Hematology/Oncology PRN Focus Session—Development of Innovative Oncology Practice Models: The New Frontier
Activity No. 0217-0000-14-113-L04-P, 2.0 contact hours; Knowledge-based activity.

Monday, October 13
3:45 p.m.–5:45 p.m.
Convention Center:
Grand Ballroom E

Moderator: Christine M. Walko, Pharm.D., BCOP
Clinical Pharmacogenetics Scientist, Moffitt Cancer Center, Tampa, Florida

Agenda

3:45 p.m. Introduction and Welcome
Christine M. Walko, Pharm.D., BCOP

3:50 p.m. Successful Oncology Collaborative Practice Agreements: Supportive Care Clinic
Jane M. Pruemer, Pharm.D., BCOP
Professor, University of Cincinnati College of Pharmacy, Cincinnati, Ohio

4:25 p.m. Successful Oncology Collaborative Practice Agreements: Outpatient Oncology
Benyam Muluneh, Pharm.D., CPP
Clinical Specialist, University of North Carolina Hospitals and Clinics, Chapel Hill, North Carolina

5:00 p.m. Inclusion of Trainees in Oncology Innovative Practice Models
Larry W. Buie, Pharm.D., BCPS, BCOP
Clinical Specialist in Hematology/Oncology, Memorial Sloan Kettering, New York, New York

Conflict of Interest Disclosures

Larry W. Buie: no conflicts to disclose.
Benyam Muluneh: no conflicts to disclose.
Jane M. Pruemer: no conflicts to disclose.
Christine M. Walko: no conflicts to disclose.
Learning Objectives

1. Define the purpose and legal requirements of oncology pharmacist collaborative practice agreements in the supportive care setting.
2. Discuss the logistical implementation and current responsibilities entailed in oncology pharmacist collaborative practice agreements in the supportive care setting.
3. Define the purpose and legal requirements of oncology pharmacist collaborative practice agreements in the outpatient oncology setting.
4. Discuss the logistical implementation and current responsibilities entailed in oncology pharmacist collaborative practice agreements in the outpatient oncology setting.
5. Identify novel opportunities for inclusion of both pharmacy student and resident trainees in innovative oncology practice models in both the inpatient and outpatient oncology setting.
6. Describe learning objectives, experiences and outcomes to prepare oncology specialty residents for developing and practicing in collaborative practice agreement.

Self-Assessment Questions

Self-assessment questions are available online at www.accp.com/am
I. The purpose of oncology pharmacist collaborative practice agreements in the supportive care setting is:
   a. To create a formal relationship between pharmacists and physicians or other providers.
   b. To define certain patient care functions that a pharmacist can autonomously provide under specified situations and conditions.
   c. To expand the depth and breadth of services the pharmacist can provide to patients and the health care team.
   d. To allow a licensed health care provider to make a diagnosis, maintain ongoing supervision of patient care, and refer the patient to a pharmacist to provide patient care functions as authorized by the provider.

II. The legal requirements of oncology pharmacist collaborative practice agreements in the supportive care setting are:
   a. Dependent upon the State in which the practice resides.

III. The logistical implementations entailed in oncology pharmacist collaborative practice agreements in the supportive care setting include:
   a. Developing an agreement between a physician and a pharmacist, wherein a pharmacist may initiate, modify, and continue medication regimens, order related laboratory tests, and perform patient assessments under a defined protocol.

IV. The current responsibilities entailed in oncology pharmacist collaborative practice agreements in the supportive care setting are:
   a. Assessment of the patient
   b. Evaluation of medication therapy
   c. Development and implementation of a plan of care
   d. Follow-up evaluation and medication monitoring
   e. Documentation
References


Successful Oncology Collaborative Practice Agreements: Supportive Care Clinic
Jane Pruemer, Pharm.D., BCOP
October 13, 2014

Conflict of Interests
- I have no conflicts of interest to disclose.

