Hematology Oncology Curriculum

Required Rotations

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Derick Lau, M.D., Ph.D.
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In Consultation with the Faculty, Division of Hematology and Oncology
UC Davis School of Medicine
WARD ROTATION CURRICULUM

Educational Purpose and Rationale:

It is necessary for specialists in Hematology and Oncology to be able to adequately evaluate, diagnose, and treat patients with hematologic or oncologic problems requiring hospitalization. An HEMATOLOGY ONCOLOGY resident will acquire the requisite knowledge and skills for this task only through direct patient care responsibility in the inpatient setting. This rotation is designed for residents to acquire the ability to care for HEMATOLOGY ONCOLOGY patients in the Inpatient setting.

Principal Teaching Methods:

The main method of teaching is patient-oriented discussion and clinical experience. Didactic presentations by faculty, HEMATOLOGY ONCOLOGY residents, and Internal Medicine residents also take place on a regular basis. At a minimum, 4.5 hours of teaching rounds will be held each week. There are didactic sessions and/or patient care conferences 4 days a week at the UC Davis Cancer Center and Ward team members are highly encouraged to attend. Attendance at the weekly MegaRounds and Journal Club are required.

The HEMATOLOGY ONCOLOGY resident will be exposed to a broad range of diseases during this rotation spanning the spectrum of hematology and oncology. Patients with solid tumors include those with lung, breast, ovarian, cervical, and esophageal cancer admitted for chemotherapy and combined modality (with radiation therapy) treatment; complications of treatment including esophagitis and diarrhea; oncologic emergencies including hypercalcemia, hyponatremia, epidural cord compression, cerebral metastasis, febrile neutropenia; and patients admitted for aggressive palliation. Hematologic problems include severe thrombocytopenia resulting from ITP, TTP, or treatment-related; acute leukemia for induction or consolidation; and patients with congenital bleeding diatheses. Common medical problems encountered include pneumonia, renal insufficiency, and deep venous thrombosis.

Conferences that the HEMATOLOGY ONCOLOGY resident may attend during this rotation include:

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<thead>
<tr>
<th>Monday</th>
<th>Fellow Core Lecture Series</th>
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<tbody>
<tr>
<td></td>
<td>2nd and 4th Mondays</td>
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<tr>
<td></td>
<td>Davis 8 BMT Conference Room, Noon</td>
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<tr>
<td>Tuesday</td>
<td>MegaRounds:</td>
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<td></td>
<td>7:30, Cancer Center Breakout Room</td>
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<td></td>
<td>GU Oncology Conference and GI Oncology Conference, alternating weeks, Noon</td>
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<tr>
<td>Wednesday</td>
<td>Thoracic Oncology Conference</td>
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<td></td>
<td>Cancer Center Breakout Room</td>
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<tr>
<td>Thursday</td>
<td>Cancer Center Basic Science Conference</td>
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<td>8:00, Cancer Center Auditorium</td>
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<td></td>
<td>Breast Conference (3 out of 4 weeks)</td>
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<td></td>
<td>Cancer Center Breakout Room, Noon</td>
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<td></td>
<td>Scientific Review Committee</td>
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<td></td>
<td>Cancer Center Breakout Room, 1 week per month, Noon</td>
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</table>
Procedures to be performed during this rotation include bone marrow biopsy, aspiration, and interpretation; diagnostic and therapeutic thoracentesis and paracentesis; lumbar puncture with intrathecal therapy; and central venous catheter placement and care. Of course, residents will become familiar with the administration of both single agent and multiagent chemotherapy and biotherapy, and combined modality therapy.

Ancillary Educational Material:

Pathology specimens reviewed generally consist of peripheral blood smears, bone marrow biopsies and aspirates. Bone marrow “sign-outs” occur twice a week with faculty Pathologist. A pathology resident also attends clinical care conferences on a regular basis for review of pathological material. A slide set of bone marrow specimens is available for review. Although there are a number of excellent reference sources in HEMATOLOGY ONCOLOGY, it is recommended that your primary reference sources to be:

Textbooks:
- DeVita et al. Principles and practice of oncology.
- Haskell. Cancer Treatment
- Williams’ Hematology
- Hoffman et al. Principles and Practice of Hematology
- Rossi et al. Transfusion Medicine
- Blume et al. Bone Marrow Transplantation

Journals:
- Blood
- British Journal of Haematology
- American Journal of Hematology
- Journal of Clinical Oncology
- Cancer
- Hematology Oncology Clinics of North America

The ubiquitous availability of Internet-based bibliographic search engines also greatly facilitates acquisition of pertinent literature. We urge that all HEMATOLOGY ONCOLOGY residents become facile in the use of these services. The librarians at the Medical Center library will be happy to assist you. URL's that are useful:

http://www.medscape.com
http://www-informatics.ucdmc.ucdavis.edu
http://www.hematology.org
http://www.asco.org
http://www.uptodate.com

Organization and Responsibilities:

The Faculty physician on Ward Service is the supervisor of the HEMATOLOGY ONCOLOGY resident during this rotation. The HEMATOLOGY ONCOLOGY resident is
responsible for the care of her/his own patients, and for supervising the Internal Medicine residents on service. In addition, HEMATOLOGY ONCOLOGY residents will supervise the Oncology Nurse Specialist in concert with the Attending physician. Fellows will be on pager call every third night, alternating with the other Ward Fellow and Consult Fellow. This arrangement was the desired schedule when the Fellows were asked to decide on a call schedule in 2002. Fellows are responsible for fielding calls from outpatients at night and weekend/holidays. They are also expected to return to the hospital and assist the IM resident with patient care if it becomes too busy. They should always feel free to try to contact the primary treating faculty member or fellow if they have questions regarding patients. Fellows should not field transfer requests from outside facilities: this is a responsibility of the Ward Attending physician.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 66 hours per week on this rotation. The Ward Service is capped at 30 patients. Fellows will not be responsible for more than 15 patients at any one time. No fellow will participate in the admission of more than 10 patients per 24 hours.

Evaluation:

The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. Internal Medicine residents are also given the opportunity to evaluate the HEMATOLOGY ONCOLOGY resident’s performance in the role of clinical supervisor and teacher. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.

