjacent organs
    b. Anatomy of the pancreatic duct and its relationship with the bile duct, sphincter of Oddi and the ampulla of Vater
    c. Anatomy of duodenum and its relationship with portal structures, retroperitoneal structures and the adjacent organs
    d. The embryology of the pancreas, pancreatic duct and duodenum and potential anomalies
    e. The physiology of pancreatic exocrine and exocrine functions and duodenal physiology
    f. Clinical biochemical tests of pancreatic function and injury and their interpretation
    g. Pancreatic and duodenal imaging techniques and their indications and interpretation
    h. Implications of investigations on surgical procedures on the pancreas and duodenum

2. Content:
    a. Embryology of the pancreas and duodenum
        (1) Relationship to liver, bile duct and other foregut structures
        (2) Etiology of anomalies including pancreas divisum and annular pancreas
    b. Anatomy of the pancreas
        (1) Spectrum of normal anatomy and variants
        (2) Arterial supply and venous drainage
        (3) Lymphatic drainage and regional lymph nodes.
        (4) Relationship with:
            (a) Portal structures: duodenum, bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches
            (b) Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
            (c) Adjacent organs: stomach, spleen, colon, small intestine
    c. Anatomy of the pancreatic duct
        (1) Variants of normal and anomalies
    d. Anatomy of the duodenum
        (1) Spectrum of normal anatomy and variants
        (2) Arterial supply and venous drainage
        (3) Lymphatic drainage and regional lymph nodes.
        (4) Relationship with:
            (a) Portal structures: bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches

(b) Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
(c) Adjacent organs: pancreas, stomach, spleen, colon, small intestine

e. Pancreatic metabolism and physiology
   (1) Exocrine enzyme physiology
      (a) Synthesis, excretion and activation
      (b) Neural and hormonal influences
   (2) Endocrine metabolism
      (a) Islet cell function, neuroendocrine hormones
f. Duodenal physiology
   (1) Motility
   (2) Neuroendocrine ("gut") hormone physiology
   (3) Biochemical investigation and interpretation
g. Biochemical Testing
   (1) Markers of pancreatic injury
   (2) Measures of pancreatic exocrine function
   (3) Urinary and serum neuroendocrine hormones
h. Imaging
   (1) Axial and body imaging techniques:
      (a) U/S, CT scan and MRI scan, including MRCP
   (2) Endoscopy and endoscopic U/S
   (3) Direct contrast imaging
      (a) Endoscopic retrograde cholangio-pancraetography (ERCP)
   (4) Nuclear studies:
      (a) PET scan
      (b) Neuroendocrine imaging (Octreotide scan)
i. Application of testing and imaging to pancreatic and duodenal surgery

3. Clinical Skills:
   a. Identify, recognize, and describe anatomic structures in and around the pancreas & duodenum
      (1) By reading and interpreting images of the duodenum, pancreas and its duct
      (2) Intraoperatively
   b. Perform and interpret intraoperative U/S of the pancreas and surrounding structures
   c. Identify anatomic anomalies and explains their embryologic origin
   d. Understand the indications for and interpret the biochemical tests and explain the underlying physiology including the tests of pancreatic function
   e. Apply the relative advantages and disadvantages of the different modalities of pancreatic imaging to efficiently investigate diseases and disorders of the pancreas and duodenum
   f. Determine the appropriate abdominal wall incision for open procedures on the pancreas and/or duodenum
   g. Determine the appropriate port site placements and patient positions for laparoscopic procedures on the pancreas and/or duodenum and the relative indications for each and the need for a hand-port

h. Develop a detailed operative strategy for pancreatic and duodenal surgery based on preoperative assessment and imaging

B. Congenital and Acquired Non-neoplastic Pancreatic Disease

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the pancreas
   b. The investigative procedures available to efficiently diagnose the disease/disorder
   c. The treatment options available for the condition, and results, including the risks and benefits of the operative and nonoperative procedures
   d. The pre-, intra- and postoperative management, including the management of complications of therapy

