Strategies for Improving Efficiency, Standardization, and Quality in Resident and Student Learning

Ashley Thompson Quan, PharmD, BCPS, BCCCP
Kendall Gross, PharmD, BCPS, BCCCP
Mandy Morris, PharmD, BCPS, BCCCP
Critical Care Pharmacists
UCSF Medical Center, San Francisco CA
Disclosure

We have nothing to disclose
Learning Objectives

✓ Identify strategies to improve efficiency of resident and student rotations
✓ Describe the role of technology in standardizing and enhancing learning delivery
✓ Examine effective quality improvement measures for new program implementation
UCSF Medical Center
Examining effective quality improvement measures for new program implementation

FROM AN ADMINISTRATOR PERSPECTIVE
The Administrator

The Educator

The Preceptor
Audience Participation

Do you have IPPE students rotating through your medical center

A. Yes

B. No
What types of activities do your IPPE students participate in [check all that apply]

A. Medication histories
B. Anticoagulation teaching
C. Insulin discharge teaching
D. Quality improvement projects
E. Research projects
F. Technician shifts
G. Other [free text]
Audience Participation

I find having IPPE students on rotation valuable

A. Strongly agree
B. Agree
C. Neutral
D. Disagree
E. Strongly disagree
The Accreditation Council for Pharmacy Education (ACPE) requires at least 300 introductory pharmacy practice experiences (IPPEs) hours before pharmacy students begin advanced pharmacy practice experiences (APPEs).

- A minimum of 150 of these hours should be balanced between community and institutional settings.
IPPE Students at UCSF Medical Center

Needed to place 91 IPPE students in 80 hour, 2 week rotations over the Summer [7 blocks]

7280 IPPE hours over three months
Creating and Implementing an IPPE program

Creating a framework for IPPE rotations
What are we trying to accomplish?

win win
Putting students in the right rotations: Survey

**IPPE Students prior work and rotational experience**

The purpose of this survey is to assess your prior hospital experience and interests, so we can provide the best fit for an inpatient IPPE rotational experience.

For additional questions or comments about this survey, please email: Ashley.Thompson@ucsf.edu

What is your first and last name?

What block are you currently scheduled for?

Please provide your email address so I can contact you with questions as needed.

Have you worked as a pharmacy technician or pharmacy intern at a hospital before?

- Yes
- No

If YES to Q2, please comment on your experiences.

Have you participated in a medication reconciliation IPPE rotation at UCSF Medical Center?

- Yes
- No

Have you participated in the warfarin discharge education IPPE rotation at UCSF Medical Center?

- Yes
- No

Do you have any other comments, special interests, or specialty training as it relates to hospital pharmacy?
What are we trying to accomplish?

✓ 15 pathways created [hospital operations or service-based direct patient care activities]

✓ Rotation pathways were created in 9 service areas with direct patient care activities
  - Intensive Care Unit, Ortho-surgery, Oncology, Cardiology, General Medicine, General Surgery, Infectious Disease, Pediatrics, and Neurosurgery
IPPE Student Activities

- Medication Histories
- Anticoagulation Discharge Education
- Insulin Discharge Teaching
- Antimicrobial Stewardship
- Technician Activities
- Medical Center Projects
- Pharmacy Resident Research Project Data Collection
How do we know we accomplished what we intended and if change needs to be implemented?
What are we trying to accomplish?

How do we know that a change is an improvement?

What changes can we make that will result in improvements we seek?
How do we know that a change was an improvement?

Utilized Electronic Survey at the end of each block

✓ Overall preceptor survey response rate was ~40%
✓ Overall student survey response rate was ~70%
How do we know that a change was an improvement?

✔ Post-rotation preceptor surveys indicated a perceived high value of working with IPPE students regardless of rotation, with a continued score greater than 4 (N=30)

✔ Students maintained a high perceived value of the service based pathways with a score > 4 across all survey blocks.

✔ Students assigned operational pathways had an average initial perceived value of **2.2 [Disagree]**
What changes can we make that will result in improvements we seek?

✓ Rapid changes based on student perceived value
✓ Created an operations checklist for improved direction
✓ Improved variety of exposure
✓ Provided clinical project opportunities
✓ Restructured rotation and project time to a split day

Parnassus Hospital Operations IPPE Learning Objectives & Checklist

Purpose: The purpose of the operations IPPE experience is to familiarize students with hospital workflow and the responsibilities of technicians and pharmacists in ensuring quality patient care.

Operational Areas at Parnassus:

What is CUDA (Central Unit Dose Area)? This is the basement pharmacy at the UCSF Medical Center which acts as the major staging area for medication distribution at the Parnassus campus.

IVAS (Intravenous drug Admixture Services): Located within CUDA, this is the area where IV chemotherapy and biologic agents stored and prepared.

13SAT (13th Floor Satellite Pharmacy): The satellite pharmacy located on 13 Meffitt is where non-batch (STAT, First dose, short expiration) IV infusions are prepared.