Strength and Limitations of the Rotation:

The strengths of this rotation include the broad exposure to multiple, complex hematologic and oncologic problems in a diverse population (socioeconomic and ethnic) of patients. HEMATOLOGY ONCOLOGY residents are closely supervised by a faculty physician who attends regularly on the Inpatient service, and have the opportunity to supervise Internal Medicine residents. The Unit has experienced, dedicated, and oncology certified nurses. Limitations include the occasional necessity to care for Medicine overflow patients, although this is a rarity. As there are two Fellows assigned to the rotation at any one time, no fellow will have responsibility for more than 15 patients (combined primary and supervisory). No IM resident will have responsibility for more than 10 patients at a time.
CONSULT ROTATION (INPATIENT)

Educational Purpose and Rationale:

A specialist in HEMATOLOGY ONCOLOGY is commonly called upon to consult on hospitalized patients with HEMATOLOGY ONCOLOGY problems under the care of a generalists or non-Internal Medicine physicians. It is thus vital that the HEMATOLOGY ONCOLOGY resident have adequate experience in the role on consultant in the inpatient setting.

Principal Teaching Methods:

The main method of teaching is patient-oriented discussion and clinical experience. Didactic presentations by faculty, HEMATOLOGY ONCOLOGY residents, and Internal Medicine residents also take place on a regular basis. There are didactic sessions and/or patient care conferences 4 days a week at the UC Davis Cancer Center and Ward team members are highly encouraged to attend. Attendance at the weekly MegaRounds and Journal Club is required. Regular conferences include:

<table>
<thead>
<tr>
<th>Day</th>
<th>Conference Name</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Fellow Core Lecture Series</td>
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<td></td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; and 4&lt;sup&gt;th&lt;/sup&gt; Mondays</td>
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<td></td>
<td>Davis 8 BMT Conference Room, Noon</td>
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<tr>
<td>Tuesday</td>
<td>MegaRounds:</td>
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<td></td>
<td>7:30, Cancer Center Breakout Room</td>
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<td></td>
<td>GU Oncology Conference and GI Oncology Conference,</td>
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<td></td>
<td>alternating weeks, Noon</td>
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<tr>
<td>Wednesday</td>
<td>Thoracic Oncology Conference</td>
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<td></td>
<td>Cancer Center Breakout Room, 12:15</td>
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<tr>
<td>Thursday</td>
<td>Cancer Center Basic Science Conference</td>
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<td></td>
<td>8:00, Cancer Center Auditorium</td>
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<td>Cancer Center Breakout Room, Noon</td>
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<td></td>
<td>Scientific Review Committee</td>
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<td></td>
<td>Cancer Center Breakout Room, 1 week per month, Noon</td>
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<tr>
<td>Friday</td>
<td>Journal Club</td>
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<td></td>
<td>8:00, Cancer Center Breakout Room</td>
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<td></td>
<td>BMT Patient Care Conference</td>
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<td></td>
<td>12:30, BMT Conference Room</td>
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HEMATOLOGY ONCOLOGY residents will see a broad range of problems including patient’s suspected of having malignancies in which our Service is asked to assist in arriving at a diagnosis; patients with known malignancies requiring primary care on another service; hematologic problems including thrombocytopenia, coagulopathies, suspected thrombophilia; and HIV-related problems. The HEMATOLOGY ONCOLOGY resident will also help other services determine the appropriateness of therapeutic apheresis.
Procedures on this rotation will likely be limited to diagnostic bone marrow biopsy and aspiration and the supervision of therapeutic apheresis.

Ancillary Educational Material:

Pathology specimens reviewed generally consist of peripheral blood smears, bone marrow biopsies and aspirates. Bone marrow “sign-outs” occur twice a week with faculty Pathologist. A Pathology resident also attends clinical care conferences on a regular basis for review of pathological material. A slide set of bone marrow specimens is available for review. Although there are a number of excellent reference sources in HEMATOLOGY ONCOLOGY, it is recommended that your primary reference sources to be:

Textbooks:
- DeVita et al. Principles and practice of oncology.
- Haskell. Cancer Treatment
- Williams’ Hematology
- Hoffman et al. Principles and Practice of Hematology
- Rossi et al. Transfusion Medicine
- Blume et al. Bone Marrow Transplantation

Journals:
- Blood
- British Journal of Haematology
- American Journal of Hematology
- Journal of Clinical Oncology
- Cancer
- Hematology Oncology Clinics of North America

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http://www.medscape.com
http://www-informatics.ucdmc.ucdavis.edu
http://www.hematology.org
http://www.asco.org
http://uptodate.com

Organization and Responsibilities:

The Faculty physician assigned to the Consult Service is responsible for supervision of the HEMATOLOGY ONCOLOGY resident on this rotation. The HEMATOLOGY ONCOLOGY resident is responsible for supervising the Internal Medicine residents and students on rotation. He/she will oversee the day-to-day activities of the Consult Service. Fellows will be on pager call every third night, alternating with the other Ward Fellow and Consult Fellow. This arrangement was the desired schedule when the Fellows were asked to decide on a call schedule in 2002. Fellows are responsible for fielding calls from outpatients at night and weekend/holidays. They are also expected to return to the hospital and assist the IM resident with patient care if it becomes too busy. They should always feel free to try to contact the primary treating faculty member or
fellow if they have questions regarding patients. Fellows should not field transfer requests from outside facilities: this is a responsibility of the Ward Attending physician.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 50 hours per week on this rotation. As the Fellow has no primary care responsibilities for consult patients, there is no cap. However, it is uncommon to have more than 15 active consult patients.

Evaluation:

The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. Internal Medicine residents are also given the opportunity to evaluate the HEMATOLOGY ONCOLOGY resident’s performance in the role of clinical supervisor and teacher. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.

