

# PED 7160 Pediatric Hematology/Oncology Syllabus

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## Contact Information

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## Course Information

### Brief Description of Course

Welcome to pediatric hematology and oncology! This rotation is an opportunity to see and learn about the wide variety of hematologic and oncologic problems. You'll split time between our outpatient hematology clinic and our outpatient oncology clinic.

In the hematology clinic, you'll see many common benign hematology problems including hemophilia, anemia, ITP/thrombocytopenia, hemoglobinopathies and neutropenia. Since most of these patients rarely get admitted to the hospital, this is a great opportunity to see many common problems that occur in general pediatrics. In the oncology clinic, you can expect to see children presenting for consult with concerns of malignancy, children for follow up after completing cancer therapy and children receiving outpatient chemotherapy since treatment for many common childhood malignancies such as acute lymphoblastic leukemia is almost entirely outpatient.

We also routinely do lumbar punctures for intrathecal chemotherapy and bone marrow aspirates and will try to arrange time for you to observe or perform these procedures.

### Course Goals

As a result of successfully completing this course, students will be able to:

#### Required Objectives:

- Understand the role of the pediatrician in preventing some of the acquired hematological disorders, and in counseling and screening individuals at risk for hematological and oncologic diseases.
  - Provide routine preventive counseling about hematology to all patients and families.
  - Provide preventive counseling to parents and patients with specific hematology/oncology conditions.
  - Provide regular hematology/oncology screening for patients.
- Distinguish normal from pathologic states of the hematological and lymphatic systems.
  - Describe the developmental changes in the hematological indices of the normal infant and child at various ages and point out the difference from the values in adults.
  - Explain the findings on clinical history and examination that suggest a hematologic or oncologic disease that requires further evaluation and treatment.
  - Interpret clinical and laboratory tests to identify hematologic or oncologic disease.
  - Explain indications for central venous access and arterial access.
  - Explain the findings on peripheral blood film examination in various disease processes, involving any of the three cell elements in the blood (the RBC, WBC, and platelets).
  - Explain the interpretation of a bone marrow aspirate in health and common disease of childhood and the difference from adult's normal bone marrow.
- Evaluate, treat, and/or refer patients with presenting signs and symptoms that may indicate a hematologic or oncologic disease process.
  - Develop a strategy to determine if the presenting signs and symptoms are caused by a hematology/oncology disease process and determine if the patient needs treatment or referral
    - Presenting signs may include: Fatigue/malaise, Fever, Bruising/bleeding, Headache, Limb pain/limp, weight loss, Seizure, Lymphadenopathy, Hepatomegaly and/or splenomegaly, Abdominal pain, Vomiting, Dizziness and gait disturbances, Nevi manifestation and others.

4. Diagnose and manage patients with hematological disorders that generally do not need referral.
  - Diagnose, explain, and manage appropriate hematologic or oncologic conditions:
    - Iron deficiency
    - Sickle cell/Hgbs, Hb, C, E, D, E or other rare abnormal hemoglobins.
    - Imbalance of globin chains such as alpha and beta thalassemia, traits, intermedia or major.
    - Transient erythrocytopenia of childhood (TIC)
    - Minor, common reactions to blood transfusions
    - Benign bone cyst
    - Un-complicated Idiopathic thrombocytopenic purpura (ITP)
  
5. Diagnose and initiate management of patients with hematological or oncological disorders that generally need referrals.
  - Identify, explain, initially manage, and seek consultation or refer appropriate hematology/oncology conditions, such as:
    - Anemia (exclusive of common iron deficiency or transient erythropenia)
    - Abnormal bruising or bleeding (inherited and acquired)
    - Major complications of inherited bleeding disorders
    - Hemoglobinopathies (sickle cell and other sickling disorders), including severe pain crisis, fever, stroke, sequestration, and aplastic crises
    - Urgent conditions in children under treatment for cancer, including fever and neutropenia, chicken pox exposure or illness, bleeding
    - Neutropenia
    - Thrombocytopenia including ITP, TTP, HUS and others.
    - Hemolytic disease of the newborn caused by various etiologies; blood groups incompatibilities, inherited hemolytic anemia due to membrane defects or enzymopathy, sepsis, and others
    - Neonatal hemolytic jaundice and other hematological disorders in the neonate
    - Abdominal masses
    - Mediastinal masses
    - Lytic bone lesions
    - Suspected or confirmed CNS tumor
    - Conditions that might predispose to malignancy (e.g., neurofibromatosis, Bloom syndrome (retinoblastoma), Down's syndrome, McCune Albright, and familial cancer)
    - Coagulation disorders and suspected venous thrombotic events (VTE)
  - In cases of serious or life-threatening disease, counsel the patient's families with sensitivity to their desire and need to know
  - Identify the role and general scope of practice of hematology/oncology; recognize situations where children benefit from the skills of specialists trained in the care of children.
  