Shadowing Desk Tech & related activities
(Technician shifts: PN / D1 / PN - E1)

Observation & Self Directed Activities
- Find the following areas in CUDA: Technician desk, purchasing pharmacy team, IVAS, narcotics cage
- Know where to find the following types of medications:
  - PO tablets, PO liquids, IV vials / drips, Topical, Rectal, Vaginal, Inhalation, Vaccines
  - Review the types of medications stored in refrigerators
  - Know that compounded IV infusions come from Mission Bay / 13SAT (ask your technician about the batch workflow)
  - Observe how to mix and draw up oral solns/suspensions from bulk bottles (Oral Specials)
  - Observe hand hygiene and safety precautions for drawing up oral chemotherapy drugs (IVAS)
  - Observe cleaning procedures for oral chemotherapy compounding hood (IVAS)
  - Understand how to make special oral formulations from an oral extraneous compounding recipe

Preparation & Dispensing of medications
- Fill medication labels and prepare for pharmacist check
- Know which auxiliary stickers must be attached to medications before they are sent to the floor
- Creams and ointments, inhalers, refrigerated medications, biologic drugs
- Utilize tube system to send medications to the ICUs, ED, or PACU
- Know which medications cannot be tubed and why (ask your pharmacist)
- Check Pyxis Printer for "Stock-outs" and "Critical-Lows."
- Know which of these need to be filled (based on time of day and workflow)
- Use APEX to analyze patient transfers, which (if any) medications must be transferred?
- Use the "Want List" and "20H0" to reorder medications that are low or out of stock

Communication & Professionalism
- Understand phone system, know which types of calls can be fielded by technicians and which require pharmacist attention
- Understand the proper way to answer phones and what information should be collected during conversations with nurses ‘Hello, CUDA Pharmacy my name is xxxx a pharmacy intern, how may I help you?’
What changes can we make that will result in improvements we seek?

- Quality improvement processes were focused in low perceived value areas.
- Assessment continued and changes were implemented each block until students in all pathways had a perceived value of 4.5 or greater.
- Flyers were distributed to all Medical Center and School of Pharmacy pharmacists to highlight student projects and accomplishments, and to encourage continued participation in the IPPE program.
I found my rotation valuable (clinical)

I found my rotation valuable (operations)

I found my rotation valuable (Summative)
I found my project valuable
I would recommend UCSF for IPPE rotations
Medical Center Benefit from IPPE projects

Select examples

COST SAVINGS

- Levothyroxine $70,000
- IV:PO expansion $190,000
- Eculizumab $450,000
- IV diuril $250,000
- Chemotherapy dose rounding $100,000

CLINICAL & PATIENT SAFETY

- NSAID use & AKI incidence
- Quetiapine & TOC
- Update critical care infusion reference
- Organized REMS
- Longitudinal residency project data collection
- Cisatracurium MUE
- Alteplase order panel

STUDENT PROJECTS HIGHLIGHTS INCLUDED MEDICATION USE EVALUATIONS, PHARMACOECONOMIC PROJECTS, RESEARCH DATA COLLECTION, AND OPERATIONS BASED PROJECTS.
Improving preceptor support
Program Sustainability – 2016 results

IPPE Student Survey Results for blocks one & two 2016 (N=17; response rate =74%)

I found my IPPE rotation experience valuable: 4.4375
I found my IPPE Project experience valuable: 4.3125
I would recommend UCSF Medical Center as a practice site to others for IPPE rotations: 4.5
Implications

✓ ACPE requires pharmacy students to complete IPPE hours; however, there is no standard guidance for structuring individual activities.

✓ A method to implement, assess, and improve new IPPE rotations over a 14 week period is described.

✓ Student perception of the value of all pathways increased with implemented changes.

✓ Preceptors believed that students provided value to UCSFMC.
Lessons learned

✓ Cap the number of students per block
✓ Operations *variety* preferred
✓ Exceptional project/data collection resource
✓ Change volunteers based on assignments
IPPE Rotation Future Directions

- Longitudinal rotations with a specific service line throughout the year
- Lecture capture orientation, repeat quarterly
- New rotations
  - Medical Center Quality Improvement Experience
  - Antimicrobial stewardship
- Articulates
  - Medication history by service line
  - Anticoagulation discharge teaching
- Create a Face sheet of activities
- Expansion to Mission Bay
Strategies for Improving Efficiency, Standardization, and Quality in Resident and Student Learning

The Preceptor Perspective

A. Kendall Gross, PharmD, BCPS, BCCCP
Critical Care Pharmacist
UCSF Medical Center
Have you seen an increase in number of students and/or residents on your clinical service or rotation?

Have you observed changes in pharmacists’ roles and/or responsibilities at your institution?
Why this talk? Transitions in Pharmacy

- **Changing healthcare landscape**
  - Healthcare delivery models, reimbursement
  - “More with less” and outcome accountability

- **Changing pharmacy landscape**
  - Evolving practice models
  - Focus on outcomes

- **Changing educational landscape**
  - ACPE standards
  - Residency training
  - Ensure adequate preceptorship
Residency Training

Demand is high
  o 2015 Match: 4,358 applicants for 3,081 PGY1 positions

Residents add value to institutions
  o Support of innovation
  o Increased capacity to deliver education/scholarship
  o Contributions to quality and cost indicators
  o Staff recruitment, development, satisfaction
  o Revenue and funding opportunities

Academic medical center perspective
  o Administrators, preceptors, and non-preceptor pharmacists


Smith KM et al. Value of Conducting Pharmacy Residency Training—The Organizational Perspective Pharmacotherapy 2010;30(12):490e–510e)
Why this talk?
The Preceptor Perspective

Changing healthcare landscape
• Institutional priorities (transitions of care, readmissions)
• “More with less” and outcome accountability

Changing pharmacy landscape
• Hybrid practice models
• Concurrent responsibilities
• Focus on outcomes and provider status

Changing educational landscape
• Multiple levels of concurrent learners
• Expanding residency programs
• Ensure meeting ACPE/ASHP requirements
We need to optimize standardization and efficiency to maintain high quality student/resident experiences while meeting the needs of all patients

How?
A Path Forward?