Strength and Limitations of the Rotation:

The Inpatient consultation service at is based a UCDMC, a tertiary-care University hospital that cares for a ethnically and socioeconomically diverse patient population. There is a full range of ICU, surgical, and obstetrics and gynecology services and the HEMATOLOGY ONCOLOGY resident will be called upon to provide consultation to all of these services. There are no primary patient care responsibilities.
**CLINIC ROTATION**

Educational Purpose and Rationale:

The majority of patient encounters in the practice of most HEMATOLOGY ONCOLOGY specialists occur in the outpatient setting. By seeing patients with faculty who are able to more narrowly define their scope of practice, HEMATOLOGY ONCOLOGY residents are able to have a more in depth exposure to a focused area of hematology and oncology (i.e., GU oncology, Lymphoma/BMT, Thoracic oncology, Hemophilia).

Principal Teaching Methods:

The main method of teaching is patient-oriented discussion and clinical experience.

The HEMATOLOGY ONCOLOGY resident will see a broad range of patients that are seen in predominantly disease-specific clinics. These clinics include the following: genitourinary oncology; lymphoma/BMT; Thoracic oncology; Breast Clinic; Hemostasis and thrombosis; hemoglobinopathies. One or more faculty physicians with expertise in a particular area staff each clinic. The HEMATOLOGY ONCOLOGY resident will be in clinic with IM residents and medical students, and are expected to assist in the education of these trainees.

Conferences that one can attend while on the Clinic rotation include:

<table>
<thead>
<tr>
<th>Day</th>
<th>Conference</th>
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</table>
| Monday    | **Fellow Core Lecture Series**  
2nd and 4th Mondays  
Davis 8 BMT Conference Room, Noon |
| Tuesday   | **MegaRounds:**  
7:30, Cancer Center Breakout Room  
GU Oncology Conference and GI Oncology Conference, alternating weeks, Noon |
| Wednesday | **Thoracic Oncology Conference**  
Cancer Center Breakout Room 12:15 |
| Thursday  | **Cancer Center Basic Science Conference**  
8:00, Cancer Center Auditorium  
Breast Conference (3 out of 4 weeks)  
Cancer Center Breakout Room, Noon  
Scientific Review Committee  
Cancer Center Breakout Room, 1 week per month, Noon |
| Friday    | **Journal Club**  
8:00, Cancer Center Breakout Room  
BMT Patient Care Conference  
12:30, BMT Conference Room  
GYN Tumor Board  
12:30, Cancer Center Breakout Room |

There are likely to be a limited number of procedures specific to this rotation, although occasional diagnostic bone marrow biopsy and aspiration, lumbar puncture, thoracentesis, or paracentesis may be performed.

Ancillary Educational Material:
Pathology specimens reviewed generally consist of peripheral blood smears, bone marrow biopsies and aspirates. Bone marrow “sign-outs” occur twice a week with faculty Pathologist. A pathology resident also attends clinical care conferences on a regular basis for review of pathological material. A slide set of bone marrow specimens is available for review. Although there are a number of excellent reference sources in HEMATOLOGY ONCOLOGY, it is recommended that your primary reference sources to be:

Textbooks:
- DeVita et al. Principles and practice of oncology.
- Haskell. Cancer Treatment
- Williams' Hematology
- Hoffman et al. Principles and Practice of Hematology
- Rossi et al. Transfusion Medicine
- Blume et al. Bone Marrow Transplantation

Journals:
- Blood
- British Journal of Haematology
- American Journal of Hematology
- Journal of Clinical Oncology
- Cancer
- Hematology Oncology Clinics of North America

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http://www.medscape.com
http://www-informatics.ucdmc.ucdavis.edu
http://www.hematology.org
http://www.asco.org
http://www.uptodate.com

Organization:

The Faculty physicians in charge of the various subspecialty clinics will supervise the HEMATOLOGY ONCOLOGY resident during this rotation. HEMATOLOGY ONCOLOGY residents will also responsible for supervision of students and IM residents that might be rotating through the outpatient clinics.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 44 hours per week on this rotation. There are no weekend or holiday responsibilities on this rotation, and there is no back-up call during this rotation.
The following is a current list of clinics that the fellow can attend. Please check with individual faculty (parentheses) as clinic times are in a constant state of flux. All clinics are held in the Cancer Center.

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<tr>
<th>Day/Time</th>
<th>AM</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Benign Hematology Clinic (Welborn/Eli Richman)</td>
<td>Genitourinary Oncology (Meyers)</td>
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<tr>
<td>Tuesday</td>
<td>BMT (Richman)</td>
<td>BMT/Lymphoma (Richman, Tuscano, Wun)</td>
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<tr>
<td></td>
<td>Gyn Oncology (Scudder)</td>
<td>Breast (Chew)</td>
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<tr>
<td></td>
<td>GI/Gyn (Jacobsen)</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Thoracic Oncology (Gandara, Lau, Davies)</td>
<td>Sickle Cell (Wun/Powell) 1st and 3rd Wednesdays only</td>
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<td></td>
<td>Hemophilia (Powell)</td>
<td>GI (Tanaka)</td>
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<td></td>
<td></td>
<td>BMT (Richman) 2nd and 4th Wednesdays only</td>
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<tr>
<td>Thursday</td>
<td>Breast Clinic (Chew, Christensen)</td>
<td>GU (Lara); Breast (Christensen, Chew)</td>
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<td></td>
<td>Leukemia (Welborn)</td>
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<tr>
<td>Friday</td>
<td>VA at Mather</td>
<td>GI (Tanaka)</td>
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<td></td>
<td>Gyn Oncology</td>
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Evaluation:
The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. Internal Medicine residents are also given the opportunity to evaluate the HEMATOLOGY ONCOLOGY resident’s performance in the role of clinical supervisor and teacher. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.

Strengths and Limitation:
The HEMATOLOGY ONCOLOGY resident will have the opportunity to care for new and follow-up patients with a broad spectrum of diseases under the supervision of faculty with particular interest and expertise in these areas. A limitation is that there is not generally the opportunity for residents to follow these patients on a long-term basis, although commonly HEMATOLOGY ONCOLOGY residents have taken these patients to their own continuity clinic.
VA Northern California Health Care System Rotation

Educational Purpose and Rationale:

This rotation allows exposure to a patient population distinct from and complementary to that experienced at UCDMC and other training sites. The population is generally older and predominantly male, although the demography of the military, and thus of eligible Veterans, is shifting. Patients in both the inpatient and outpatient setting are seen at the Sacramento VA Medical Center, which boasts a brand new (move in July 2003) state-of-the-art facility with a separate Hematology Oncology Clinic used solely by the Section of Hematology and Oncology.

