HepAPPtology

Kelly Warren Burak

About HepAPPtology

HepAPPtology (HepAPP) is an electronic resource to facilitate the learning of Hepatology. Although first developed for the Undergraduate Medical Education (UME) curriculum at the University of Calgary (UofC), HepAPP will be a useful resource for other trainees and practicing health care providers who wish to learn more about the diagnosis and management of liver disease.

The UME curriculum at the University of Calgary uses "**schemes"** to help organize an approach to clinical presentations (https://blackbook.ucalgary.ca/).

Why use Schemes?

Experts use mental frameworks or "schemes" to organize knowledge in memory and to help solve clinical problems. Research has shown that using "schemes" enhances memory organization and improves the diagnostic success of trainees when approaching clinical cases.

Coderre S, Mandin H, Harasym PH, Fick GH. Diagnostic reasoning strategies and diagnostic success. *Med Educ* 2003; 37(8): 695-703.

At the UofC, we utilize a "**Flipped Classroom**" approach to teach Hepatology to first year medical students. Video podcasts **(vodcasts)** replace traditional lectures. They are viewed at home prior to doing "homework" in the classroom in the form of an interactive **workshop.** We utilize online-simulated cases, with MCQs and immediate feedback, using "**Cards**" (https://cards.ucalgary.ca/). During the workshop, there is considerable peer-based learning, and the instructors receive immediate results of performance on the MCQs. We can then clarify teaching points if needed.

Why use the Flipped Classroom?

Students in the flipped classroom had better performance on the Hepatology content of the end-of-course examination [78.0% (11.7%) vs. 74.2 (15.1%), $p < 0.01$]. In the words of one student: "*…I hated it while I was learning it, but boy did I remember it…*"

Burak KW, Raman M, Page M, Busche K, Coderre S, McLaughlin K. A Mixed Methods Study on the Effect of Flipping the Undergraduate Medical Classroom. *Educ Sci* 2017**;** *7*(4): 83 https://doi.org/10.3390/educsci7040083

How to use HepAPPtology

The three **Modules** in HepAPP each consist of seven **Vodcasts**. Information that is more detailed is located in the fifteen **Chapters**. A workshop follows each module for active peer-based learning. Information learnt in the vodcasts and chapters is reinforced by using **Cards**, which can be replayed multiple times until mastery of the material is obtained. Below you will find a Table of Contents (vodcasts & chapters) and the learning objectives for the vodcasts & workshops. *Pre-clerkship medical students are responsible for learning the material presented in the vodcasts, as the information in the chapters is a reference for later use during clinical training*. For additional information, please refer to the practice guidelines from CASL, AASLD, EASL, ACG, and AGA, on which HepAPP is based (**Resources**).

I hope you enjoy HepAPPtology and find it helpful in learning about the liver!

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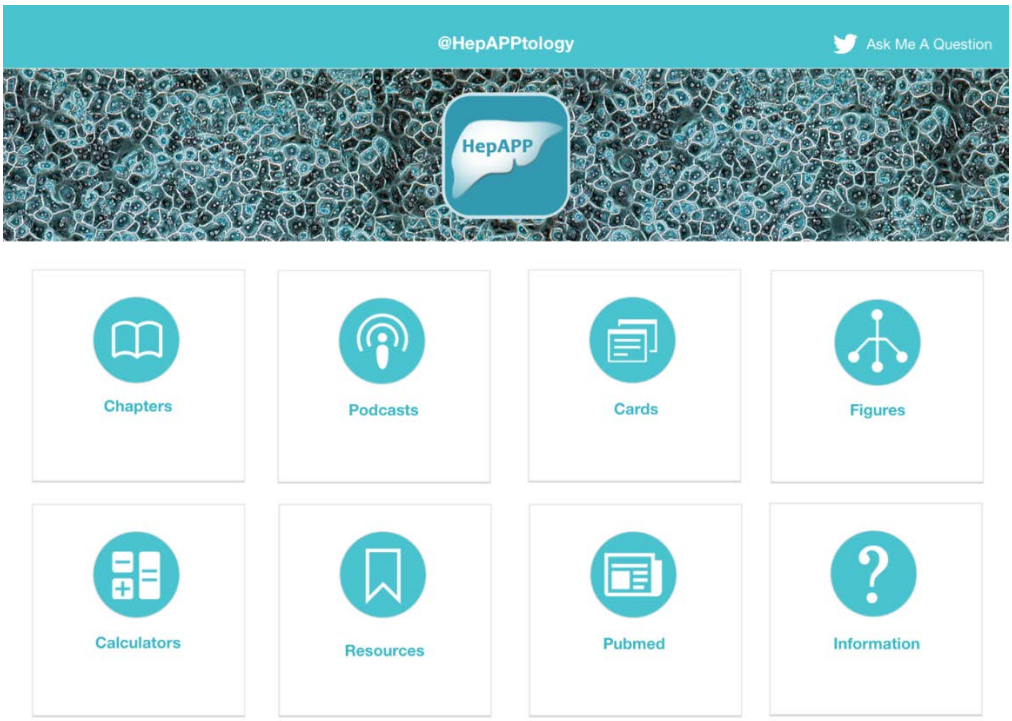
Screenshot of HepAPP