Challenges

Growing numbers of trainees
Increasing responsibilities

Multiple preceptors
New pharmacy models

Non-patient care responsibilities

Goals: Maximize productivity and efficiency
Meet educational goals (interprofessional participation and direct patient care)
Provide real-world experience of contemporary pharmacists’ roles and responsibilities
UCSF Medical Center

Patients
- 935 licensed beds
- 3 campuses
- 1,149,883 outpatient visits/year

Learners
- 207 IPPE student-weeks
- 744 APPE student-weeks
- 12 PGY1 residents
- 9 PGY2 residents
- 34 Primary preceptors

ICU Rotation
- 8 Preceptors
- 5 ICUs
- IPPE, APPE students
- PGY1 residents
- PGY2 residents
Layered Learning Model

What is it?
- Incorporates attending pharmacists, residents, and students into patient care roles
- Means of extending pharmacist services using a tiered approach to care

Does it work?
- Increased pharmacist interventions (similar acceptance rates)
- Improved HCAPHS scores
- More drug-related problems identified
- Satisfaction from learners and preceptors

ASHP Pharmacy Forecast (2016)
- Pharmacy team-based approach with formalized roles
- Students take a more active role in patient care (medication history and teaching)
Layered Learning Model

**Patient care**
- Clinical recommendations
- Anticoagulation teaching
- Medication reconciliation

**Teaching**
- Clinical skills
- Topic discussions
Audience Poll

1. Do you have multiple levels of learners in your institution?

2. Do you use the layered learning model?
Layered Learning Practices at UCSF
UCSFMC Preceptor Survey (n=22)

Concurrent Learner Levels?
- Yes: 91%
- No: 9%

Layered Learning Model?
- Always: 14%
- Frequently: 32%
- Sometimes: 27%
- Never: 5%
- Not applicable: 9%
## A Path Forward?

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solutions</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing numbers of trainees</td>
<td>✓Layered learning model</td>
<td>-Learners participate in patient care at their level of expertise, redeplo</td>
</tr>
<tr>
<td>Increasing responsibilities</td>
<td>✓Productivity tools</td>
<td>ying pharmacists</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Learners gain experience in teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Centralized calendars, documents, project tools</td>
</tr>
<tr>
<td>Multiple preceptors</td>
<td>Consistent expectations</td>
<td>-Articulate-based orientation</td>
</tr>
<tr>
<td>New pharmacy models</td>
<td>Standardization</td>
<td>-Orientation checklist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Standard expectations for clinical care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Integrate evening pharmacists</td>
</tr>
<tr>
<td>Non-patient care responsibilities</td>
<td>Learner engagement</td>
<td>-Learners extend pharmacist work in projects</td>
</tr>
<tr>
<td></td>
<td>Maximize technology</td>
<td>-Use shared data entry formats (REDCap)</td>
</tr>
</tbody>
</table>
Productivity Tools
Shared Email Account

Shared Google Account
◦ Accessible from home

Google Drive
◦ File sharing and collaboration
◦ Orientation materials
◦ Key articles and guidelines
◦ Real-time approved journal club list

Google Documents and Sheets
◦ Web-based documents
◦ Real-time meetings across campuses
◦ Real-time editing of information
## Planning
- Code coverage
- Rotation expectations
- Meetings

## Shared among
- IPPE
- APPE
- PGY1
- PGY2
- Group activity

### Productivity Tools
Calendar Management

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Katie - Code Coverage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Joanne - Research Day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8 – 11</strong></td>
<td>IPPE Shadowing (10ICU)</td>
<td><strong>8 – 11</strong></td>
<td>IPPE Shadowing (10ICU)</td>
<td></td>
</tr>
<tr>
<td><strong>12p – 1p</strong></td>
<td>Multidisciplinary ICU Conference</td>
<td><strong>12p – 1p</strong></td>
<td>Multidisciplinary ICU Conference</td>
<td><strong>12p – 1p</strong></td>
</tr>
<tr>
<td><strong>1p</strong></td>
<td>- MDC Presentation</td>
<td><strong>1p – 2p</strong></td>
<td>Multidisciplinary ICU</td>
<td><strong>1p – 3p</strong></td>
</tr>
<tr>
<td><strong>2p – 3p</strong></td>
<td>ACLS Topic Discussion (ALL)</td>
<td><strong>2p – 3p</strong></td>
<td>ICU CLA (Katie)</td>
<td><strong>2p – 3p</strong></td>
</tr>
</tbody>
</table>
### Challenges
- Growing numbers of trainees
- Increasing responsibilities

### Solutions
- Layered learning model
- Productivity tools

### Strategies
- Learners participate in patient care at their level of expertise, redeploying pharmacists
- Learners gain experience in teaching
- Centralized calendars, documents, project tools