2. Content:
   a. Pancreatitis
      (1) Acute
         (a) Pathogenesis, staging and prognosis
         (b) Management, including surgical options and complications
         (c) Indications for surgical intervention
      (2) Chronic
         (a) Pathogenesis, complications and nonoperative management
         (b) Pancreatic stents and endoscopic/percutaneous drainage procedures
         (c) Surgical options and indications
         (d) Pain control
   b. Pancreas Divisum
      (1) Pathogenesis, staging and prognosis
      (2) Management, including surgical options and complications
      (3) Indications for surgical intervention
   c. Annular pancreas
      (1) Pathogenesis, staging and prognosis
      (2) Management, including surgical options and complications
      (3) Indications for surgical intervention

3. Clinical Skills:
   a. Manage patients with acute pancreatitis, including complications
      (1) Determine the need for surgical intervention
      (2) Perform open and/or laparoscopic procedures for acute pancreatitis
   b. Investigate and manage the patient with chronic pancreatitis
      (1) Determine the need for operative intervention
      (2) Perform: pseudocyst-enterostomy, lateral pancreaticojejunosomy with/without limited resection of the head of the pancreas (Frey procedure), pancreatic resection

C. Neoplastic Diseases of the Pancreas

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The Pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the pancreas
   b. The investigative procedures available to efficiently diagnose the disease/disorder
   c. The staging of malignancies of the pancreas including histologic assessment
   d. The treatment options available for the neoplasm, and the outcomes, including the risks and benefits of the operative and nonoperative procedures
   e. The pre-, intra- and postoperative management, including the management of complications of therapy
   f. The role of neoadjuvant and adjuvant therapy of malignant pancreatic lesions

2. Content:
   a. Benign cysts and neoplasms of the pancreas
      (1) Microcystic serous cystadenoma
         (a) Presentation, investigation, diagnosis, and natural history
         (b) Histology and indications for biopsy
         (c) Treatment options and indication for resection
      (2) Mucinous cystic neoplasm
         (a) Presentation, investigation, diagnosis, and natural history
         (b) Histology and indications for aspiration/biopsy
         (c) Treatment options and indication for resection
      (3) Intraductal papillary mucinous neoplasm (IPMN)
         (a) Presentation, investigation, diagnosis, and natural history
         (b) Histology and indications for aspiration / biopsy
         (c) Treatment options and indication for resection
      (4) Solid Pseudopapillary Neoplasms
         (a) Presentation, investigation, diagnosis, and natural history
         (b) Histology and indications for aspiration / biopsy
         (c) Treatment options and indication for resection
      (5) Cystic Neuroendocrine Tumors
         (a) Presentation, investigation, diagnosis, and natural history
         (b) Histology and indications for aspiration / biopsy
         (c) Treatment options and indication for resection
      (6) Von Hippel Lindau syndrome
         (a) Pathology, associated lesions, investigation
         (b) Management

   b. Malignancies of the pancreas
      (1) Primary
         (a) Adenocarcinoma
            1. Presentation, investigation and staging
            2. Assessment of resectability
            3. Pre-, peri- and postoperative management
            4. Palliative procedures

(b) Neuroendocrine tumors
1. Presentation, investigation and staging
2. Assessment of resectability
3. Pre-, peri- and postoperative management

(c) Lymphoma
1. Presentation, staging
2. Role of surgery

(2) Secondary

(a) Renal cell carcinoma
1. Presentation and management

(b) Melanoma
1. Presentation and management

3. Clinical Skills:
   a. Investigate and manage patients with benign cysts and neoplasms of the pancreas
      (1) Determine need for biopsy/aspiration and resection
      (2) Perform resections including enucleation of NE tumors and spleen preserving distal pancreatectomy
   b. Investigate and manage patients with adenocarcinoma of the pancreas
      (1) Stage the tumor pre- and intraoperatively and determine resectability
      (2) Perform pancreatoduodenectomy +/- portal vein resection and reconstruction
      (3) Perform distal pancreatectomy and regional lymphadenectomy
      (4) Perform palliative procedures for unresectable tumors
   c. Participate in multidisciplinary tumor review conferences
   d. Provide postoperative management including the diagnosis and treatment of complications of pancreatic resection and/or bypass
   e. Recommend appropriate therapy for unresectable pancreatic carcinoma
   f. Recommend appropriate neo- and adjuvant radiation and/or chemotherapy and interact with Medical and Radiation Oncologists

D. Diseases of the Duodenum

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The pathophysiology, presentation and natural history of the diseases of the pancreas
   b. The investigative procedures available to efficiently diagnose the disease/disorder
   c. The treatment options available for the condition, and the results, including the risks and benefits of the operative and non-operative procedures
   d. The pre-, intra- and postoperative management, including the management of complications of therapy