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Robots & Pencils
WE MAKE APPS.™

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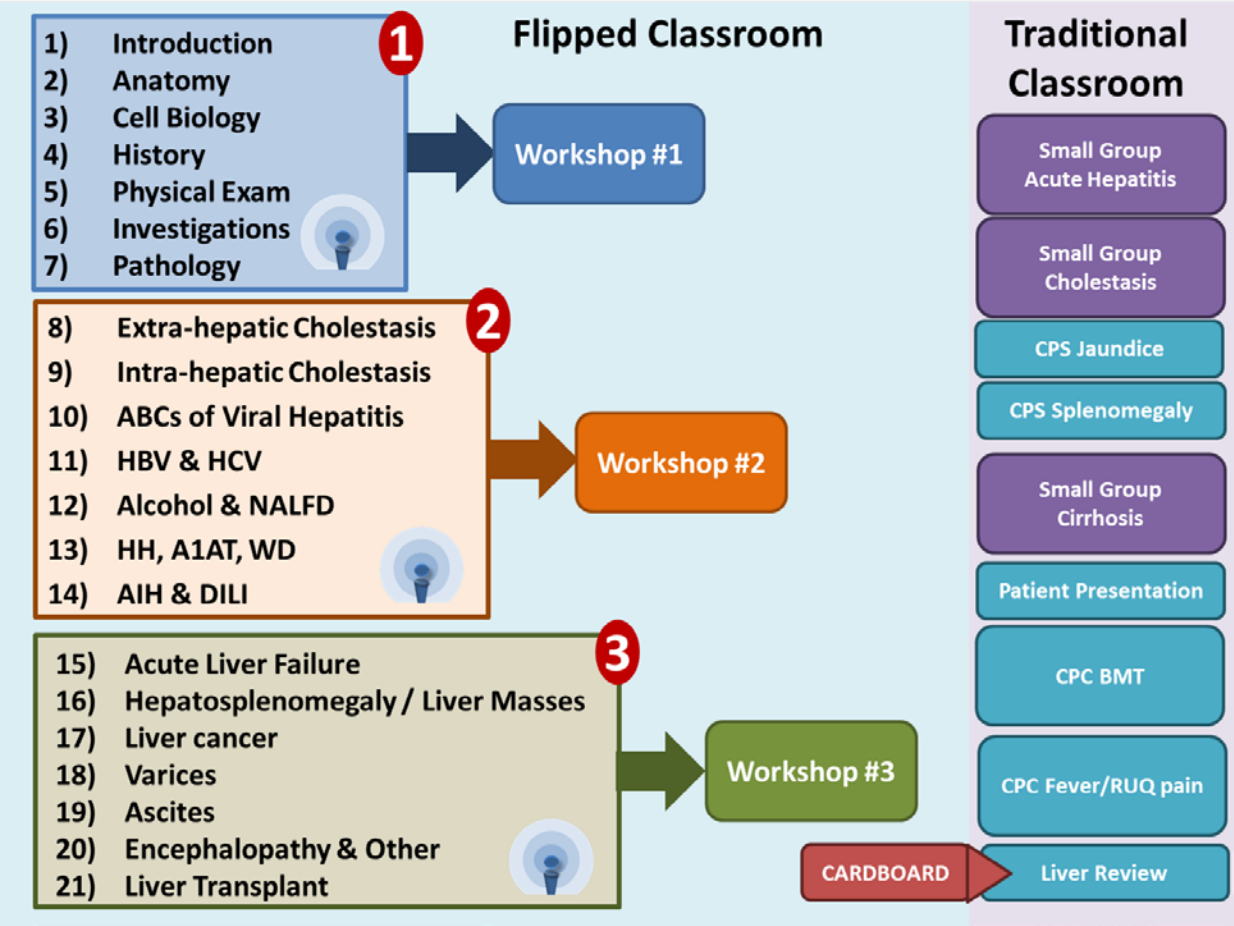