### Challenges
- Multiple preceptors
- New pharmacy models

### Solutions
- Consistent expectations
- Standardization

### Strategies
- Articulate-based orientation
- Orientation checklist
- Standard expectations for clinical care
- Integrate evening pharmacists

### Challenges
- Non-patient care responsibilities

### Solutions
- Learner engagement
- Maximize technology

### Strategies
- Learners extend pharmacist work in projects
- Use shared data entry formats (RedCAP)
Standardization
Learning Experience Orientation

Goals
◦ Consistent expectations
◦ Provide reference for learners
◦ Maximize efficiency

Components
1. Recorded (Articulate) lecture
2. Orientation checklist
3. In-Person Preceptor discussion
Residency Standard

Learning experience descriptions (3.3c) must include:

- General description of practice area
- Roles of pharmacists in area
- Expectations of residents
- Educational goals and objectives
- Activities associated with goals and objectives

Orientation

- Preceptors must review learning experience with each resident during orientation
Orientation Standardization
Recorded Articulate Lecture

Location
- Student and resident websites

Contents
- Practice site
- Helpful numbers, times, etc.
- Required presentations, projects

Standardized template
- Discuss questions/checklist with preceptor after viewing
Orientation Standardization
Orientation Checklist

Part I: Expectations/Schedule
Part II: Patient workup
Part III: Patient presentations
Part IV: Policies and Procedures

### Part I: Introduction to Critical Care
To be modeled by preceptor in the first week of rotation

### Part II: Patient Presentations
To be modeled by preceptor in the first week of rotation

- History & Physical
- Progress and consult notes
- Medication List
- MAR
- Vital signs
- Ordered labs
- Laboratory results
- Intake/Output
- Insulin/glucose and nutrition
- Microbiology Results
- Results of diagnostic studies

- One-liner
  - Applicable patient disposition updates
  - Problem List - list major problems either in order of importance or by system
  - Actionable to-do list

  - Patient presentations
    - Review resident calendar
    - Review resident goals/objectives
    - Schedule evaluations, topic discussions and learning experiences

1430-1600
  - Listen to BCPS Critical Care Lecture (80 min)
Orientation Standardization
Skill-Based Orientation

Anticoagulation Teaching
Medication Reconciliation
Does it work?
UCSFMC Preceptor Survey (n=22)

Learner Types Precepted

<table>
<thead>
<tr>
<th>Type</th>
<th>64%</th>
<th>73%</th>
<th>86%</th>
<th>64%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPPE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY1</td>
<td>64%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Orientation Methods Used

<table>
<thead>
<tr>
<th>Method</th>
<th>91%</th>
<th>100%</th>
<th>82%</th>
<th>36%</th>
<th>9%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review LE/Rotations...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-person orientation</td>
<td>91%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent readings</td>
<td></td>
<td></td>
<td>82%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online recordings</td>
<td></td>
<td></td>
<td></td>
<td>36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation checklists</td>
<td>9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Does it work?
**UCSFMC Preceptor Survey: Orientation**

<table>
<thead>
<tr>
<th></th>
<th>Primarily Articulate-Based (n=4)</th>
<th>Any Articulate Use (n=8)</th>
<th>Non Articulate-Based (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with the methodology and time required for orientation&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.5 +/- 0.57</td>
<td>4.13 +/- 0.64</td>
<td>3.29 +/- 0.99</td>
</tr>
<tr>
<td>Time spent on orientation by learner type, hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPPE</td>
<td>0.55 +/- 0.53</td>
<td>2.04 +/- 3.4</td>
<td>1.16 +/- 0.66</td>
</tr>
<tr>
<td>APPE</td>
<td>0.85 +/- 0.87</td>
<td>2.28 +/- 3.29</td>
<td>5.73 +/- 8.42</td>
</tr>
<tr>
<td>PGY1</td>
<td>1.63 +/- 0.95</td>
<td>4.31 +/- 5.27</td>
<td>2.95 +/- 2.37</td>
</tr>
<tr>
<td>PGY2</td>
<td>1.13 +/- 0.25</td>
<td>2.21 +/- 2.5</td>
<td>2.11 +/- 1.97</td>
</tr>
</tbody>
</table>

<sup>a</sup> Rated from very unsatisfied to very satisfied on 5-point Likert Scale
Standardization & Clinical Care

Standard ICU pharmacist sign-out

Anticoagulation teaching documentation

Drug level monitoring documentation

Rx Signout

Dispo: CRRT, sepsis

Med

[ ] ID: 0/3 empiric PNA: cosyn/vanc - f/u resp cx

[ ] vanc trough 8/5 @1500

[ ] TDM: s/p phenytoin load on 8/2, 8/5 __

[ ] BG: DM2 (home metformin): glarg 15 + esparp - weaning steroid

[ ] PTA held. Lisinopril (bp)

CC: 54F w/ HTN presented with COPD exacerbation on 7/31, tsf ICU on 8/3 after resp decompensation.

