Preamble
The General and Hepatobiliary Surgery (Orange) Service emphasizes clinical assessment, diagnostic evaluation and management of patients with a variety of hepatic, biliary and pancreatic problems. The resident is exposed to other general surgical conditions as well. Orange Service provides the resident with the unique opportunity to experience continuity of patient care beginning in the ambulatory surgical clinic, continuing in the operating room and culminating in hospital discharge and early follow-up.

General Objectives
Upon completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident is expected to acquire the Knowledge (cognitive), clinical and technical skills (psychomotor) and attitudes (affective) essential to the CanMEDS roles/competencies pertinent to the General and Hepatobiliary Surgery Service rotation, including gender-related and ethnic perspectives.

The junior resident should strive to become competent as a team leader in the day-to-day perioperative management of patients on the Service.

The senior/chief resident should aim to demonstrate complete competence as a consultant in General Surgery, including authoritative team leadership and the provision of thoughtful, appropriate and complete management of general and (most) hepatobiliary surgical cases. Furthermore, he/she is charged with contributing to the education of more junior trainees by initiating discussions around appropriate clinical cases on a regular basis.

Specific Objectives
At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will have acquired the following competencies and will function as:

Medical Expert

- Establish and maintain clinical knowledge, skills and attitudes appropriate to the General and Hepatobiliary Surgery rotation
  - Apply knowledge of the clinical, socio-behavioral and fundamental biomedical sciences relevant to the General and Hepatobiliary Surgery rotation

The resident in General Surgery is required to attain sufficient knowledge as follows:

Basic/General Areas

- Medical problems in the surgical patient, including:
  - Preoperative assessment
  - Preparation for specific operative interventions
  - Antimicrobial prophylaxis
  - Anticoagulation/thromboembolic prophylaxis
  - Corticosteroid management
  - Diabetes management
- Conduct of a surgical procedure, including:
  - General principles
  - Specific operative interventions
- Postoperative care, including:
  - Prevention and treatment of postoperative infections
  - Management of cardiac/hypertensive complications
  - Management of pulmonary complications
  - Management of thromboembolic complications
  - Management of endocrine/metabolic problems (e.g. diabetes)
  - Management of fluid and electrolyte/renal problems
- Wound management and healing
- Sepsis and surgical infections
- Hemostasis and use of blood products
- Fluid management and acid-base problems
- Metabolic and nutritional care
Liver anatomy, including:
- Lobar/segmental anatomy
- Vascular anatomy
- Microscopic anatomy, including:
  - Functional unit
  - Hepatocyte

Hepatic physiology, including:
- Metabolism, including:
  - Carbohydrate metabolism
  - Lipid metabolism
  - Protein metabolism
  - Bilirubin metabolism
  - Vitamin metabolism
  - Drug/toxin metabolism
- Bile formation/secretion
- Coagulation
- Reticuloendothelial system

Assessment of liver function

Liver imaging, including:
- Ultrasound
- CT
- MRI

Interventional diagnostic radiology, including:
- Needle biopsy
- Angiography
- CT arterial portography

Presentation, principles of assessment and diagnostic strategy in the patient presenting with a liver mass

Presentation, pathophysiology, principles of assessment, diagnostic strategy, specific management, complications of disease and intervention and expected outcomes of common liver disorders, including:
- Infectious diseases, including:
  - Pyogenic abscess
  - Amoebic abscess
  - Hydatid cyst
- Benign neoplasms, including:
  - Liver cell adenoma
  - Focal nodular hyperplasia
  - Hemangioma
  - Hamartoma
  - Simple cyst/polycystic liver disease
- Malignant neoplasms, including:
  - Hepatocellular carcinoma
  - Metastatic tumors, including:
    - Colorectal tumors
    - Neuroendocrine tumors
    - Non-colorectal, non-neuroendocrine tumors

Principles of liver resection, including:
- Indications/contraindications
- Technical aspects of the following:
  - Wedge resection
  - Right hepatectomy
  - Left hepatectomy
  - Extended right hepatectomy (right trisegmentectomy)
  - Left lateral segmentectomy
  - Extended left hepatectomy (left trisegmentectomy)
- Perioperative patient care
- Complications of the above procedures
- Expected outcomes

Non-resectional therapeutic interventions, including:
- Percutaneous abscess/cyst drainage
- Ablation of hepatic neoplasms, including:
  - Embolization
  - Radiofrequency ablation (RFA)
- Hepatic artery catheterization for chemotherapy

Surgical complications of cirrhosis and portal hypertension, including:
- Anatomy, physiology and pathophysiology of portal hypertension
- Evaluation of the patient with cirrhosis
- Principles of assessment and management of variceal hemorrhage, including:
  - Endoscopic management
Balloon tamponade
Pharmacotherapy
Transjugular intrahepatic portosystemic Shunt (TIPS)
Portosystemic shunts
Liver transplantation