Principal Teaching Methods:

The main method of teaching is patient-oriented discussion and clinical experience. Didactic presentations by faculty physicians also occur and there is a weekly general Tumor Board. Fellows will also be expected to return to the UC Davis Cancer Center for Megarounds and Journal Club.

The VA patient population is distinct in that it is predominantly male, of lower socioeconomic class, and older. There are a wide variety of problems seen including many patients with prostate and lung cancer. In addition, many outpatient consultations are requested for anemia, leukopenia, and monoclonal gammopathies. Many patients have complicating co-morbidities.

Procedures to be performed during this rotation include bone marrow biopsy, aspiration, and interpretation; diagnostic and therapeutic thoracentesis and paracentesis; lumbar puncture with intrathecal therapy; and central venous catheter placement and care. Of course, HEMATOLOGY ONCOLOGY residents will become familiar with the administration of both single agent and multiagent chemotherapy and biotherapy, and combined modality therapy.

Ancillary Educational Material:

Pathology specimens reviewed generally consist of peripheral blood smears, bone marrow biopsies and aspirates. The bone marrow and anatomic pathology lab is now for the Northern California VA System is now located at the Sacramento VA Medical Center and specimens can be reviewed with Pathologists. Although there are a number of excellent reference sources in HEMATOLOGY ONCOLOGY, it is recommended that your primary reference sources to be:

Textbooks:
- DeVita et al. Principles and practice of oncology.
- Haskell. Cancer Treatment
- Williams’ Hematology
- Hoffman et al. Principles and Practice of Hematology
- Rossi et al. Transfusion Medicine
- Blume et al. Bone Marrow Transplantation

Journals:
- Blood
- British Journal of Haematology

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- http://www.hematology.org
- http://www.asco.org
- http://www.uptodate.com

The VA also has a wealth of on-line material for training in ethics, employee safety, and human subjects protection. Fellows are highly encouraged to review these materials. Fellows are required to complete the yearly training required by the UCD and VA IRB’s.

Organization/Supervision/Responsibilities:

Ted Wun, M.D., is the overall supervisor for Hematology Oncology residents on this rotation. Other faculty will also supervise the HEMATOLOGY ONCOLOGY resident. All HEMATOLOGY ONCOLOGY faculty at the Sacramento VA Medical Center have UCD faculty appointments. Fellows will take pager call to alternate weekends with the faculty. Pager call at the VA is characteristically light. Fellows will see patients in the outpatient clinic and consults in the hospital. They will review consults with the faculty in charge of clinic that day. Occasionally there is a Pathology resident rotating at the VA, and the Fellow will help supervise that resident. Primary care residents also attend the Wednesday Hematology clinic, but are mainly supervised by the Faculty.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 44 hours per week on this rotation. Rounding on the weekends and holidays are on an as-needed basis, and is a rare event. Pager call is characteristically light, and is split with the designated faculty member on the weekends. The number of active consult patients rarely exceeds five. This rotation provides a good opportunity for reading time.

Evaluation:

The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.
Strengths and Limitations:

The HEMATOLOGY ONCOLOGY resident is exposed to a broad range of patient problems in an alternative model of health care. Fellows gain exposure to military predominant health care issues, such as Agent Orange associated illnesses, post-traumatic stress disorder, and Gulf War Syndrome. There are few women patients seen in the VA system. However, this deficiency is more than made up for in the other rotations.
KAISER ROTATION

Educational Purpose and Rationale:

Over the past decades, the practice of medicine has changed dramatically, and the Sacramento region is one of the most highly penetrated areas by managed care in the nation. Kaiser Foundation Health Plan is the largest Health Maintenance Organization (HEMATOLOGY ONCOLOGY) in the country and insured approximately 25% of all people in Northern California. Residents from Internal Medicine spend a considerable proportion of their time at Kaiser. HEMATOLOGY ONCOLOGY residents will have the opportunity to experience the provision of specialty care in this environment and gain an appreciation of the advantages and disadvantages of this system.

Principal Teaching Methods:

The main method of teaching is patient-oriented discussion and clinical experience.

The HEMATOLOGY ONCOLOGY resident will see a broad range of hematological and oncologic problems in both the outpatient and inpatient settings. Generally, HEMATOLOGY ONCOLOGY residents see predominantly new patients. The population is generally middle to upper middle class, well-educated, and well cared for. Thus, this setting is complementary to the other patient populations in the program.

Attendance at the Didactic series, Megarounds, and Journal Club are expected during this rotation.

Procedures are generally limited to diagnostic bone marrow biopsy and aspiration.

Ancillary Educational Material:

Pathologic specimens can be reviewed with the pathology staff at Kaiser; they are generally very happy to go over specimens with residents. Marrow aspirates and biopsies are reviewed with the HEMATOLOGY ONCOLOGY faculty at Kaiser.

Although there are a number of excellent reference sources in Hematology and Oncology, it is recommended that your primary reference sources to be:

Textbooks:
- DeVita et al. Principles and practice of oncology.
- Haskell. Cancer Treatment
- Williams’ Hematology
- Hoffman et al. Principles and Practice of Hematology
- Rossi et al. Transfusion Medicine
- Blume et al. Bone Marrow Transplantation

Journals:
- Blood
- British Journal of Haematology
- American Journal of Hematology
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Hematology Oncology Clinics of North America

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http://www.medscape.com
http://www-informatics.ucdmc.ucdavis.edu
http://www.hematology.org
http://www.asco.org
http://www.uptodate.com

Kaiser also has clinical treatment guidelines that have been developed by their clinicians and research department. The Fellows are encouraged to review these guidelines.

Organization:

Edward Hearn, M.D., and Tim Grennan, M.D, are the supervisors of this rotation. Other Kaiser-based faculty will also supervise the HEMATOLOGY ONCOLOGY resident in relation to shared patients. There is no call during this rotation.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 40 hours per week on this rotation. There are no weekend, holiday, or call responsibilities on this rotation. There are no primary patient care responsibilities and Fellows can expect to see 3-5 patients a day. This is a good rotation for reading and independent study.