2. Content:
   a. Congenital disorders of the duodenum
      (1) Duodenal atresia and duplication
      (2) Duodenal diverticulae
   b. Duodenal ulcer disease

(1) Pathogenesis, investigation and diagnosis
(2) Nonoperative treatment
(3) Operative management

c. Crohn's disease
   (1) Presentation, investigation, diagnosis
   (2) Management

d. Benign neoplasms
   (1) Adenoma
   (2) Hereditary Familial Polyposis
      (a) Genetics, presentation, investigation
      (b) Management

e. Malignant neoplasms of the duodenum
   (1) Adenocarcinoma
      (a) Presentation, investigation, staging
      (b) Management
   (2) Gastrointestinal stromal tumor (GIST) and sarcomas
      (a) Presentation, investigation, staging
      (b) Management options
         1. Chemotherapy
         2. Resection
   (3) Neuroendocrine tumor
      (a) Presentation (syndromes) investigation, staging
      (b) Management
   (4) "Secondary" to direct invasion of adjacent malignancy
      (a) Carcinoma of the stomach or colon
      (b) Renal cell carcinoma
      (c) Investigation, staging
      (d) Operative management

3. Clinical Skills:
   a. Investigate and manage patients with benign lesions of the of the duodenum
      (1) Determine need for operative intervention
      (2) Perform acid-reduction procedures, limited resection and duodenal bypass procedures
   f. Investigate and manage patients with malignant neoplasms of the duodenum
      (1) Stage the tumor pre- and intraoperatively and determine resectability
      (2) Perform appropriate resection (including pancreatoduodenectomy +/- portal vein resection and reconstruction when necessary) with regional lymphadenectomy
      (3) Perform palliative procedures for unresectable tumors
      (4) Participate in multidisciplinary tumor review conferences
      (5) Recommend appropriate therapy for unresectable duodenal malignancies
      (6) Recommend appropriate neo- and adjuvant radiation and/or chemo-therapy and interact with Medical and Radiation Oncologists
   g. Provide postoperative management including the diagnosis and treatment of complications of duodenal resection and/or bypass

Unit 4 – Imaging

1. Objectives: Upon completion of this unit the fellow will:
   a. Understand the physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures including biliary excretion scan (HIDA), RBC scan, Octreotide scan, and L/S scan
   b. Understand the relative advantages, disadvantages and indications of each
   c. Read and interpret the detailed information provided by the imaging of the liver biliary tract, pancreas and duodenum
   d. Perform and interpret intraoperative ultrasound

2. Content:
   a. The applied physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures
   b. The clinical protocols available for each technology
      (1) The information provided by each protocol
      (2) The interpretation of images
      (3) The application to clinical investigation
   c. Imaging algorithm for the investigation of hepatobiliary and pancreatic lesions including
      (1) Liver cyst or tumor
      (2) Jaundice
      (3) Periampullary tumor
      (4) Cyst or mass in the pancreas

3. Clinical Skills:
   a. Apply understanding of the relative merits of each imaging modality to efficiently investigate (including staging of) lesions of the liver, biliary tract, and pancreas
   b. Interpret images to correctly identify normal structures, anomalies and pathologic abnormalities
   c. Correlate and integrate the findings of the various imaging studies during the investigation of a patient
   d. Perform and interpret intraoperative ultrasound
   e. Interact with Diagnostic Radiologists with expertise in HPB diseases and body imaging

Unit 5 – Oncology

1. Objectives: Upon completion of this unit the fellow will:
   a. Understand the basic pathophysiology of neoplasia and the currently understood mechanisms of carcinogenesis
   b. Understand the mechanisms of action of the classes of chemotherapeutic agents currently available for HBP malignancies
   c. Understand the physics, mechanism of action and technology of radiation therapy
   d. Apply this understanding to the multidisciplinary management of HBP malignancies