Biliary Tract
- Biliary tract anatomy, including:
  - Extrahepatic biliary tract
  - Common anomalies/variations
  - Vascular anatomy
- Biliary tract physiology, including:
  - Bile ducts
  - Gallbladder
  - Bile composition and function
  - Biliary motility
- Bacteriology of the biliary tract/antibiotic selection
- Biliary tract imaging, including:
  - Ultrasound/endoscopic ultrasound
  - CT
  - MRI/MRCP
  - Biliary scintigraphy
  - ERCP
  - Percutaneous transhepatic cholangiography
- Interventional therapeutic radiology/endoscopy, including:
  - Percutaneous biliary drainage/stenting/lithotripsy
  - ERCP therapeutic techniques
- Obstructive jaundice, including:
  - Differential diagnosis
  - Diagnostic evaluation/strategy
  - Principles of management
- Presentation, pathophysiology, principles of assessment, diagnostic strategy, specific management, complications of disease and intervention and expected outcomes of common non-emergent biliary tract disorders, including:
  - Calculous biliary disease, including:
    - Gallstone pathogenesis
    - Diagnosis of gallbladder disease
    - Laparoscopic/open cholecystectomy, including:
      - Indications
      - Technical considerations
      - Complications
      - Outcomes
    - Choledocholithiasis
    - Laparoscopic/open common bile duct exploration, including:
      - Indications
      - Technical considerations
      - Complications
      - Outcomes
  - Polypoid lesions of the gallbladder
  - Bile duct injury, including:
    - Classification
    - Approach to diagnosis/management
    - Surgical/technical considerations
  - Choledochal cyst, including:
    - Classification
    - Approach to diagnosis/management
    - Surgical/technical considerations
  - Gallbladder cancer
  - Cholangiocarcinoma, including:
    - Classification
    - Staging
    - Surgical/technical considerations
    - Palliative management

Pancreas
- Pancreatic anatomy, including congenital anomalies
- Pancreatic physiology, including:
  - Exocrine function
  - Endocrine function
  - Assessment of pancreatic exocrine/endocrine function
Pancreatic imaging, including:
- Ultrasound/endoscopic ultrasound
- CT
- MRI/MRCP
- Scintigraphy
- Angiography/portal venous sampling
- ERCP

Interventional therapeutic radiology/endoscopy, including:
- Percutaneous cyst drainage
- ERCP therapeutic techniques

Presentation, pathophysiology, principles of assessment, diagnostic strategy, specific management, complications of disease and intervention and expected outcomes of common non-emergent disorders of the pancreas, including:
- Chronic pancreatitis, including:
  - Approach to diagnosis/management
  - Surgical/technical considerations
  - Pain management strategies
- Benign exocrine tumors
- Pancreatic adenocarcinoma, including:
  - Staging
  - Pancreatoduodenectomy, including:
    - Indications/contraindications/resectability
    - Technical considerations
  - Resectional surgery for tumors of the body/tail
  - Palliative surgical management
  - Chemoradiation therapy for palliation
- Islet cell tumors, including:
  - Insulinoma
  - Gastrinoma/Zollinger-Ellison syndrome
  - VIPoma (Verner-Morrison syndrome)
  - Glucagonoma
  - Somatostatinoma
  - Multiple endocrine neoplasia (MEN)

With respect to the above outline of cognitive objectives:
- The PGY-1 resident and the junior resident will be able to outline the initial management of the listed conditions
- The senior/chief resident will be able to describe the listed conditions beyond initial management, including operative procedures, perioperative considerations, complications, expected outcomes and follow-up
- **Perform a complete and appropriate assessment of the general/hepatobiliary surgical patient**
  - Elicit a history that is relevant, concise and accurate
  - Perform a focused physical examination that is relevant and accurate
  - Select medically appropriate investigations in a resource-effective and ethical manner
  - Demonstrate effective clinical problem solving and judgment to address the problems, including interpreting available data and integrating information to generate differential diagnoses and management plans
- **Use preventive and therapeutic interventions effectively**
  - Implement an effective and prioritized management plan for the general/hepatobiliary surgical patient
  - Demonstrate effective, appropriate and timely application of therapeutic interventions relevant to the General and Hepatobiliary Surgery (Orange) Service rotation
  - Ensure appropriate informed consent is obtained for therapies

The PGY-1 resident and the junior resident will be able to:
- Perform many of the above clinical skills
- Initiate well thought-out and appropriate management strategies; will require corroboration or modification by a more senior individual