Evaluation:

Drs. Hearn and Grennan will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.

Strengths and Limitations:

This rotation expands the demographic profile of patients seen by our residents. One also gets to be supervised by excellent, experienced HEMATOLOGY ONCOLOGY physicians outside of the University setting. They will also be exposed to a model of health care that many of our graduates choose to seek employment. Residents will not have the opportunity for long-term follow-up of patients.
Sacramento Medical Foundation Transfusion Medicine Rotation (at Bloodsource)

Educational Purpose and Rationale:

It is probably not an exaggeration that modern hematological and oncologic therapy would not be possible without the ability to provide adequate blood product support. For instance, 40% of platelet usage at UCDMC is by the Hematology Oncology Service. The Hematology Oncology specialist is also often called upon to consult on blood product related matters. Thus, it is imperative that well-trained hematologists have exposure to transfusion medicine. We have chose the Bloodsource as the site of this rotation: it is a private, non-profit blood bank with a research institute (Center for Blood Research). It supplies the blood product needs of the entire region surrounding Sacramento, as well as clinical apheresis services. Paul Holland, M.D., Director and CEO, is an internationally recognized transfusion medicine expert who ran the blood center at the NIH. Other staff members are all board-certified and actively engaged in clinical and research transfusion medicine.

Major Goal

To improve Hematology/Oncology Fellow knowledge of transfusion medicine, with emphasis on key topics, as defined in the Objectives section, below.

Principle Teaching Methods:

The rotation will combine practical experience, didactics, one-on-one teaching, and lecture preparation as the main methods of instruction. The major components of this rotation will be:

Pre-Test: The pre-test, which will be open book, will consist of 25 essay and multiple choice questions that reflect the objectives of this rotation. Special emphasis will be placed upon issues most relevant to practicing clinicians (e.g., the management of transfusion reactions; the selection of appropriate blood components for transfusion; etc.). In addition, however, some consideration of topics more specific to blood center operations will be covered as well (e.g., decision making re: donor eligibility; blood component preparation, etc.). As much as possible, these questions will mirror board-type questions to which the Fellows eventually will be exposed. One or more of the SMF physicians shall correct the test, with the results reviewed with the Fellow during the course of his/her rotation. The Fellow's final evaluation will not be dependent upon the results of his/her pre-test. The pre-test merely serves as a means to focus the Fellow on what he or she needs to learn and review.

Topics that will be emphasized during the rotation are:

A. **Blood Components**: Collection, Preparation, Testing, and Indications for Usage
B. **RBC Serology**: ABO, Rh, Other Blood Groups, and Pre-Transfusion Testing
C. **Transfusion Reactions**: Acute and Delayed
D. Infectious Complications of Transfusions
E. The HLA System
F. Therapeutic Apheresis and Phlebotomy
Progenitor Cell Collection and Processing
Platelet refractoriness: definition and management
Pertinent Miscellaneous topics: Emergency transfusion management; autoimmune hemolytic anemia

Ancillary Educational Material:

Suggested Texts and References (Will be supplied by the Blood Center)

B. Additional References:

Selected journal articles will be provided by the Bloodsource faculty.

Organization:

Drs. Leonor Fernando and Chris Gresens will be the direct supervisors of Fellows on this rotation.

Orientation: an orientation schedule will be arranged so as to give each fellow an opportunity to see the basic operations of the entire Blood Center. Department Heads (or designees) will conduct these sessions. At a minimum, the following areas will be included:

A. Apheresis Department, Autologous Center and Donor Room—Andy Clark, RN and/or Selina Fakalata, RN (1 hour)
B. Center for Blood Research—Malcolm MacKenzie, MD (1 hour)
C. Components—Rita Tate, MT(ASCP) (1 hour)
D. HLA Laboratory—Kathie Muto, MT(ASCP) (8 hours)
E. Marrow—Karlynne Utterback, RN (2 hours—1 for overview and 1 for marrow donor session, if possible)
F. Medical Department—Leonor Fernando, MD (multiple, as dictated by physician-related assignments)
G. NAT Lab—Sherri Aceituno (1 hour)
H. Processing Lab—Erica Bonney (1 hour)
I. Progenitor Cell Laboratory—Carol Richman, MD (8 hours)
J. Recruitment/Donor Resources—Steve Ferraiuolo (1 hour)
K. Reference/Hematology/Coagulation Labs—Joan Ward, MT(ASCP)SBB (8 hours)

Faculty Discussion/Tutorial Sessions

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<tr>
<th>No</th>
<th>Topic</th>
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<tr>
<td></td>
<td><strong>Blood Components</strong>: Collection, Preparation, Testing, and Indications for Usage</td>
<td>Dr. Kopko</td>
<td>Harmening, Chapt. 10 (pp. 233-248) and Chapt. 16 (optional reading found in <em>Technical Manual</em>, Chapt. 7, 8, &amp; 21)</td>
<td>Harmening, p. 250 (Questions 6-15) and Chapt. 16 (Cases 1-3 &amp; Questions 1-8)</td>
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<td>2</td>
<td><strong>RBC Serology</strong>: ABO, Rh, Other Blood Groups, and Pre-Transfusion Testing</td>
<td>Dr. Janatpour</td>
<td>Harmening, Chapt. 3-8, 11, &amp; 12 (optional reading found in <em>Technical Manual</em>, Chapt. 10, 12 13-15, &amp; 18-20)</td>
<td>All questions and case studies found in Harmening Chapt. 3-8, 11, &amp; 12)</td>
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<td>3</td>
<td><strong>Transfusion Reactions</strong>: Acute and Delayed</td>
<td>Dr. Holland</td>
<td>Harmening, Chapt. 18 (optional reading found in <em>Technical Manual</em>, Chapt. 27)</td>
<td>All questions and case studies found in Harmening, Chapt. 18</td>
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<td>4</td>
<td><strong>Infectious Complications of Transfusions</strong></td>
<td>Dr. Holland</td>
<td>Harmening, Chapt. 19 (optional reading found in <em>Technical Manual</em>, Chapt. 28)</td>
<td>All questions and case studies found in Harmening, Chapt. 19</td>
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<td>5</td>
<td>The HLA System</td>
<td>Kathie Muto, MT(ASCP)</td>
<td>Harmening, Chapt. 23 and <em>Technical Manual</em>, Chapt. 17 (both required)</td>
<td>All questions and case studies found in Harmening, Chapt. 23</td>
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<td>6</td>
<td><strong>Therapeutic Apheresis and Phlebotomy</strong></td>
<td>Dr. Fernando</td>
<td>Technical Manual, pp. 134-146 (will also assign more intensive reference)</td>
<td>[To be determined]</td>
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<tr>
<td>7</td>
<td><strong>Progenitor Cell Collection and Processing</strong></td>
<td>Drs. Richman and MacKenzie</td>
<td>Technical Manual, Chapt. 25</td>
<td>[To be determined]</td>
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<tr>
<td>8</td>
<td><strong>Pertinent Miscellaneous Topics</strong>: Platelet Transfusion Refractoriness, Transfusing in Emergent Situations, Autoimmune Hemolytic Anemia, etc.</td>
<td>Dr. Gresens</td>
<td>[To be determined]</td>
<td>[To be determined]</td>
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Day-to-Day Responsibilities: The Fellows shall be assigned to duties (e.g., “doctor-of-day” or “on-call doctor”) in conjunction with the BLOODSOURCE Associate Medical Directors. When on duty, they shall, as much as possible, be allowed first opportunity to handle each case—understanding that, until they have been deemed competent in dealing with each particular type of case (as determined by any of the Associate Medical Directors), they first should discuss all cases with faculty.