Learning Objectives
- Define the purpose and legal requirements of oncology pharmacist collaborative practice agreements in the supportive care setting
- Discuss the logistical implementation and current responsibilities entailed in oncology pharmacist collaborative practice agreements in the supportive care setting

Collaborative Practice Agreements: Qualifications
- Clinical pharmacists are practitioners who provide comprehensive medication management and related care for patients in all health care settings.¹
- They are licensed pharmacists with specialized advanced education and training who possess the clinical competencies necessary to practice in team-based, direct patient care environments.²,³
- Accredited residency training or equivalent post-licensure experience.
- Board certification

Process of Care provided by Clinical Pharmacists
- Assessment of the patient
- Evaluation of medication therapy
- Development and implementation of a plan of care
- Follow-up evaluation and medication monitoring
- Documentation

Assessment of the Patient
- Review the medical record using a problem-oriented framework
- Meet with the patient/caregivers to obtain a complete medication history, adherence, allergies, etc.
- Obtain, organize, and interpret patient data
- Prioritized patient problems and medication needs

Evaluation of Medication Therapy

- Assess the appropriateness of current medication
- Evaluate the effectiveness, safety, and affordability of each medication
- Assess medication-taking behaviors and adherence to each medication
- Identify medication-related problems

Development and Implementation of a Plan of Care

- Develop an individualized plan for optimizing medication therapy
- Formulate a medication management plan in collaboration with the health care team and implement the plan
- Educate the patient/caregivers
- Establish patient-specific monitoring plans

Follow-up Evaluation and Medication Monitoring

- Coordinate with other providers to ensure that patient follow-up and future encounters are aligned with the patient’s needs
- Review updates of the patient’s medical record
- Conduct ongoing assessments and refine the plan
- Monitor, modify, document and manage the plan of care

Documentation

- Medication History
- Active Problem List
- Plan of Care

Legal Components of a Collaborative Practice Agreement

- Clinical pharmacists establish written collaborative drug therapy management agreements (CDTM) with individual physicians, medical groups, or health systems and/or hold formally granted clinical privileges from the medical staff or credentialing system of the organization in which they practice.
- These privileging processes, together with the applicable state pharmacy practice act, confer certain authorities, responsibilities, and accountabilities to the clinical pharmacist as a member of the health care team and contribute to the enhanced efficiency and effectiveness of team-based care.

CPSs in State Practice Acts

- As of 2009, a total of 27 states have added specific language to their pharmacy laws authorizing CPAs.
- In 2012, according to the National Alliance of State Pharmacy Associations (NASPA), a total of 46 states address or mention some form of CPAs and/or protocols between physicians and pharmacists.
- States typically regulate these practices through scope of practice acts and boards of pharmacy and medicine regulations.
- Currently, many states restrict the care that a pharmacist can provide because of the specificity of the collaborative practice authority. However, some states expand the role of pharmacists through practice acts that are less restrictive and more empowering.
Question
What symptom management needs do patients with cancer have in the outpatient setting?

Objectives
- Identify methods for pharmacists to participate as members of multidisciplinary teams for supportive care of patients with cancer
- Identify the impact of supportive care clinics on the quality of life of patients with cancer

Methods
- Assembled a multidisciplinary team
- Developed 2 surveys
- Surveyed cancer care outpatient clinics
- Analyzed data
- Presented findings

Outpatient Findings
- 95% of outpatients approached completed survey (n = 112)
- 71% of outpatients would attend a symptom management clinic
- 94% of oncologist would refer to a symptom management clinic (n = 16)
**Patients’ Perceived Symptom Relief**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>50%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>40%</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>30%</td>
</tr>
<tr>
<td>Sleeping difficulty</td>
<td>30%</td>
</tr>
</tbody>
</table>

*Identified by outpatient  
N=112

**Oncologists’ Perceived Symptom Relief**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>81%</td>
</tr>
<tr>
<td>Diet</td>
<td>75%</td>
</tr>
<tr>
<td>Depression</td>
<td>69%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>56%</td>
</tr>
</tbody>
</table>

*Identified by oncologist  
N=16

**Professional Desired**

<table>
<thead>
<tr>
<th>Professional</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>35%</td>
</tr>
<tr>
<td>Social worker</td>
<td>21%</td>
</tr>
<tr>
<td>Dietician</td>
<td>18%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>18%</td>
</tr>
</tbody>
</table>

*Identified by outpatient  
N=112

**Professional to Compliment Care**

<table>
<thead>
<tr>
<th>Professional</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietician</td>
<td>69%</td>
</tr>
<tr>
<td>Psychologist</td>
<td>69%</td>
</tr>
<tr>
<td>Nurse</td>
<td>56%</td>
</tr>
<tr>
<td>Social worker</td>
<td>56%</td>
</tr>
</tbody>
</table>