6. Summarize the common stages, presenting signs and symptoms, diagnostic procedures, principles of current therapy, prognosis, and long-term complications (due to disease or treatment) for common malignancies and conditions
  - Compare and contrast the common acute side effects of frequently used chemotherapeutic drugs.
  - Be familiar with adjunctive medications that increase patients' tolerance of chemotherapy such as granulocytes colony, stimulating factor (G-CSF)
  - Discuss the common late complications of childhood cancer treatment that may present in childhood or adolescence and be familiar with the availability of late-effect clinic for follow-up of such patients.
  
7. Discuss the appropriate methods of diagnosis and management of a patient with iron deficiency disorder.
  - Describe the normal requirements, absorption, and metabolism of iron from birth through adolescence.
  - Identify the common causes and features of iron deficiency (including anemia) in all age groups and compare and contrast with anemia caused by chronic inflammation.
  - Describe the diagnosis and treatment of iron deficiency and discuss the follow-up necessary to assure success in treatment.
  - Develop a treatment and education plan for managing iron deficiency. This should include dietary management, replacement therapy, parent education, and follow-up.
  
8. Understand indications for and complications related to the use of blood products.
  - Explain the appropriate indications for and potential risks of various blood products
  - Describe alternatives to blood transfusions

- Describe the indications for leukofiltration, irradiation of blood products, and use of CMV negative blood products in immunocompromised patients.
  - Summarize the signs and symptoms of a transfusion reaction. Develop an effective treatment plan to manage a transfusion reaction.
  - Be familiar with the comprehensive type and crossmatch for patients who are expected to receive blood transfusions for a long period of time.
9. Understand the general pediatrician's role in the diagnosis and management of patients with sickle cell disease.
- Explain the findings on clinical history, examination, and laboratory tests that suggest a diagnosis of sickle cell disease or one of its complications, starting with interpretation of results of cord blood screen.
  - Compare and contrast the different sickle cell syndromes.
  - Discuss the common complications seen in a child with sickle cell disease.
  - Outline the management of a patient who presents with a sickle crisis.
  - Develop a preventive care plan for a patient with a sickle disease.
  - Identify the indicators for a hematology referral in a child with sickle cell disease.
10. Technical diagnostic and therapeutic procedures.
- Describe common tests or procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.
    - Bone marrow: aspiration/biopsy
    - Central line: use/care
    - Lumbar puncture
    - Medication delivery: IV
    - Blood smear
      - to distinguish abnormalities of red blood cell, white blood cell morphology and platelet number and morphology.
      - to identify hypochromasia, polychromasia, spherocytes, schistocytes, fragmented RBCs, polychromatophilic cells, nucleated RBCs, sickle cells, atypical lymphocytes, and blast cells
    - Coombs test, direct and indirect.
    - Osmotic fragility, interpretation, and indications. EMA / Eosin-5 maleimide binding tests, a flow detecting band 3 mutations with very high specificity for the identifying of patients with hereditary spherocytosis (HS).
    - Iron studies including; TIBC, serum Fe, and saturation, serum ferritin, and soluble transferrin receptors (sTfR)
    - free erythrocyte protoporphyrin/FEP
    - fibrin degradation products
    - hemoglobin evaluation, including Hgb. A and F levels.
    - Coagulation studies: PT, PTT, PFA-100, fibrinogen, and mixing studies
    - VonWillebrand panel and multimers for patients with suggestive symptoms
    - individual factors assays including FVIII and FIX in the diagnosis of Hemophilia A&B
    - Interpretation of Thrombophilia work up including inherited risk factors for thrombosis such as factor V Leiden (FVL), prothrombin gene mutation(G20210A) and hyper-cysteinemia, or the various acquired causes of thrombosis.
    - Radiologic interpretations: abdominal ultrasound, abdominal X-ray, chest X-ray, CT of head, extremity X-ray, MRI of head, renal ultrasound, renogram and PET scans.

## Course Format & Schedule

### Timeline

#### Typical Schedule

Clinic typically starts between 8:00AM to 8:30AM so plan to report right after morning report. Our oncology clinic is located on the 4th floor of the main hospital directly across from the north elevators. The hematology clinic is located in the doorway directly west of the north elevators. We typically see patients until 4:00-5:00PM.

Every day we have 5-6 different providers actively seeing patients. You will receive a schedule with different providers to work with every day in clinic. The goal of this is to identify one provider everyday who can route you to interesting patients and be a resource to help navigate our busy clinic.