Participation in Scheduled Meetings/Educational Opportunities: The Fellows shall participate in as many regularly scheduled BLOODSOURCE meetings and educational opportunities that pertain to physicians as possible. Examples of these include, but are not limited to:

A. Monthly Physicians’ Meetings
B. SAC/IRB Meetings (bi-monthly)
C. Transfusion Review Committee (quarterly)
D. AABB Teleconferences

In addition, the Fellow is expected to attend Megarounds and Journal Club at the UC Davis Cancer Center.

Lecture by Fellow: Toward the end of his/her rotation at SMF Blood Centers, the Fellow will present a 45-50 minute lecture on a topic of his/her choice that is related either to blood banking or hematology/oncology. The lecture will be scheduled so as to allow as many SMF Blood Center employees as possible to attend. In addition, invited attendees may include physicians, technologists, and nurses from other facilities throughout the Sacramento region.

Post-Test: Toward the end of the rotation (preferably after the Fellow has completed all of the assigned faculty discussion/tutorial sessions), the Fellow will be required to take an open-book post-test, which will consist of 25 essay and multiple choice questions substantially similar to those covered by the pre-test. This test shall be corrected by one of the Associate Medical Directors. While no pre-set passing score shall be established, it will be the responsibility of the Fellow to follow-up on all incorrectly answered questions by proving, to the satisfaction of the Associate Medical Director, that s/he fully comprehends the material involved, and can come up with correct solutions for comparable problems.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 40 hours per week on this rotation. There are no primary patient care responsibilities, although as noted the Fellow will function as the “Doctor of the Day” that will respond to any emergencies at the blood center. There is no weekend or night call during this rotation.

Evaluation:

Fellows will be evaluated on the following:

A. Successful completion of post-test

B. Active participation in:
   1. Discussions/tutorials
   2. Meetings with selected Department Heads
   3. Management of day-to-day duties fellow takes on
   4. Scheduled meeting/educational opportunities

Successful lecture given on topic of Fellow’s choice

A standard evaluation form will be filled out and reviewed with the Fellow. The Fellow will also be given the opportunity to provide a written review of the rotation.
Strengths and Limitations:

A relative weakness is the limited amount of time available with which to expose the fellow to such a broad field. However, this is overcome by the highly structured nature of the rotation and the outstanding program and teaching faculty available. In addition, the opportunity to rotate at a first-class community-based “academic” blood center is quite unique and has been very favorable reviewed.
RADIATION ONCOLOGY

Educational Purpose and Rationale:

Radiation therapy is an important modality for the treatment of many malignancies. The Hematology Oncology resident should be familiar with the theoretical basis for radiation therapy, some of the practical aspects, and the appropriate use of the modality. Combined modality therapy (especially chemoradiotherapy) is becoming more prevalent in the treatment of many tumors and has established efficacy in cervix cancer, larynx cancer, nasopharyngeal cancer, lung cancer, rectal cancer, and anal cancer. It is important that the Hematology Oncology resident understands the approach to these malignancies and be familiar with the literature in support of the use of combined modality therapy. The Department of Radiation Oncology is a growing, research-oriented department with five full-time M.D. faculty members. It has fellows and has applied for a residency training program.

Principal Teaching Method:

The Hematology Oncology resident will learn by direct evaluation of patients, attendance at patient care conferences, didactics from the Radiation Oncology faculty, and reading material provided by the Department of Radiation Oncology.

Fellows are expected to attend Megarounds and Journal Club while on this rotation.

Ancillary Educational Material:

The Department of Radiation Oncology has handouts on the basics of radiation oncology that it provides for rotating residents.

In addition to the major textbooks of Oncology, Leibel and Phillips Textbook of Radiation Oncology is available in the Fellows library.

Organization and Responsibilities:

Janice Ryu, M.D., Associate Professor in the Department of Radiation Oncology will be in charge of the Fellows on this rotation. Fellows will see new and follow-up patients with the Radiation Oncology faculty. Emphasis will be placed on cervical cancer, head and neck cancer, and CNS tumors as Fellows have limited opportunity to care for these patients in other settings. Fellows may also be asked to evaluate inpatients where a radiation oncology consult has been requested.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 40 hours per week on this rotation. There are no weekend or holiday responsibilities, and no call is taken during this rotation. There are no primary patient care responsibilities during this rotation.

Evaluation:
The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. The Hematology Oncology resident’s evaluate the rotation and the faculty physician. Hematology Oncology residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.