DVT: SQH

SUP: lanso (PPI PTA, MV)

TDM:

BG: (only fill out if not active; otherwise, if active, put on top)

N:

Sed

Pain: chronic pain

PTA regimen: MS Contin 60 TID > 8/3 fent gtt

Delirium:

CV:

#sepsis - NE

#HTN -

P:

# MV 8/3 (hypoxia)

FEN/GI:

Nutrition:

R:

#CKD (stage 3) - 8/4 CRRT (low UOP)

H:

ID:

#UTI outpt. finished clpco x7 days (end 7/12/16)

E:

#DM2 home metformin
Centralized reference material locations

UCSF-specific guidelines offering recommendations on antimicrobial management on a wide variety of inpatient and outpatient infections.

- Adult Antimicrobial Dosing Guidelines
- Aminoglycoside Dosing and Monitoring
- Antibiogram
- Guidelines for Initial Therapy
- IDMP Contact Information
- Pediatrics
A Path Forward?

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solutions</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing numbers of trainees</td>
<td>✓ Layered learning model</td>
<td>- Learners participate in patient care at their level of expertise, redeploying pharmacists</td>
</tr>
<tr>
<td>Increasing responsibilities</td>
<td>✓ Productivity tools</td>
<td>- Learners gain experience in teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Centralized calendars, documents, project tools</td>
</tr>
<tr>
<td>Multiple preceptors</td>
<td>✓ Consistent expectations</td>
<td>- Articulate-based orientation</td>
</tr>
<tr>
<td>New pharmacy models</td>
<td>✓ Standardization</td>
<td>- Orientation checklist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Standard expectations for clinical care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Integrate evening pharmacists</td>
</tr>
<tr>
<td>Non-patient care responsibilities</td>
<td>✓ Learner engagement</td>
<td>- Learners extend pharmacist work in projects</td>
</tr>
<tr>
<td></td>
<td>✓ Maximize technology</td>
<td>- Use shared data entry formats (RedCAP)</td>
</tr>
</tbody>
</table>
What is REDCap?
- Web-based, secure site
- Allows for concurrent data collection
- Structured fields to ensure consistency with instructions on where to find information
- Export to Excel, STATA, SPSS, etc.

Role of Students
- IPPE student contributions to ongoing QI/QA and research projects
- Requires HIPAA and CITI training modules
# Standardized Project Management Orientation and Reference

<table>
<thead>
<tr>
<th>Name</th>
<th>Owner</th>
<th>Last modified by me</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASHP MUE Article.pdf</td>
<td>Joanne Smith</td>
<td>Jun 29, 2016</td>
</tr>
<tr>
<td>Data collection FAQ</td>
<td>me</td>
<td>Aug 10, 2016</td>
</tr>
<tr>
<td>Evaluation of Discontinuation of Atypical Antipsychotics (Catatonic Wolfgang)</td>
<td>Joanne Smith</td>
<td>—</td>
</tr>
<tr>
<td>ICU Quetiapine Data Entry Procedure in RedCap</td>
<td>William Martin</td>
<td>—</td>
</tr>
<tr>
<td>Implications of atypical antipsychotic prescribing</td>
<td>Joanne Smith</td>
<td>—</td>
</tr>
<tr>
<td>IPPE Quetiapine Project Orientation.docx</td>
<td>Joanne Smith</td>
<td>—</td>
</tr>
<tr>
<td>Quetiapine Flyer.pdf</td>
<td>Joanne Smith</td>
<td>Jul 26, 2016</td>
</tr>
<tr>
<td>Quetiapine for ICU delirium - CCM 2009.pdf</td>
<td>Joanne Smith</td>
<td>—</td>
</tr>
</tbody>
</table>
Standardized Project Management

ASHP Guidelines on Medication-Use Evaluation

Medication-use evaluation (MUE) is a performance improvement method that focuses on evaluating and improving medication-use processes with the goal of optimal patient outcomes. MUE may be applied to a medication or therapeutic class, disease state or condition, a medication-use process (prescribing, dispensing, or administration), a unit, a department, or an entire organization.

Steps of the MUE Process

While the specific approach varies with the practice setting and patient population being served, the following common steps occur in the ongoing MUE process:

- Establish organizational authority for the MUE process and identify responsible individuals and groups.
- Develop screening mechanisms (indicators) for comprehensive surveillance of the medication-use system.
- Set priorities for in-depth analysis of important aspects of medication use.