The senior/chief resident will be able to:
- Perform the above clinical skills
- Formulate management strategies completely

- **Demonstrate proficient and appropriate use of procedural skills**
  - Demonstrate effective, appropriate and timely performance of diagnostic procedures relevant to the General and Hepatobiliary Surgery (Orange) Service rotation
  - Demonstrate effective, appropriate and timely performance of therapeutic procedures relevant to the General and Hepatobiliary Surgery (Orange) Service rotation
  - Ensure appropriate informed consent is obtained for procedures
- Appropriately document and disseminate information related to procedures performed and their outcomes
- Ensure adequate follow-up is arranged for procedures performed
- Compile and maintain an accurate and complete electronic data base of all operative procedures performed on the General and Hepatobiliary Surgery (Orange) Service rotation

Having completed the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to demonstrate technical competence for the following procedures:

(Designation is listed as to expectation of Surgeon (S) or Assistant (A) for each procedure and for each level of training)

<table>
<thead>
<tr>
<th>Operative Procedures</th>
<th>PGY-1</th>
<th>Junior</th>
<th>Senior/Chief</th>
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</thead>
<tbody>
<tr>
<td><strong>General Diagnostic and Therapeutic Procedures</strong></td>
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<tr>
<td>Venipuncture/venous cutdown</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Central venous catheter insertion</td>
<td>S</td>
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<td>S</td>
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<tr>
<td>Urinary catheter insertion</td>
<td>S</td>
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<td>S</td>
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<tr>
<td>Nasogastric tube insertion</td>
<td>S</td>
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<tr>
<td><strong>Endoscopic Procedures</strong></td>
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<tr>
<td>Esophagogastroduodenoscopy</td>
<td>NA</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Colonoscopy</td>
<td>NA</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Endoscopic polypectomy</td>
<td>NA</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Percutaneous endoscopic gastrostomy (PEG)</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td><strong>Gastrointestinal Procedures</strong></td>
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<tr>
<td>Open partial gastric resection with Billroth I/Billroth II/Roux-en-y reconstruction</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Open total gastrectomy</td>
<td>A</td>
<td>A</td>
<td>S</td>
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<tr>
<td>Open gastroenterotomy</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Open surgical gastrostomy techniques</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td><strong>Small Intestinal Procedures</strong></td>
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<tr>
<td>Open enterostomy (end/loop/feeding)</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Open small intestinal resection/anastomosis</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Open enteranastomosis</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Strictureplasty for Crohn’s disease</td>
<td>A</td>
<td>A/S</td>
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<tr>
<td><strong>Colon and Rectal Procedures</strong></td>
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<tr>
<td>Open colostomy (end/loop)</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Colostomy closure</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Open colonic resection/anastomosis (segmental/subtotal)</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Anterior resection with total mesorectal excision (TME)</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Abdominoperineal resection with total mesorectal excision (TME)</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Takedown of Hartmann</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td><strong>Liver Procedures</strong></td>
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<tr>
<td>Open liver biopsy</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Wedge excision of liver lesion</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Left lateral segmentectomy</td>
<td>A</td>
<td>A/S</td>
<td>S</td>
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<tr>
<td>Left hepatic lobectomy</td>
<td>A</td>
<td>A</td>
<td>A/S</td>
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<tr>
<td>Left trisegmentectomy</td>
<td>A</td>
<td>A</td>
<td>A/S</td>
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<tr>
<td>Right hepatic lobectomy</td>
<td>A</td>
<td>A</td>
<td>A/S</td>
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<tr>
<td>Right trisegmentectomy</td>
<td>A</td>
<td>A</td>
<td>A/S</td>
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<tr>
<td>Open radiofrequency ablation of liver lesion</td>
<td>A</td>
<td>A</td>
<td>A/S</td>
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<tr>
<td>Open decompression/management of liver abscess/cyst</td>
<td>A</td>
<td>A</td>
<td>S</td>
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<tr>
<td><strong>Gallbladder and Biliary Tract Procedures</strong></td>
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<tr>
<td>Laparoscopic cholecystectomy and cholangiography</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Open cholecystectomy and cholangiography</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Open cholecystostomy</td>
<td>A</td>
<td>S</td>
<td>S</td>
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<tr>
<td>Open common bile duct exploration</td>
<td>A</td>
<td>A</td>
<td>S</td>
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<tr>
<td>Biliary-intestinal anastomosis for tumour/stricture/bile duct injury</td>
<td>A</td>
<td>A</td>
<td>S</td>
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<tr>
<td>Operative management of choledochal cyst/neoplasm</td>
<td>A</td>
<td>A</td>
<td>A/S</td>
</tr>
<tr>
<td><strong>Pancreatic Procedures</strong></td>
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</tbody>
</table>
Open drainage of pancreatic pseudocyst by anastomosis to stomach or intestine  
A   A/S          S