**Tips for Seeing Patients and Success in Clinic**

- Most of our patients will have been in our clinic many times before but don't be intimidated. Most families are happy to share their child's story
- In preparing for an encounter, we recommend reviewing the chart and then discussing with your preceptor the best plan for seeing the patient. In some cases, you'll see patients independently and present to your preceptor. In others it might be best to see the patient with your preceptor.
- Update your iCentra as soon as you get to clinic using the tips below to access the schedule for our providers
- We encourage you to take part in some of our multidisciplinary meetings during the week. Its great insight into how our team works together to take care of patients. We will try to provide you with updated links and a list of locations prior to your week but please ask if you don't get one.

**Conference Schedules**

	Monday	Tuesday	Wednesday	Thursday	Friday
7:30 AM		Sarcoma Rounds*			Tumor Board (1 <sup>st</sup> week) 3rd Floor Auditorium
					Heme Path (2 <sup>nd</sup> week) PCH Pathology Conference Room
					Journal Club (4 <sup>th</sup> week) Location TBD
8:00 AM		Neuro-Onc Planning Conference		Grand Rounds PCH Auditorium	Neuro-Onc tumor board (3 <sup>rd</sup> week) 3rd Floor Auditorium
12:00 PM		Heme/Onc Noon Conference Weekly			
4:00 PM	Blastoma Conference*		Leukemia/Lymphoma Conference*		

\*All meetings are available virtually right now. Ask other team members to share links and information to join in.

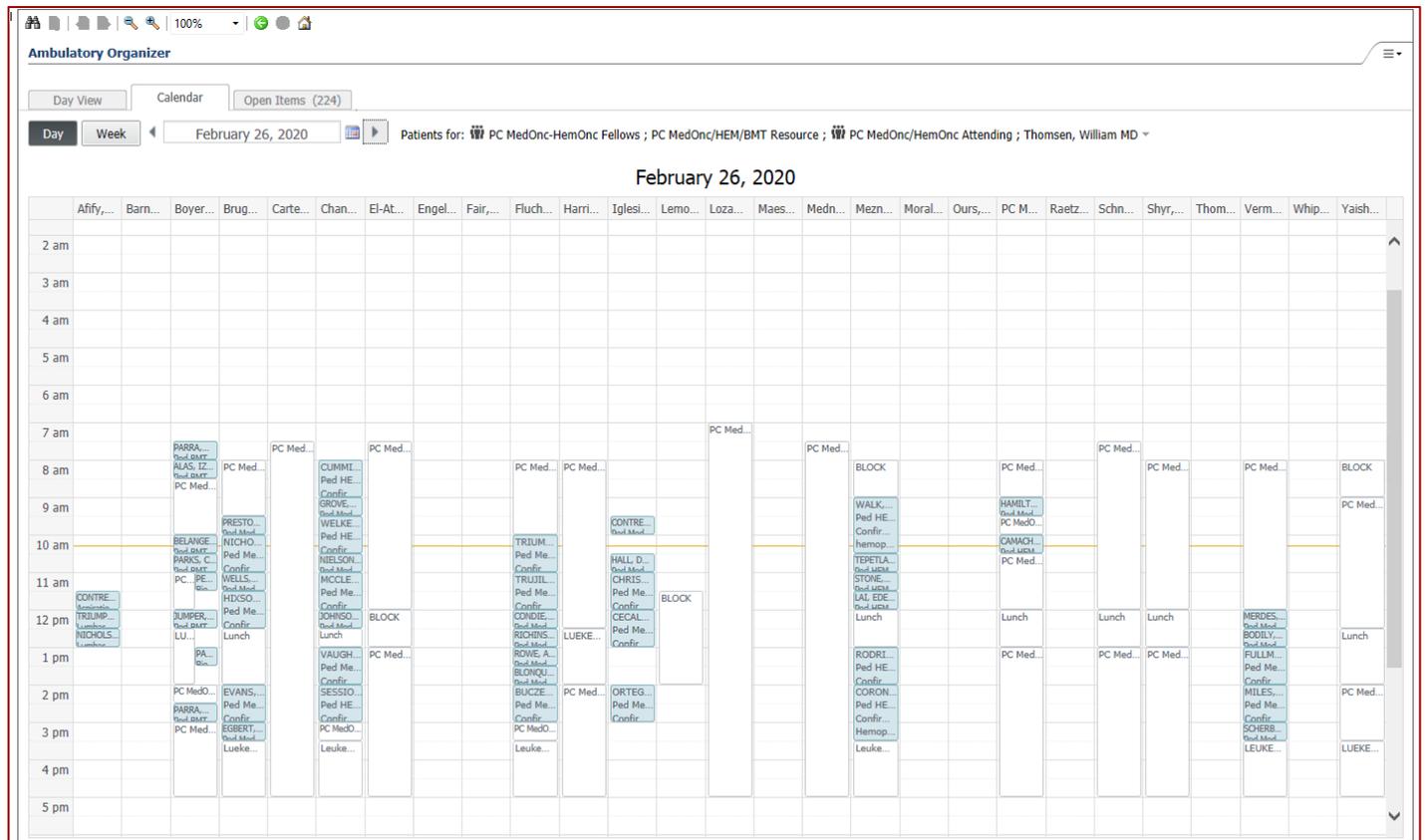
### Clinic iCentra Tips

You should set your iCentra up with the following clinic groups to view the schedule of all patients coming to clinic on a given day. The schedule is also posted on the wall daily in clinic but this will let you scout interesting patients in advance.