Title of Medication Use Evaluation

Acetaminophen is a nonopioid analgesic and antipyretic that is used to treat mild to moderate pain and fever. Acetaminophen can also be used for the management of moderate to severe pain with adjunctive opioid analgesics. Acetaminophen is available in both oral and rectal forms; the IV formulation (COFAM) was approved by the FDA in November 2010 for the treatment of pain and fever in adults, adolescents, and children over the age of two. IV acetaminophen was approved for pain on the basis of two clinical trials that demonstrated superiority of IV acetaminophen versus placebo for postoperative pain. It was further approved for the indication of fever based upon one trial that showed its superiority over placebo when given as a single dose to 80 healthy male subjects. The recommended dosage for adults and adolescents weighing over 50 kg is 1000 mg IV every 15 hours or 650 mg IV every 4 hours. The dose must be given as an infusion over 15 minutes. The daily cost for 1000 mg of IV acetaminophen is $40.80-$61.20 while the daily cost of 650 mg of PO acetaminophen is $0.24 and the daily cost of 650 mg of IV acetaminophen is $2.16-$3.24. IV acetaminophen was approved by the Pharmacy and Therapeutics (P&T) Committee in April 2011 with the understanding that its use should be limited to patients who are NPO or NFR and have contraindications to alternative therapies such as IV opioids and IV ketorolac. We present the results of a medication use evaluation (MUE) of IV acetaminophen over a six-month period after its addition to formulary.
<table>
<thead>
<tr>
<th>Task</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final write up uploaded to PharmAcademic</td>
<td>15.06.2016</td>
</tr>
<tr>
<td>Final write up due to preceptors</td>
<td>01.06.2016</td>
</tr>
<tr>
<td>WSC presentation</td>
<td>23.05.2016</td>
</tr>
<tr>
<td>WSC slides uploaded to PharmAcademic</td>
<td>04.05.2016</td>
</tr>
<tr>
<td>Western States PPT submission due</td>
<td>10.05.2016</td>
</tr>
<tr>
<td>Spring Research Poster Session</td>
<td>04.05.2016</td>
</tr>
<tr>
<td>WSC dry run presentation</td>
<td>25.04.2016</td>
</tr>
<tr>
<td>Spring Research Poster to preceptors for proofing</td>
<td>20.04.2016</td>
</tr>
<tr>
<td>WSC dry run slides to preceptors for proofing</td>
<td>15.04.2016</td>
</tr>
<tr>
<td>Abstract due for Spring Research Poster Session</td>
<td>24.03.2016</td>
</tr>
<tr>
<td>Abstract due for Western States</td>
<td>01.03.2016</td>
</tr>
<tr>
<td>Meeting Kathleen and Hildy (January)</td>
<td>26.01.2016</td>
</tr>
<tr>
<td>Present poster - UHC Poster Session</td>
<td>05.12.2015</td>
</tr>
<tr>
<td>FINISH DATA COLLECTION</td>
<td>30.11.2015</td>
</tr>
</tbody>
</table>
## A Path Forward!

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solutions</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing numbers of trainees</td>
<td>Layered learning model</td>
<td>-Learners participate in patient care at their level of expertise, redeploying pharmacists</td>
</tr>
<tr>
<td>Increasing responsibilities</td>
<td>Productivity tools</td>
<td>-Learners gain experience in teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Centralized calendars, documents, project tools</td>
</tr>
<tr>
<td>Multiple preceptors</td>
<td>Consistent expectations</td>
<td>-Articulate-based orientation</td>
</tr>
<tr>
<td>New pharmacy models</td>
<td>Standardization</td>
<td>-Orientation checklist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Standard expectations for clinical care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Integrate evening pharmacists</td>
</tr>
<tr>
<td>Non-patient care responsibilities</td>
<td>Learner engagement</td>
<td>-Learners extend pharmacist work in projects</td>
</tr>
<tr>
<td></td>
<td>Maximize technology</td>
<td>-Use shared data entry formats (REDCap)</td>
</tr>
</tbody>
</table>

**Goals:** Maximize productivity and efficiency

Meet educational goals (interprofessional participation and direct patient care)

Provide real-world experience of contemporary pharmacists’ roles and responsibilities
Implementation: Considerations

- Consider scalability
  - Applicability of shared training materials between rotations/learner types
  - General template and customize based on specific populations

- Applicability to (multiple) learner levels
  - Medication reconciliation
  - Anticoagulation teaching

- Don’t be afraid to try something and refine as you go
Summary

- Evolving healthcare, pharmacy and educational landscapes

- Layered learning model a promising option for maximizing learning and productivity with increasing numbers of pharmacist trainees

- Technology can aid in improving standardization and efficiency in clinical rotations
Strategies for Improving Efficiency, Standardization, and Quality in Resident and Student Learning

The Educator Perspective

Mandy Morris, PharmD, BCPS, BCCCP
Critical Care Pharmacist
UCSF Medical Center
The Administrator

The Educator

The Preceptor
Why this talk?
The Educator Perspective

- Challenges of the **learning** landscape
  - Provide consistent, high quality training with limited preceptor resources
  - Engaging multiple levels of learners
  - Bridge connections amid an expanding health system
Identified Challenges

PGY1

PGY2

APPE

IPPE

Preceptors
Identified Solutions

Consolidation of Learning Activities
- Rotation Presentations
- Journal Club
- Simulation Lab

Productivity Tools
- Orientation
- Research

Layered Learning Model
- Precepting
- Discussions

Activity Tools
- PGY1
- APPE
- IPPE
- PGY2

PGY2 QI Projects
- Orientation
- Journal Club
- Rotation Presentations
- Research
- Simulation Lab

PGY1
- Continuing Education
- Teaching Certificate
## Consolidation of Learning Activities

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tues</th>
<th>Weds</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5 (Centralized Learning Activity)</td>
<td>6 (Topic Discussion)</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12 (Centralized Learning Activity)</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19 (Critical Simulation Lab)</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26 (Centralized Learning Activity)</td>
<td>27 (Rotation Talk)</td>
<td>28</td>
</tr>
</tbody>
</table>