Strengths and Limitation:

The Fellow will be able to learn directly from outstanding radiation oncologists at various career stages. She/he will be able to participate in several multidisciplinary conferences with surgeons and radiologists.
PALLIATIVE CARE ROTATION

Educational Purpose and Rationale:

Despite more effective therapy for malignancies, many patients will progress and succumb to their underlying disease. For some patients, palliation rather than cure is the primary goal from the outset. Perhaps more than in any other field of medicine, oncologists need to be well versed in palliative care; it is imperative that trainees in Hematology Oncology have a clear understanding of the principles of palliative medicine. The UC Davis Palliative Care Program is an award-winning program with a long history of innovation and extramural funding and is under the leadership of Frederick Meyers, M.D., Chair, Department of Internal Medicine.

Principal Teaching Method:

Fellows will become a member of the Palliative Care Team. They will attend the weekly patient care conference and evaluate patients for hospice care. They will go on a home visit. They will also participate in a program of palliative care education specifically designed for physician education developed by the West Coast Center for Palliative Education.

The Division has a yearly retreat, dedicated to end-of-life, palliative care, and physician coping strategies for both Faculty and Fellows. This is organized by Angela Davies, M.D. Attendance is mandatory for Fellows.

Ancillary Teaching Materials:

A syllabus will be provided by the Palliative Medicine program.

Organization and Evaluation:

Fred Meyers, M.D., Professor and Chair of the Department of Internal Medicine is the faculty member in charge of this rotation. Scott Christensen, M.D., Assistant Clinical Professor of Medicine is the Hospice Director.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 40 hours per week on this rotation. There is no call, weekend or holiday responsibilities. There are no direct patient care responsibilities.

Evaluation:

The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.
Strength and Limitation:

The Palliative Care Program at UC Davis is one of the few University-based programs in the United States. It has received NIH and Robert Woods Johnson funding. It has an innovative program of “simultaneous care” whereby patients can be receiving tumor-directed therapy (if on a clinical trial) and be enrolled in the Palliative Care program at the same time. Thus, Fellows will be exposed to the “cutting-edge” of palliative medicine.
ELECTIVE IN PATHOLOGY

Educational Rationale:

Accurate pathological diagnosis and a strong relationship with Pathologists are critical for the practice of Hematology and Oncology. As the old saying goes: Tumor is only a rumor without pathology. Although not expected to become competent in interpreting pathological specimens, the Hematology Oncology Fellow greatly benefits from an understanding of pathological methods and pitfalls. Many of our Fellows choose to spend 2-4 weeks with our hematopathologists in order to gain a greater appreciation of pathological issues and to supplement their already strong experience in the interpretation of bone marrow aspiration specimens. For those fellows wishing to learn the technique of fine needle aspiration (FNA), this training is available with Lydia Howell, M.D., Director of Cytopathology.

Principle Teaching Method:

Learning will occur by case-based tutorial with the faculty hematopathologist and hematopathology fellow. Those choosing to learn how to perform FNA will learn under the supervision of the Cytopathology faculty when they come to the UC Davis Cancer Center. Lymph node, bone marrow, and other tissue specimens will be reviewed. Flow cytometry data and interpretation is also covered.

The Fellow will be expected to attend Megarounds, the Didactic series, and Journal Club.

Ancillary Teaching Material:

Pathology atlases are available for review in the bone marrow laboratory and in the Pathology laboratory. Several web-based atlases are also available.

Supervision and Responsibilities:

Edward Larkin, M.D., or Kim Janatpour, M.D., will supervise the Fellow on this rotation. The Fellow will be required to attend the pathology review sessions with these faculty members, and to work closely with the hematopathology fellow. There are no patient care responsibilities.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 40 hours per week on this rotation. There is no call, weekend or holiday responsibilities. There are no direct patient care responsibilities.

Evaluation:

The Fellow will be evaluated on attendance and enthusiasm. Ongoing assessment of the ability to interpret a bone marrow aspiration specimen will continue. The Fellow will
not be expected to become proficient at lymph node interpretation. If the Fellow chooses to learn FNA, they will be evaluated on their proficiency with this procedure.

Strengths and Limitations:

There is a wealth of clinical material and dedicated hematopathologists and cytopathologists. However, during the short period of time that the fellow is on this rotation, it is unlikely that he/she will become able to confidently interpret lymph node specimens. Regardless, it will allow the Fellow to greater appreciation pathology reports and interact with pathologists.
Bone Marrow Transplant Rotation

Educational Rationale: High-dose therapy with autologous or allogeneic stem cell transplant is used to treat a variety of hematological disorders. The use of stem cell transplant is now extending to non-hematological disorders as well. A specialist in Hematology and Oncology will likely refer many patients for consideration for stem cell transplant and care for these patients after return from the transplant center, and therefore should be familiar with the indications for stem cell transplant, potential benefits and risks, and acute and long-term complications. There are also many issues in immunology, transfusion medicine, histocompatibility, and infectious disease that will be learned by a transplant experience. The UC Davis BMT Program is performs autologous and the full-range of allogeneic transplants, including matched unrelated donors and reduced-intensity (mini-allo) transplants and is a Center of Excellence for most third-party payors and Medical. The total number per year is 40-50.

Principle Method of Teaching:

The principle teaching method will be experiential, case-discussions, and didactic. The Fellow will also attend Tuesday BMT clinic and Friday Noon BMT conference. The HLA-system will be reviewed with the Faculty physician and Kristine Ahlberg, R.N., BMT Clinical Nurse Coordinator who is certified to perform National Marrow Done Program searches for unrelated donors.

The Fellow should attend the Didactic series, Megarounds, and Journal Club while on this rotation.

Ancillary Teaching Material:

Carol Richman, M.D., has prepared a packet of seminal and review articles for reading on the rotation. In addition, a copy of Forman, Blume, and Thomas is available for use by the Fellow. A bone marrow transplantation handbook is also available for use on the BMT Unit.

Supervision and Responsibilities:

The BMT faculty will supervise the Fellow on this rotation. The fellow will be responsible for the daily care of the BMT inpatients, and attending the outpatient clinic and conferences as above. He/she will round with the faculty on a daily basis. The Fellow is also expected to give one ½ hour lecture on a BMT-related topic during one of the Friday BMT conferences. Although Fellows will discuss the pediatric patients, they will not care for pediatric patients.