- PC MedOnc-HemOnc Fellows
- PC MedOnc/HemOnc Attending

Set your ambulatory organizer to calendar view on the day tab will let you see the entire clinic schedule for all providers including the doctor that is doing procedures

During the clinic the PCH HemOnc BMT Clinic tracking board which is displayed on the large monitor in clinic is useful to track as patients arrive and are placed in rooms.



### Educational and Instructional Modalities

#### Role of the Student in this Course

#### Objectives and Aims: Student Performance

##### Student Activities

- Student will see all new hematology referrals while on rotation and will examine their blood smear when appropriate.
- Students will be involved in new oncology consults when appropriate or educationally beneficial
- Student will see inpatients that arise from new or educationally interesting admissions or consults.
- Student will attend individual lecture and discussion sections

##### Student Responsibilities

- Student is responsible for reading on assigned topics

##### Attending Responsibilities

- Attendings and fellows are expected to provide reading assignments to students that meet specific objectives
- Examine the blood films of the patients being seen in consultation with the student

#### Objectives and Aims: Learning of Core Competencies

**Patient Care**

- Use logical and appropriate approach to care
- Describe general indications for subspecialty procedures and interpret results for families

**Medical Knowledge**

- Acquire, interpret, and apply the knowledge appropriate for the generalist regarding the core content of this subspecialty area.
- Critically evaluate medical information and scientific evidence related to this subspecialty area

**Interpersonal Skills and Communication**

- Provide effective patients education
- Communicate effectively with primary care and other physicians, other health professionals, and health-related agencies to create and sustain information exchange and teamwork for patient care
- Maintain accurate medical records

**Practice-based Learning and Improvement**

- Identify standardized guidelines for diagnosis and treatment of conditions common to this subspecialty area and adapt them to individual patients.
- Identify personal learning needs related to this subspecialty

**Professionalism**

- Demonstrate personal accountability to the well-being of patients
- Demonstrate a commitment to carrying out professional responsibilities.
- Adhere to ethical and legal principles and be sensitive to the diversity

**Systems-based Practice**

- Identify key aspects of health care systems as they apply to specialty care.
- Demonstrate sensitivity to the costs of clinical care in this subspecialty setting.
- Recognize and advocate for families who need assistance to deal with system complexities.
- Recognize one's limits and those of the system; take steps to avoid medical errors.

**Required Textbook(s)/Readings**

None but the hematology-oncology Canvas page has a wide variety of review articles on common hematology and oncology topics. We encourage you to read about interesting patients in advance.

<https://utah.instructure.com/courses/8978>

**Additional Resources**

Pediatric Hematology-Oncology Syllabus of selected articles: Available in ICS inpatient work/conference room, heme-onc office conference room and outpatient clinic. Double headed microscopes which are available in the clinic area.

[www.curesearch.org](http://www.curesearch.org)

## Assessment & Grading

**Preceptor Evaluations**
**Assessments –**

Assessment/Assignment	Due Date	Weight towards Final Grade
Preceptor Evaluations		100%

**Grading System**

Students will receive a final letter grade of PASS (P), or FAIL (F) for this course.

PASS: A student who achieves the criteria will be assigned a grade of PASS for the course.

FAIL: A student who fails to achieve the criteria for PASS will be assigned a grade of FAIL for the course.

## Student Feedback

Student feedback is important and helps identify opportunities to improve the course.

At the conclusion of each course, clerkship or rotation medical students are required to complete a summative evaluation. Evaluations are completed electronically and remain confidential.

## Standard Policies

Please refer to the Student Handbook (on the Student Affairs website) for these policies:

**Accommodations**

**Addressing Sexual Misconduct**

**Attendance policy**

**Dress Code**

**Examination and Grading Policies**

**Grade or Score Appeal**

**Professionalism, Roles & Responsibilities**

**Mistreatment**

## Center for Disability & Access Services

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability and Access, 162 Olpin Union Building, 581-5020 (V/TDD). Staff of the Center for Disability and Access will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability and Access.

The Senior Director of the Academic Success Program, Dr. Steven Baumann (1C047B SOM Dean's Office, 587-3671, or [steven.baumann@hsc.utah.edu](mailto:steven.baumann@hsc.utah.edu)), serves as the liaison between the School of Medicine and the Center for Disability and Access.