Puestow procedure  
A   A          S

Local excision of pancreatic lesion  
A   A          S

Distal pancreatectomy  
A   A/S          S

Pancreaticoduodenectomy (Whipple procedure)  
A   A          A/S

<table>
<thead>
<tr>
<th>Hernia and Abdominal Wall Procedures</th>
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<tbody>
<tr>
<td>Elective open repair of inguinal hernia using tension-free mesh technique</td>
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<tr>
<td>A          S          S</td>
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<tr>
<td>Elective open repair of femoral hernia using tension-free mesh technique</td>
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<tr>
<td>A          S          S</td>
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<tr>
<td>Open repair of ventral (incisional) hernia</td>
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<tr>
<td>A          S          S</td>
</tr>
<tr>
<td>Repair of parastomal hernia</td>
</tr>
<tr>
<td>A   A/S          S</td>
</tr>
</tbody>
</table>

- Seek appropriate consultation from other professionals
  - Demonstrate insight into his/her own limitations of expertise by self-assessment
  - Demonstrate effective, appropriate and timely consultation of another health professional as needed for optimal patient care
  - Arrange appropriate follow-up care services for a patient and his/her family

Communicator

At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to:

- **Develop rapport, trust and ethical therapeutic relationships with patients and families**
  - Establish positive therapeutic relationships with patients and their families that are characterized by understanding, trust, respect, honesty and empathy
  - Respect patient confidentiality, privacy and autonomy
  - Listen effectively
- **Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues and other professionals**
  - Seek out and synthesize relevant information from other sources such as the patient’s family, caregivers and other professionals
- **Accurately convey relevant information and explanations to patients and families, colleagues and other professionals**
  - Deliver information to the patient and family, colleagues and other professionals in a humane and understandable manner
- **Convey effective oral and written information**
  - Maintain clear, accurate, appropriate and timely records of clinical encounters and operative procedures involving the general and hepatobiliary surgical patients
  - Maintain an accurate, complete and up-to-date electronic database (log) of operative procedures performed during the General and Hepatobiliary Surgery (Orange) Service rotation
  - Effectively present verbal reports of clinical encounters and medical information during the General and Hepatobiliary Surgery (Orange) Service rotation

Collaborator

At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to:

- **Participate effectively and appropriately in an interprofessional healthcare team**
  - Recognize and respect the diversity of roles, responsibilities and competence of other professionals in the management of the general/hepatobiliary surgical patient
  - Work with others to assess, plan, provide and integrate care of the general/hepatobiliary surgical patient
  - Demonstrate leadership on the General and Hepatobiliary Surgery (Orange) service

Manager

At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to:

- **Manage his/her professional and personal activities effectively**
  - Set priorities and manage time to balance professional responsibilities, outside activities and personal life
  - Employ information technology effectively (e.g. electronic surgical procedure database)
- **Demonstrate an understanding of cost-effectiveness in patient management**
  - Utilize hospital resources wisely when managing general/hepatobiliary surgical patients
Serve in leadership roles, as appropriate
  - Participate effectively at teaching rounds and other meetings

**Health Advocate**

At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to:

**Respond to the needs of the general/hepatobiliary surgical patient**
  - Identify health needs of an individual patient
  - Identify opportunities for advocacy, health promotion and disease prevention (e.g., promotion of healthy lifestyle for the prevention of liver/pancreatic disease)

**Scholar**

At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to:

- **Maintain and enhance professional activities through ongoing learning**
  - Pose an appropriate learning question
  - Access and interpret the relevant evidence
  - Integrate new learning into development as a general surgeon
- **Critically evaluate medical information and its sources and apply this appropriately to clinical decisions**
  - Critically appraise the general/hepatobiliary surgery evidence in order to address a clinical question
  - Integrate critical appraisal conclusions into clinical care
- **Facilitate the learning of students and residents**
  - Demonstrate an effective presentation while assigned to the General and Hepatobiliary Surgery (Orange) Service
  - Provide effective feedback to faculty, residents and students

**Professional**

At the completion of the General and Hepatobiliary Surgery (Orange) Service rotation, the General Surgery resident will be able to:

- **Demonstrate a commitment to patients through ethical practice**
  - Exhibit appropriate professional behaviors, including honesty, integrity, commitment, compassion, respect and altruism
  - Appropriately manage conflicts of interest
  - Recognize the principles and limits of patient confidentiality
  - Manage appropriate relations with patients
- **Demonstrate a commitment to physician health**
  - Balance personal and professional priorities
  - Strive to heighten personal and professional awareness and insight