Evaluation of First Liver Flipped Classroom

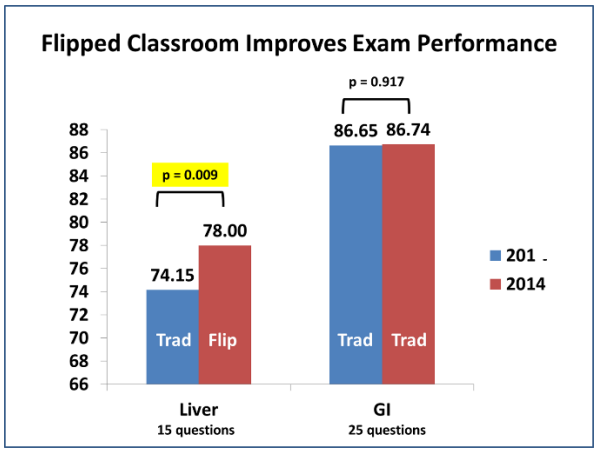

Table of Content – Vodcasts

Module 1 – Introduction to the Liver and Liver Disease

Module 2 – Cholestatic and Hepatocellular Liver Diseases

Module 3 – Acute and Chronic Liver Failure

Table of Content – Chapters

Learning Objectives

Module 1

Vodcasts

- Describe the normal anatomy of the liver
- Recognize the importance of the portal circulation
- Describe normal liver histology including the liver acinus and lobule
- List the basic functions of the liver
- Describe bilirubin metabolism
- List the components and functions of bile
- Recognize the natural history of liver disease
- Describe the important aspects of history taking from a patient with liver disease
- List the clinical stigmata of chronic liver disease (CLD)
- Identify which stigmata of CLD are due to portal hypertension vs ↓ liver function vs ↑ estrogen
- Describe the physical examination of the liver & spleen and how to detect ascites
- Recognize the patterns of hepatocellular and cholestatic liver tests
- Describe an approach to jaundice and abnormal liver tests
- List the tests to screen for chronic liver diseases
- Describe how a liver biopsy is done and recognize the risks of a liver biopsy
- Describe a system for grading and staging of liver pathology
- Recognize non-invasive alternatives to liver biopsy

Workshop 1

- Review the key features of history taking in patients with chronic liver disease
- List the physical exam findings of chronic liver disease and identify which are due to portal hypertension, decreased hepatic function or the high estrogen state of cirrhosis
- Describe an approach to abnormal liver tests and how to screen for chronic liver disease

Module 2

Vodcasts

- Define cholestasis and differentiate between intra-hepatic and extra-hepatic
- Recognize the imaging modalities for the biliary system
- Describe the clinical presentations and management of gallstones
- Recognize the clinical features of cholestasis and describe the management of pruritus
- List the common causes of intrahepatic cholestasis
- Identify liver biopsy findings of cholestasis
- Describe the diagnosis and management of primary biliary cirrhosis and primary sclerosing cholangitis (PSC)
- List the complications of PSC
- Describe the management of PSC
- Review the global prevalence, transmission, risk factors and testing for Hepatitis A, B, C, D, E
- Identify other non A-E causes of viral hepatitis including EBV and CMV
- Describe HBV replication and interpret HBV serology
- Outline the natural history of HBV and HCV
- List indications for therapy and the treatment options for chronic HBV & HCV
- List three clinical presentations associated with excessive alcohol use
- Describe the prognosis and management of alcoholic hepatitis
- Identify the 3 major risk factors for NAFLD
- Understand the pathogenesis and natural history of NAFLD
- Outline the management of NAFLD
- Describe the genetic mutations and pathophysiology of HH, WD, and A1AT deficiency
- List the organs affected by these conditions
- Describe the management of HH, WD, and A1AT deficiency

- Describe the clinical and lab features of autoimmune hepatitis (AIH)
- Outline the treatments for AIH and list common side-effects of corticosteroid therapy
- Categorize the types of drug induced liver injury and describe how acetaminophen can lead to liver injury

Workshop 2

- Differentiate extra- and intra-hepatic causes of cholestasis and how they are investigated
- Describe the natural history of perinatal acquired Hepatitis B virus, interpret HBV serology and decide who needs therapy
- Describe an approach to the evaluation of a patient with chronic elevation of liver tests

Module 3

Vodcasts

- Define acute liver failure and list the major causes
- Describe the management of ALF
- Recognize acute on chronic liver failure
- Describe an approach to hepatomegaly and splenomegaly
- Recognize portal hypertension as a major cause of splenomegaly
- Describe an approach to liver masses
- Recognize the significant burden of HCC and identify groups that should undergo surveillance
- Describe the diagnosis and multidisciplinary management of HCC & CCA
- Describe the risks for bleeding varices and how we can prevent this
- List three interventions that can save lives during acute GI bleeding in cirrhotics
- Recognize PHG and GAVE and describe their management
- List the causes of high gradient versus low gradient ascites
- Describe the pathogenesis and management of ascites in cirrhotic patients

- Recognize the complications of SBP and HRS and their management
- Define and classify hepatic encephalopathy
- Describe the pathogenesis and the management of encephalopathy
- List the other complications of cirrhosis and recognize the importance of nutrition
- Identify scoring systems to predict prognosis for cirrhotic patients
- Describe the indications for liver transplant and strategies to increase the organ donation
- Recognize the need for immunosuppressive drugs and their side effects

Workshop 3

- Describe a scheme for hepatomegaly and liver masses
- Recognize the four major complications of cirrhosis
- Describe the diagnosis of HCC
- Describe the management of variceal bleeding, encephalopathy and ascites

Liver Review Vodcasts

- Review history, PE, lab, biopsy findings of patients with liver disease
- Review the schemes relevant to Hepatology
- Review the important diagnostic features and management of the most common liver diseases
- Review the 4 major complications of cirrhosis and their management