2. Content:
   a. Basic pathophysiology of neoplasia
      (1) Mechanisms of carcinogenesis
      (2) Genetic alterations
      (3) Viral carcinogenesis
      (4) Chronic inflammation
      (5) Tumor biology including the potential for metastases
   b. Chemotherapy
      (1) Classes of drugs
      (2) Mechanisms of action
      (3) Toxicities
      (4) Combination therapy and available protocols
   c. Radiation therapy
      (1) Applied physics and technology
      (2) Mechanism of action
      (3) Toxicity
      (4) Combination protocols with chemotherapy
   d. Multidisciplinary management
      (1) Relative roles of surgery, ablation, chemotherapy and radiation therapy as:
         (a) Definitive management
         (b) Neo- and adjuvant therapy
         (c) Therapy for recurrent disease
         (d) Palliative therapy

3. Clinical Skills
   a. Apply knowledge of tumor biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual HBP malignancies
   b. Participate regularly in multidisciplinary tumor review conferences
   c. Interact with Interventional Radiologists, Medical Oncologists, Radiation Oncologists, Oncology Nurses and Allied Health Professionals, Palliative Care Physicians and Nurses

Unit 6 – Trauma

1. Objectives: Upon completion of this unit the fellow will understand:
   a. The pathophysiology of blunt and penetrating trauma to the liver, biliary tract and portal structures, pancreas, duodenum and adjacent structures
   b. The methods of assessment and diagnosis
   c. The principles and techniques available to manage traumatic injuries
   d. The management of complications of trauma to the liver, biliary tract, pancreas and duodenum

2. Content:
   a. Liver trauma
      (1) Mechanisms of injury and presentation
      (2) Diagnosis and classification of liver lacerations
      (3) Management
         (a) Angiography and embolization
         (b) Liver parenchyma hemostasis techniques
         (c) Total vascular exclusion +/- IVC shunt or veno-venous bypass for retrohepatic IVC and/or hepatic vein injuries
         (d) Resection
      (4) Complications: diagnosis and management
   b. Biliary tract and portal structures
      (1) Mechanisms of injury and presentation
         (a) "External" trauma
         (b) Operative injury during cholecystectomy
      (2) Investigation, diagnosis and classification of bile duct injuries
         (a) Identification of associated injuries
      (3) Management
         (a) Timing and role of ERCP + stent and PTBD
         (b) Principles and techniques of biliary reconstruction
      (4) Complications: diagnosis and management
   c. Pancreatic and duodenal trauma
      (1) Mechanisms of injury and presentation
      (2) Investigation, diagnosis
         (a) Identification of pancreatic duct disruption
         (b) Identification of duodenal injury
      (3) Management
         (a) Indications for pancreatic resection
         (b) Techniques for repair of duodenal injuries
      (4) Complications: diagnosis and management

3. Clinical Skills
   a. Consult and manage patients with blunt and penetrating trauma to the upper abdomen
   b. Evaluate injuries to the liver, biliary tract, porta, pancreas and duodenum
   c. Evaluate post-cholecystectomy injuries to the bile duct and determine a management strategy

d. Perform emergency and elective operative procedures to resole and/or repair injuries to the liver, bile duct, portal structures, pancreas, and duodenum
e. Manage complications of operative intervention

Unit 7 – Transplantation

1. Objectives: Upon completion of this unit the fellow will have a working knowledge of:
    a. Organ procurement and preservation
    b. Indications for liver transplantation
    c. Outcomes including complications of transplantation
    d. Immunosuppression and its toxicities

2. Content:
    a. Organ procurement
        (1) Brain death and donor management
            (a) Deceased donor hepatectomy and pancreatectomy
        (5) Living donor assessment
            (a) Living donor left or right hepatectomy
    d. Organ preservation
        (1) Principles and application
    e. Transplantation
        (1) Indications for liver transplantation
            (a) Acute and chronic liver failure
            (b) Hepatocellular carcinoma and other liver tumors
            (c) Childs' and MELD scores and organ allocation
        (2) Liver
            (a) Transplant hepatectomy
            (b) Liver transplant techniques
        (3) Pancreas
            (a) Back bench reconstruction
            (b) Pancreas transplant
        (4) Immunosuppression
            (a) Drugs, mechanisms of action, toxicities and combination therapy
        (5) Complications of transplantation
            (a) Surgical
            (b) Infectious
            (c) Immunologic

3. Clinical Skills:
    a. Apply understanding of liver transplantation to recommend a liver transplant to the appropriate patient at the appropriate time
    b. Recognize the oncologic impact of immunosuppression on recurrence of hepatocellular carcinoma following liver transplantation and the increased risk of de-novo malignancies