*Identified by oncologist  
N=16

**Interpretation**

- Symptoms need to be addressed in the outpatient setting
- Both outpatients and oncologists perceive benefit from a collaborative and interdisciplinary symptom management clinic

**Outcome**

- Symptom Management Clinic opened 2/1/05
Development of Treatment Algorithms

- Medical director of program was identified
- Multidisciplinary team was named and began to develop treatment algorithms for the most commonly reported symptoms
- Reviewed literature to support development of algorithms
- Group met with medical director to gain consensus
- Algorithms were approved by appropriate medical staff committees

Treatment Algorithms Developed

- Pain Management
- Constipation
- Depression
- Insomnia
- Diarrhea
- Nausea and Vomiting
- Hot Flashes

Chronic Pain Treatment Algorithm

Pain Assessment

Outcome Measures

- Symptom Management Clinic opened 2/1/05
- Presented an assessment of SMC on pain and quality of life (QOL) from 2/2005 to 3/2008
  - Primary Objective:
    - Determine if HR-QOL, as measured by the FACT-G, improved significantly over a 6 month treatment period.
  - Secondary Objectives:
    - Evaluate changes in current pain, best pain in 24 hours, and worst pain in 24 hours
    - Determine whether variables such as sex, race, cancer diagnosis or stage are associated with positive changes in QOL
    - Identify possible relationship between trends in QOL and trends in pain scores
Assessment of Patients Seen for Pain Management at the SMC between 2005 and 2008

Quality of Life Assessment

Pain Assessment

Summary of Results for QOL and Pain Management
- Statistically significant difference in FACT-G scores (except for social/family well-being).
- Mean increase in FACT-G composite score was 10.6 (95% CI 4.9-16.3, p=0.001).
- No statistically significant difference in current or "best in 24 hours" pain scores
- Statistically significant decrease in "worst in 24 hours" pain scores of 1.1 points (p=0.009) on the 11 point scale.
- No statistically significant difference in number of patients who had a QOL response by sex, cancer diagnosis, or race.

Final Thoughts on a Symptom Management Clinic and Pharmacists
- As defined in the role of pharmacists in providing Pharmaceutical Care, pharmacists have a responsibility to ensure medications are optimally used to manage cancer patients.
- Pharmacists offer a unique perspective in providing patient care as experts in pharmacotherapeutics.
- Pharmacists can gain professional satisfaction in participating directly in the supportive care of cancer patients.
Successful Oncology Collaborative Practice Agreements: Outpatient Oncology

Benyam Muluneh, PharmD, BCOP, CPP
Clinical Pharmacist Practitioner
Malignant Hematology Clinic
University of North Carolina Medical Center

Disclosures
• No relevant disclosures

Learning Objectives
• Define the purpose and legal requirements of oncology pharmacist collaborative practice agreements in the outpatient oncology setting.
• Discuss the logistical implementation and current responsibilities entailed in oncology pharmacist collaborative practice agreements in the outpatient oncology setting.

Historical Context
1951: Durham-Humphrey Amendment
1960s: Pharmacist role expansion within Indian Health Service
1974: Department of Health, Education, and Welfare’s drug regimen regulation in nursing homes
1995: Veterans Health Administration establishes collaborative practice agreements

Terminology: Patient Care Services

What is a Collaborative Practice Agreement (CPA)?
“The construct of collaborative practice agreements between physicians and pharmacists are mutually agreed upon, voluntary in nature, and contain appropriate communication mechanisms between the physician and pharmacist to coordinate care. Initiation and monitoring of therapy occurs per protocol post-diagnosis and uses the expertise of the pharmacist in managing multiple medication regimens, including chronic disease management.”