Work Hours and Patient Load:

As with all rotations, the maximum allowable work hours is 80 hours per week when averaged over 4 weeks. A minimum of 1 full day off per week is to be taken, when averaged over 4 weeks. Based on previous experience, the Fellow should expect to work an average of 40 hours per week on this rotation. Fellows generally take one weekend day off, and share night phone back-up call with the Attending on an every other night basis. The number of calls after hours is generally remarkably low. The inpatient census rarely exceeds 4-5 patients.
Evaluation:
The faculty physicians will evaluate the fellows on the 6 core competencies, namely: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice. The HEMATOLOGY ONCOLOGY resident’s evaluate the rotation and the faculty physician. HEMATOLOGY ONCOLOGY residents may review their evaluations at any time, and concerns should be brought to the attention of the Program Director. All evaluations will be performed using the “E-value” web-based system.

Strengths and Limitations:

The UC Davis BMT Program is a small program but performs the full spectrum of stem cell transplants. One-on-one contact with faculty enhances learning. Interaction with the pediatric transplant team during BMT Conference is a unique component of this rotation. The small patient numbers limits the spectrum of complications that the Fellow may see. However, over the course of the Fellowship most will have direct exposure to graft-versus-host disease.
RESEARCH REQUIREMENT

Educational Rationale: Research is the foundation for progress in all of medicine. Regardless of whether one is going to choose an investigative career, understanding the basics of hypothesis generation, study design, analysis and interpretation, and reporting is vital to being able to interpret the medical literature. It is also an ACGME requirement that all Fellows engage in mentored research activities.

Principle Teaching Methods:

The principle teaching method will be mentored investigation, laboratory or clinical. All Fellows must have a research mentor identified and a preliminary research proposal approved by May of his/her first academic year.

In addition, all first year Fellows are required to take the Clinical Epidemiology and Research Design Course (McCurdy and Romano Course) given in July of the first year. Fellows are excused from their clinical duties during that course. Fellows may also attend the Grant writing course given by John Rutledge, M.D., which spans the Summer/Fall quarter. A General Clinical Research Center rotation is in development by Ted Wun, M.D., Program Director and Lars Berglund, M.D., Ph.D., and Fellows will have the option of this elective as well.

Fellows regularly attend the monthly Scientific Review Committee of the UC Davis Cancer Center. Finally, Fellows will now be members of the Clinical Trials CQI Committee beginning in 2004.

Ancillary Teaching Material:

This will depend on the research project chosen. Those choosing laboratory-based research will have intensive mentoring in the pertinent laboratory methods, either by lab personnel or in course offered by the University.

Faculty has books on clinical trial design and biostatistics that can be used by the Fellows. In addition, a Biostatistics “brown-bag” lunch is available to the fellows every other week, run by Laurel Beckett, Ph.D., Chief of Biostatistics.

Supervision/Responsibilities:

The primary supervisor will be the mentor. However, Primo Lara, Jr., M.D., is charged with ensuring adequate progress in Fellow research. During protected research time, his/her mentor will evaluate the fellow in the performance of ongoing research in narrative form. The fellow will be informed, in writing, of unsatisfactory progress.

Work hours and Patient Load:

Work hours will not be more than 50 hours per week during protected periods for research. There are no patient care or call responsibilities during months designated for research.

Strength and Limitations:
There is a wealth of basic, clinical, translational, and epidemiological research in hematology and oncology related areas at UC Davis. The UC Davis campus is the ranks 17th in extramural funding of all American Universities. The UC Davis School of Medicine is ranked 52nd among medical schools, but on a per faculty basis is in the top 20. The Division of Hematology and Oncology has the most well-funded research portfolio in the Department of Internal Medicine. In recent years, Fellows have published abstracts and papers at an accelerated rate.

Elements of a Research Proposal:

The purpose of the Fellow research requirement is to introduce Fellows to the mechanics of research. The most important aspect of this is probably the research proposal, as it provides the opportunity for the Fellow to succinctly pose a question in the form of a hypothesis, and design a rational study to test that hypothesis. The design of the study is the most critical aspect in the success or failure of research. Your research proposal must include the following essential elements for approval of your research, with approximate guides as to the length of each.

1. **Background (2 paragraphs)**
   a. What is known about the problem that you want to address, what is not.
   b. Why is your question important? What is the rationale for studying this question?
   c. Example: There is evidence that homocysteine is a risk factor for venous thromboembolism. However, it is unknown whether lowering serum homocysteine might decrease the rate of recurrent VTE.

2. **Hypothesis (1 sentence)**
   a. What is the question that you want to test?
   b. Example: We hypothesize that patients given homocysteine-lowering therapy, combined with standard anticoagulation, will have a decreased rate of recurrence of VTE after an incident VTE.
      i. Furthermore, the decreased rate of recurrent will be correlated with decreased homocysteine levels.

3. **Specific Aim(s) (1-3 sentences)**
   a. How will you test the hypothesis? What are the goals?
   b. Example: In order to test the hypothesis, we will perform a prospective, randomized, double-blinded, placebo-controlled study of folic acid supplementation, in addition to standard anticoagulation, in patients with a first episode of VTE (DVT and pulmonary embolism).
      i. What is the rationale for this design?

4. **Methods (2-4 paragraphs)**
   a. How will you perform the study, e.g., the actual details.
   b. Example: Perform a prospective study as above. We will recruit patients from the UCDMC who have had an objectively proven first episode of VTE. Inclusion and exclusions will be....
   c. You do not have to be overly detailed for this proposal, but be enough so that one can determine whether your method will allow you to test the hypothesis.
   d. This section should include statistics, if appropriate.

5. **Anticipated results and interpretation (1 paragraph)**
   a. Discuss possible results and how they will be interpreted.
b. Example: We anticipate that our study will demonstrate that the group randomized to folic acid will have a decreased rate of VTE recurrence. This decreased rate will correlate with decreased homocysteine levels. However, it is possible that other effects of folic acid could be protective. A negative study might disprove our hypothesis, or be due to an inadequate dose or duration of drug.

6. Timeline
   a. How long will you need, and justify it.

7. Signature of your research mentor.

The total should not be more than 2 pages. Again, careful design of the research study is probably the most important element in its eventual success or failure.

Protected research time will not be approved without an approved research proposal.