- **15th**: Evening Seminar
- **22nd**: Rotation Talk
Pharmacy Grand Rounds

- **Objectives**
  - ✔ Centralize the scheduling of learning activities
    - Collapse learning experiences
    - Standardize the date/time
  - ✔ Engagement of multiple levels of learners
  - ✔ Connect learners across campuses
    - Interactive learning experiences
    - Opportunity for enhanced interactions amongst learners
    - Technology to bridge communication
Pharmacy Grand Rounds

• Creation of a standardized learning experience
  ✓ Scheduling
    - Recurring date/time with preceptor consensus
    - Same day, time and location
    - Connect campuses
  ✓ Activities
    - Centralized Learning Activities (CLA)
    - Faculty Seminars
    - Continuing Pharmacy Education (CPE)
    - Critical Simulation Lab
  ✓ Attendees
    - Faculty, staff, residents, students
Bridging the Gaps

• **Use of technology to bridge communications amongst hospitals**
  - Growing institutions with expanding network of hospitals
    ▪ Connecting learners from multiple campuses and institution
    ▪ Allows for active participation for distance learners

• **Example technologies**
  - Dynamic meeting rooms
  - WebEx meetings
  - Google Hangouts
  - Live Lecture Capture
Putting It Into Practice

- Bridge multiple campuses
  - Pharmacy Grand Rounds
    - Allow for resident participation while at offsite rotations
    - Reduce need for commuting between institutions

- Bridge multiple institutions
  - Northern California Critical Care Journal Club
    - Create a network of institutions (UCSF, UC Davis & Stanford Medical Centers)
    - Quarterly journal club presentation (PGY2 Critical Care Resident)
Centralized Learning Activities

- Resident-led service-based presentation
  - 12 sessions (12 residents)
    - 1 service-specific presentation
      - Evidence-based medicine
      - Updates in service protocols/manuals
      - Updates in guideline recommendations
  - Examples:
    - 2016 HAP/VAP Guidelines
    - Use of extended infusion beta-lactam antibiotics
    - Management of pulmonary hypertension (Family Feud)
Centralized Learning Activities

- **Benefits (Learner Perspective):**
  - Increased attendance to resident presentations
  - Peer evaluations
  - Broadened learner exposure to variety of topics

- **Benefits (Preceptor Perspective):**
  - Opportunity to provide service-specific updates to a wide audience
  - Centralize preceptorship of a learning activity
  - Extension of the layered learning model
Faculty Seminars

- Faculty-led learning experiences
  - Emphasis on professional development
  - Schedule based on residency milestones
    - Staffing Orientation
      - LEAN Concepts
    - ASHP Midyear Conference
      - Motivational Interviewing
    - Western States Conference
      - Writing a Manuscript
Continuing Pharmacy Education

• ACPE-Accredited Continuing Pharmacy Education Activities
  o Program development and administration by clinical pharmacy staff
    ▪ PGY-1 and PGY-2 residents
    ▪ Clinical pharmacist preceptorship
  o Offer ≥ 20 hours CPE credit annually
    ▪ Pharmacist License Renewal (30 hours CPE every 2 years)
  o Regularly scheduled series
    ▪ Same objectives for all CPE presentations
    ▪ Live viewing option
      ✓ Reduction in administrative overhead
Continuing Pharmacy Education

**Topic areas:**
- Annual topic selection by the CPE Committee
- Topic areas driven by needs of the hospital
  - Topic area requests are submitted by pharmacy staff concurrent with resident evaluations

![Continuing Pharmacy Education Assignments](image-url)
Critical Simulation Lab
• Do you utilize a form of simulation at your institution for the training of students, residents or pharmacy staff?
What is Simulation?

• Simulation in health profession training
  o Well-established within nursing and physician training

• Is there a role for simulation in pharmacy training?
  o Allows trainees to practice clinical skills with no risk to live patients
  o May address any gaps in clinical learning
  o Build confidence and decreases performance anxiety for future encounters
  o Knowledge retention

Why Simulation?

• **Challenges – “To Err is Human”**
  - Residents are primary code blue responders
  - Increase preparedness for emergency situations
  - Hands on orientation is limited in ability to take through all clinical scenarios

• **Opportunities**
  - Develop a forum to provide best practices and discussion of experiences
  - Content experts to provide hands-on training
  - Incorporate institution-specific practices
Simulation Techniques

Standardized Patients
Patient Counseling

Low Fidelity
Code blue compounding

Medium Fidelity
Classroom “mega” code

High Fidelity
Sim Man
High Fidelity Simulation

- **Features:**
  - Full vitals
  - Pulses
  - Auscultation: heart, lung, bowel sounds
  - Eye Signs: blinking, reactive pupils
  - Secretions: sweat, tears, bleeding
  - CPR feedback (depth and rate)
  - Drug recognition system (rate of medication administration)
  - Vascular access (IV, IO)
  - Convulsions
Program Development

#1 - Case Selection
- Identify areas of critical pharmacy interventions
- Total of 16 cases (4 cases per simulation session)
- Course progresses through increasing complexity of cases

#2 - Course Objectives & Assessment Strategies
- Develop 6 objective domains
- Mapped course objectives across 16 cases

#3 - Identify Content Experts
- Created a case template
- Provided case objectives
- Identified content experts to write and oversee case
  - Adult cardiac arrest
  - Sepsis
  - Intracranial hemorrhage
  - Status epilepticus
Program Objective Domains