© American College of Clinical Pharmacy
**What is a Collaborative Practice Agreement (CPA)?**

<table>
<thead>
<tr>
<th>Patient Assessment</th>
<th>Initiate, adjust, discontinue drug therapy</th>
<th>Order, interpret, monitor labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulate clinical assessments</td>
<td>Develop therapeutic plans</td>
<td>Coordinate care for wellness and prevention of disease</td>
</tr>
<tr>
<td>Conduct patient education</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hammond et al. Pharmacotherapy. 2003; 23:1210-1225

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**Legal Requirements for CPA**

- Regulatory body for pharmacist-physician collaboration specified in 43 states as of 2012
  - The six that don’t: Alabama, Delaware, Illinois, Kansas, Oklahoma, and South Carolina, Missouri
    - Maine: emergency contraception only
- Centers for Medicare & Medicaid Services (CMS)
  - Pharmacists recognized as members of medical staff
  - CPA allows for reimbursement for pharmacists who manage drug therapy

Gilberson et al. U.S. Public Health Service. Dec 2011

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**CPA in the Hematology/Oncology Setting**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Setting</th>
<th>Goals</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chung et al. Am J Health Syst Pharm. 2009</td>
<td>Community hospital</td>
<td>Dose rounding protocol</td>
<td>Cost savings ($24,300/year, 43%) reduction in chemotherapy-related errors</td>
</tr>
<tr>
<td>Valgus et al. Am J Health Syst Pharm. 2009</td>
<td>Academic medical center</td>
<td>Supportive care protocols</td>
<td>Developed a billable supportive care service and first flush chemotherapy counseling service</td>
</tr>
<tr>
<td>Shah et al. Ann Pharmacother. 2006</td>
<td>Veterans Administration</td>
<td>Document pharmacist services in cancer clinic</td>
<td>41% patient visits, 94% supportive care issues, 38% drug-specific interventions, 44% prescriptions written</td>
</tr>
<tr>
<td>Bernstein et al. Am J Health Syst Pharm. 1999</td>
<td>Community hospital</td>
<td>Physician led GCSF protocol</td>
<td>Cost savings ($2,252,46) during first 6 months with no negative clinical effect</td>
</tr>
<tr>
<td>Martin et al. Am J Hosp Pharm. 1998</td>
<td>Ambulatory care oncology clinic</td>
<td>Physician led antiretroviral protocol</td>
<td>49% of patients managed for 321 days with no adverse events</td>
</tr>
</tbody>
</table>

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**Navigating the Legal Path**

- Decision to establish CPA
  - Check with state board regarding specific laws
  - Laws support CPAs
  - No CPA laws
  - Check with specific restrictions
  - Set up institutional specific protocol

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**Legal Requirements for CPA**

- 33 states + DC
- 8 states
- 6 states
- 31 states

- **Initiate, modify, d/c**
  - 33 states + DC
  - 8 states
  - 6 states
  - 31 states

- **Practice restriction**
  - Order and interpret lab results

- **Disease state restriction**

- **Implementation**
  - Responsibilities

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**A Case Study**

**MALIGNANT HEMATOLOGY CLINIC**
Steps Towards Implementation

Clinical Needs + Business Model → Clinical Pharmacist Practitioner

Business Model

CPP Hired

- Facility Fee Billing
- Specialty Pharmacy Revenue

Clinical Needs

Oral Chemotherapy Monitoring → Transitions of Care → Medication Therapy Management

Comprehensive Oral Chemotherapy Program

Prescription → Clinical Review → Benefits Investigation

Patient follow-up → Education → Inventory

Comprehensive Oral Chemotherapy Program

Full UNCH Involvement

Institutional Data:

- Oral Chemotherapy Adherence

- Don't always think about last time they ate
- Incorrect food-drug administration
- Sometimes forget their OA
- Sometimes cut back their OA
- Don't tell their MD they cut back their OA

Don't always think about last time they ate: 44%
Incorrect food-drug administration: 31%
Sometimes forget their OA: 28%
Sometimes cut back their OA: 21%
Don't tell their MD they cut back their OA: 31%

Muluneh et al. J Clin Oncol. 2012;30 (supp0; abstr 6042)
Institutional Data: Oral Chemotherapy Adherence

<table>
<thead>
<tr>
<th>Reasons for Intentionally Cutting Back</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Effects</td>
<td>43%</td>
</tr>
<tr>
<td>MD Instructions</td>
<td>45.5%</td>
</tr>
<tr>
<td>Delay in Refill</td>
<td>46.9%</td>
</tr>
<tr>
<td>Other: Out-of-pocket cost (n=3), vacation (n=2), emotional (n=1), don't remember (n=1), misc. (n=2)</td>
<td></td>
</tr>
</tbody>
</table>

![Graph showing reasons for cutting back on chemotherapy and their frequency.]


Oral Chemotherapy Program Workflow

**Patient receives medication**

- **CPP first follow-up (1-2 weeks)**
  - Emphasize educational points, management of early-onset toxicities, laboratory evaluation
- **MD Visit (4-6 weeks)**
  - CPP to see patient prior to MD

**Continued follow-up**

- **MD Visit (3 months post-initiation)**
  - CPP to see patient prior to MD

Oral Chemotherapy Program Workflow

**Patient condition at 3 mo. assessment by CPP:**
- Increased risk of non-adherence (MPR<85%)?
- Adverse drug reactions?
- Abnormal lab values and need for dose adjustment?
- Request of physician for additional fu?

**Stable**

- Q1-6 month apt with MD
- Q3 month phone call with CPP
- Q6month visit with CPP

**Unstable**

- Visits will be individualized Q2-4 weeks pm

ALL Maintenance Protocol

**CALGB 10403 Maintenance**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vincristine</td>
<td>1.5 mg/m² on days 1, 29, 57</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>6 mg/m² divided BID on days 1-5, 29-33, and 57-61</td>
</tr>
<tr>
<td>Mercaptopurine</td>
<td>75 mg/m²/day PO on Days 1-84</td>
</tr>
<tr>
<td>IT Methotrexate</td>
<td>15 mg IT on day 1 and 29 (for the first 4 courses)</td>
</tr>
<tr>
<td>PO Methotrexate</td>
<td>20 mg/m² PO weekly (on Days 8, 15, 22, 29, 36, 43, 50, 57, 64, 71, and 78). Hold day 29 for the first 4 courses</td>
</tr>
</tbody>
</table>

**Target ANC: 0.75 - 1.5 /µL**

ALL Maintenance Protocol

**Started on Maintenance**

- ANC ± 1.5µL on 3 CBC(s) done over 6 weeks or a successive monthly/CBC(s)
- Increase dose of PO MTX by 25%
- Observe for 2-4 weeks
- Increase dose of 6MP by 25%
- After 2-4 weeks if ANC doesn’t drop likely noncompliance
- Therapeutic drug monitoring and counseling by clinical pharmacist
Collaborative Practice Agreements in Oncology

Definitions

Legal Requirements

Logistical Implementation

Formal Construct

Federal

State

Institutional

Clinical Needs

Business Model

Questions?
Conflict of Interests

- Larry W. Buie, Pharm.D., BCOP has no real or apparent conflicts of interest related to this presentation to disclose.

Objectives

- Discuss the development and implementation of the Layered Learning Practice Model (LLPM) at the University of North Carolina Hospitals (UNC)
- Review available pilot data and how the LLPM helps achieve clinical goals of the Pharmacy Practice Model Initiative (PPMI)
- Provide limitations of the current model and plans for future expansion
- Describe the expanding clinical pharmacy services at Memorial Sloan Kettering Cancer Center (MSKCC)

Value of Clinical Pharmacy Services

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value (% of total)</th>
<th>Effect on Mortality Rate p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug Use Evaluation</td>
<td>836 (96.46)</td>
<td>0.005</td>
</tr>
<tr>
<td>In-service Education</td>
<td>580 (65.54)</td>
<td>0.012</td>
</tr>
<tr>
<td>Drug Information</td>
<td>327 (36.55)</td>
<td>0.008</td>
</tr>
<tr>
<td>Poison Information</td>
<td>137 (15.48)</td>
<td>0.009</td>
</tr>
<tr>
<td>Clinical Research</td>
<td>104 (11.75)</td>
<td>0.040</td>
</tr>
<tr>
<td>Patient Specific:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AED Monitoring</td>
<td>823 (96.46)</td>
<td>0.001</td>
</tr>
<tr>
<td>PK Consultation</td>
<td>711 (80.34)</td>
<td>0.289</td>
</tr>
<tr>
<td>Drug Therapy Monitoring</td>
<td>471 (53.45)</td>
<td>0.007</td>
</tr>
<tr>
<td>Drug Protocol Management</td>
<td>616 (69.90)</td>
<td>0.018</td>
</tr>
<tr>
<td>TPN Team Participation</td>
<td>386 (44.92)</td>
<td>0.181</td>
</tr>
<tr>
<td>Drug Therapy Counseling</td>
<td>410 (46.33)</td>
<td>0.132</td>
</tr>
<tr>
<td>CPR Team Participation</td>
<td>281 (31.75)</td>
<td>0.021</td>
</tr>
<tr>
<td>Medical Rounds Participation</td>
<td>203 (22.94)</td>
<td>0.047</td>
</tr>
<tr>
<td>Administration Drug Histories</td>
<td>37 (4.18)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