1. **Patient Specific Factors:** Patient-specific or medication-specific information that is within the scope of a pharmacist to identify and should provide to the physician

2. **Medical Knowledge:** Abides by national guideline recommendations and/or algorithms

3. **Systems-Based Practice:** Considers UCSF Medical Center bundles and algorithms to direct care; verbalizes pharmacy-specific functions

4. **Drug Information:** Provides appropriate responses to drug information questions utilizing available drug references

5. **Drug Preparation/ Procurement:** Demonstrates knowledge of appropriate drug procurement and utilizes appropriate drug preparation techniques

6. **Interpersonal Skills and Communication:** Effectively communicates information and collaborates with other team members
# Mapping Case-Specific Objectives

<table>
<thead>
<tr>
<th>Case</th>
<th>Patient Specific Factors</th>
<th>Medical Knowledge</th>
<th>Systems-Based Practice</th>
<th>Drug Information</th>
<th>Drug Preparation/Procurement</th>
<th>Interpersonal Skills and Communication</th>
</tr>
</thead>
</table>
| Sepsis | • Recognizes patient meets SIRS, sepsis and severe sepsis criteria given end organ dysfunction (e.g. hypotension), indicating need for fluid resuscitation and early antibiotic administration  
• Resident assesses patient for multidrug resistant pathogen risk-factors and reviews past culture history results | • Recommendations consistent with guidelines  
• Able to assist with fluid selection and volume for resuscitation | • Provides antibiotic selection and dosing recommendations based on the UCSF Code Sepsis algorithm and susceptibility information  
• Selects antibiotic doses that expedite delivery time to bedside  
• Verbalizes need for code sepsis documentation in the EMR  
• Use of UCSF Code Sepsis Order-Set | • Be able to provide reasonable antibiotic dosing recommendations based on limited laboratory data  
• Understand which antibiotic should be administered first with limited line access  
• Retrieve drug compatibility information for administration  
• Understand the risks of peripheral vasopressor administration | • Be able to prepare a norepinephrine infusion  
• Perform bedside admixing of antibiotics | • Be able to communicate with rapid response, ICU, and primary team(s) to identify risk factors for MDR pathogens, and appropriate fluid and vasopressor selection  
• Be able to prioritize multiple requests and communicate with fellow team member  
• Communicates to RN order of antibiotic administration and compatibility of multiple infusions as needed |
75 year old male with history of mild dementia, type 2 diabetes, coronary artery disease, and atrial fibrillation who was admitted from his skilled nursing facility for hip arthroplasty after sustaining a fall. He was recently treated for UTI as an outpatient (completed course 2 days prior to admission).

You are on your ID rotation and covering code sepsis for the acute care floor patients. The pager goes off, notifying you of a code sepsis on 14 Moffitt. Your team is rounding on the 14th floor, and you go to the patient’s bedside.
Code Sepsis

State 1
• Severe sepsis recognition

State 2
• Antimicrobial selection and procurement

State 3
• Hypotension (fluid administration)

State 4
• Antimicrobial administration

State 5
• Hypotension (vasopressor selection)
Assessment Strategies

• Debriefing Session
  o Guided by content expert
  o 2 minutes of debrief: 1 minute simulation
  o Able to utilize video replay
  o Resident self-reflection

• Critical Action Checklist
  o Reflects case objectives
  o Framework for debriefing session

• Survey
  o Satisfaction survey
  o Pre- and Post-Likert based confidence survey
Survey Results from Resident Training

• Will your performance change as a result of participating in this simulation activity?

<table>
<thead>
<tr>
<th>Performance Change</th>
<th>Total Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>0</td>
</tr>
<tr>
<td>Slightly</td>
<td>0</td>
</tr>
<tr>
<td>Moderate</td>
<td>17%</td>
</tr>
<tr>
<td>Significantly</td>
<td>75%</td>
</tr>
<tr>
<td>Completely</td>
<td>8%</td>
</tr>
</tbody>
</table>
Survey Results from Resident Training

Rate level of satisfaction of the following:

- Content of the simulation cases: 93% Very Good
- Use of simulation based technologies: 91% Very Good
- Utilization of debriefing as a positive learning experience: 93% Very Good
- Practical application to practice: 93% Very Good
Summary

• Evolving learning landscape requires a dynamic approach to teaching strategies with *ongoing assessments* to determine if we are meeting the needs of our learners and preceptors.

• Consolidation of learning experiences into a *structured, predictable schedule* has enhanced attendance, increased learner participation and reduced duplicative teaching efforts.

• Consider the role of *novel teaching strategies* such as simulation experiences.
Future Directions

• **Pharmacy Grand Rounds**
  • Create multidisciplinary teaching opportunities (residency requirement)
  • Expand CE program to offer technician CE credits

• **Simulation Lab**
  • Combine efforts with other institutions to share ideas/cases/best practices
  • Create multidisciplinary simulation experiences
  • Extend training opportunities to IPPE and APPE students
    ▪ Med rec, warfarin counseling
    ▪ Difficulty in meeting adequate sites for 300 hour requirement
CSHP thanks our Schools/Colleges of Pharmacy for their support of Seminar 2016
Session Code:

1. Write down the course code. Space has been provided in the daily program-at-a-glance sections of your program book.

2. To claim credit: Go to www.cshp.org/cpe before December 1, 2016.