UNC Pharmacy Residency: 2011 – 2014

2011-2012
- Pharmacy Residents: 25
  - Pharmacy practice (general): 9
  - Pharmacy administration: 6
  - Specialty residency: 10
  - Ambulatory Care
  - Cardiology
  - Critical Care
  - Geriatrics
  - Hematology / Oncology
  - Infectious Diseases
  - Pediatrics
  - Pharmacotherapy
  - Psychiatry

2014-2015
- Pharmacy Residents: 31
  - PGY1 (traditional): 9
  - PGY1 MS/SPA: 4
  - PGY1 Ambulatory Care: 1
  - Specialty residency: 17
  - Ambulatory Care
  - Cardiology
  - Critical Care (2 residents)
  - Health System Pharmacy Administration (4 residents)
  - Hematology / Oncology
  - Infectious Diseases
  - Pediatrics
  - Pharmacotherapy

Student Rotations

Pressures on a Pharmacy Department
- Escalating cost of medications
- Minimizing medication errors
- Involvement in medication reconciliation
  - Providing an accurate medication list upon admission, transfer, and discharge
- Anticoagulation education
- Antifungal use surrounding surgery (SCIP compliance)
- Appropriate immunizations of patients
- Reduced readmissions of certain patient groups
- All medications appropriately packaged and labeled for individual use

Pressures on Academia
- Growing numbers of pharmacy schools (and pharmacy students enrolled)
  - Maintaining quality of students
  - Shrinking job market
- Total research dollars are less and more competition for those dollars
- Meeting accreditation standards for experiential education
  - Two introductory months (IPPEs): 300 hours
  - Nine advanced months (APPEs): 1440 hours
- Finding quality rotation sites for students
  - Competition from schools
  - Hospitals are busy and have less time for teaching

UNC Partnership in Patient Care
**UNC Partnership in Patient Care**
- Desire a mutually beneficial relationship that complements each individual organization's mission
- This relationship will work to support the patient care, teaching, and research efforts of both organizations
- Development of a "one pharmacy community" mindset

**Guiding Philosophies**
- Excellence in patient care at the center of all our efforts
- An integrated collaborative structure to support our shared vision and mission
- A shared partnership whereby both organizations are philosophically and financially committed to each other's success
- A loyalty to the advancement of the individual aims of both organizations
- An unquenchable desire to establish national excellence in patient care, teaching, and point of care research
- An acknowledgment that pharmacy students and pharmacy residents are vital components to the delivery of patient care offered by the Hospital as well as the teaching, service and research missions of the School

**Goals of the Partnership**
- Seamless provision of patient care, education, and point of care research
- Complete accountability and responsibility for medication-related activities
- Strategic growth of pharmacists in pharmacotherapy intensive ambulatory care environments
- Comprehensive acute care pharmacy clinical services to all areas of UNC Hospitals to ensure high quality and reliability
- Significant growth in the number of students and the number of student months of precepted practice experiences
- Engagement of pharmacy residents and students as clinical extenders to support expanded patient services
- Growth in the number of pharmacist faculty practitioners and pharmacy residents

**Outcomes of the Partnership In Patient Care**
- Improvement in the care provided to patients at UNC Hospitals
- Expanded pharmacist services into areas where currently there are none
- Growth in the number of students trained and number of student months precepted
- Increased teaching commitment to the School
- Increased number of peer-reviewed and non peer-reviewed published manuscripts
- Hospital and School leadership at the local, state, national, and international settings demonstrating
  - (a) enhanced collaboration between a hospital/health system and a school/college of pharmacy
  - (b) expanded role of the pharmacists in patient care, education, and point of care research
  - (c) innovative experiential teaching model for students and residents

**Layered Learning Practice Model**

**LLPM: The UNC Experience**
National Patient Safety Goals

- NPSG (03.06.01)
  - Medication Reconciliation
  - Maintain and communicate accurate patient medication information across the continuum of healthcare

- NPSG (03.05.01)
  - Anticoagulation
  - Reduce the likelihood of harm related to the use of anticoagulant therapy

Team Members

- Acute Care Attending Pharmacists
- Supporting Clinical Specialists
- Decentralized Pharmacists
- Pharmacy Residents
- Pharmacy Students
- Pharmacy Prior Authorization Specialists
- Charge Nurse
- Pharmacy Leadership
- Pharmacy Technicians

Attending Pharmacist

- Oversees all aspects of pharmaceutical care and education
  - Rounds
  - Clinical review of pertinent orders
  - Therapeutic Drug Monitoring
  - Drug information
  - Review admission medication histories/discharge plans
  - Arranges and coordinates educational sessions for learners
  - Learner Evaluation

Pharmacy Resident

- Assume 100% of the patients on service
- Service requirements were adjusted if PGY1
  - Rounds
  - Order verification
  - Therapeutic drug monitoring
  - Drug information questions
  - Medication histories
  - Student education/Student Clinical Activity Review
  - Documentation for Attending Pharmacist review
  - Attendance at educational sessions required

PY4 Student

- Clinical coverage of 4-6 patients
- Reported directly to the pharmacy resident on service
- Medication admission history
- Assessed daily need for patients to speak to a pharmacist about their medications
- Responsible for clinical documentation
- Attendance mandatory at all educational sessions

Decentral Pharmacist (Clinical Generalist)

- In charge of order verification responsibilities
- Oversee resident verification for order verification
- Task list documentation
- Generation of discharge medication plans
- Discharge counseling
- Attendance at educational sessions encouraged
**Experiences to Date**

- Have conducted various pilots since June, 2011
  - Oncology
  - Nephrology
  - Pediatrics
  - Cardiology
  - Ambulatory Care
- Received unsolicited positive feedback from attending physicians, medical residents, pharmacists, pharmacy residents, and students

**Educational Reorganization**

- General curriculum for residents to occur throughout the year
- POD teaching is shared responsibility among all members within the service group to offset work that is required
- Residents are responsible for teaching/precepting students
- Goal is layered “active” learning
**The Data: A Closer Look**

<table>
<thead>
<tr>
<th>Total # of discharges</th>
<th>Heme Tumors – June</th>
<th>Solid Tumors – August</th>
</tr>
</thead>
<tbody>
<tr>
<td># weekend discharges</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Discharge capture rate</td>
<td>33 (79%)</td>
<td>30 (38%)</td>
</tr>
<tr>
<td>Avg drug therapy</td>
<td>1.18</td>
<td>2.1</td>
</tr>
<tr>
<td>Avg counseling time per patient</td>
<td>22.5 min</td>
<td>18.8 min</td>
</tr>
<tr>
<td>Notes in medical record</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Drug Therapy Related Problems: A Snapshot**

- **MDE-Heme DTP Identified at Discharge**
- **MDE-Solids DTP Identified at Discharge**

**The Pharmacy Practice Model Initiative (PPMI)**

- **Goal**
  - To significantly advance the health and well-being of patients and hospitals and health systems by developing and disseminating optimal pharmacy practice models that are based on the effective use of pharmacists as direct patient care providers

- **Objectives**
  - Describe optimal pharmacy practice models
  - Identify core patient-care-related services to be provided
  - Foster understanding of and support for these models
  - Identify existing and future technologies required
  - Identify specific actions required to implement practice models
  - Determine the tools and resources needed

**PPMI Compliant?**

- Improved pharmacy visibility
- Patients know they have a pharmacist
- Team approach to care
- NPSG for medication reconciliation/anticoagulation met and owned by pharmacy
- Pharmacy is involved in the discharge process
- Access to medications are guaranteed prior to discharge
- Transition from passive to active learning model
- Making progress towards meeting all recommendations of the PPMI

**What Have We Learned?**

- Layered Learning Practice Model
  - Part of the overall departmental practice model
  - Can be an inherent tension between learning and practice
  - Everyone has a different definition of what it is
  - While we have determined feasibility with our pilots, we need to test sustainability

- Not everyone is equipped to be an attending pharmacist
  - Preceptor expectations are very different than a clinical specialist
  - Credentialing?

- Adoption throughout the department may be slower than thought given resource allocation
LLPM: Limitations

- Ability to provide 24/7 services
- Must accommodate other learner activities
- Increased numbers of learners for sustainability
- More clinical generalist involvement for greater success
- No decentralized technician support
- Need tools to enhance documentation efficiency

Unfinished Business

- Need at least 50 residents (currently at 25)
- Need at least 600-700 student months (currently at 350)
- Need to grow pharmacy presence
  - Emergency department
  - Clinic setting
  - Expand the role of pharmacy technicians
- Have not taken full accountability for medication reconciliation or other quality measures
- Research is just beginning for the partnership

What is the Future at UNC?

- Seamless provision of patient care, education, and point of care research
- Complete accountability and responsibility for medication-related National Patient Safety Goals, CMS Core Measures, and other essential medication-related activities
- Strategic growth of pharmacists in pharmacotherapy intensive ambulatory care environments
- Comprehensive acute care pharmacy clinical services to all areas of UNC Hospitals over the entire day, seven days per week, to ensure high quality and reliability

Collaborative Drug Therapy Management (CDTM)

Increased Need

- Increased demand for cancer prevention, screening and treatment
- Shortage of oncology physicians
- Rising costs of new treatment
- Once diagnosis confirmed, 80% treatment is pharmacotherapy

Services

- Therapeutic drug monitoring
- Management of drug interactions
- Access to chemotherapy
- Supportive care

MSKCC Pharmacist Interventions

<table>
<thead>
<tr>
<th>Intervention Category</th>
<th>N=2392 (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimization of Therapy by Indication</td>
<td>1235 (51.6)</td>
</tr>
<tr>
<td>Discontinue Unnecessary Drug Treatment</td>
<td>482 (20.1)</td>
</tr>
<tr>
<td>Discontinue Duplicative Therapy</td>
<td>37 (1.5)</td>
</tr>
<tr>
<td>Initiate Therapy for Untreated Condition</td>
<td>716 (29.9)</td>
</tr>
<tr>
<td>Optimization of Effectiveness</td>
<td>694 (18.5)</td>
</tr>
<tr>
<td>Incorrect Dose</td>
<td>627 (26.2)</td>
</tr>
<tr>
<td>Inappropriate Route</td>
<td>67 (2.8)</td>
</tr>
<tr>
<td>Optimization of Safety</td>
<td>363 (15.1)</td>
</tr>
<tr>
<td>Excessive Dose</td>
<td>119 (5)</td>
</tr>
<tr>
<td>Dangerous Drug Interactions</td>
<td>244 (10.2)</td>
</tr>
</tbody>
</table>

*All physicians surveyed felt that clinical pharmacy specialists improved efficiency and optimized medication-related outcomes.
### New Clinical Services

<table>
<thead>
<tr>
<th>Current Model</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone Marrow Transplant-5</td>
<td>Solid tumor-Inpatient</td>
</tr>
<tr>
<td>Leukemia-4</td>
<td>Solid tumor-oupatient</td>
</tr>
<tr>
<td>Lymphoma-5</td>
<td>Melanoma</td>
</tr>
<tr>
<td>Myeloma-1</td>
<td>Sarcoma</td>
</tr>
<tr>
<td>Neuro-Oncology-3</td>
<td>Head and neck cancer</td>
</tr>
<tr>
<td>Infectious Diseases-2</td>
<td><strong>Role of the Resident</strong></td>
</tr>
<tr>
<td>Palliative Care-1</td>
<td>To pilot new inpatient service and outpatient clinical pharmacy models</td>
</tr>
<tr>
<td>Pediatric Oncology-7</td>
<td>Medication reconciliation</td>
</tr>
</tbody>
</table>

### Medication Reconciliation at MSKCC
- All patients interviewed on admission
- Medications are reconciled and a note is placed in the medical record
- Discharge medication reconciliation is also documented in the medical record at time of discharge
- Formal discharge counseling for every patient on the hematologic malignancies teams