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## PHARMACY PRACTICE

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# Incorporation of Pharmaceutical Care into a Hospital Residency Rotation

Jana M. Bajcar

### BACKGROUND

One of the post-baccalaureate clinical training programs available to pharmacy graduates in Canada is a 12-month Hospital Pharmacy Residency Program. The purpose of this program is to “provide an experiential learning environment using practitioner role models so the necessary skills, knowledge, and values required to be a competent pharmacist can be acquired and applied by the resident in the promotion of exemplary patient care, such that leadership potential for the profession can be encouraged.”<sup>1</sup> Since the aim is to expose the resident to contemporary pharmacy practice, as changes in practice occur these should be incorporated and reflected in the structure and content of the residency rotations.

Recently the Department of Pharmacy at St. Michael's Hospital was introduced to the concept of Pharmaceutical Care (PC) as defined by Helper and Strand<sup>2</sup> and a commitment was made to incorporate this philosophy into the daily practice of pharmacy. The Medical-Surgical Intensive Care Unit (MSICU) was

chosen as the initial trial site to test the desirability and feasibility of implementing a model of practice based on the provision of PC which was being developed in conjunction with the Faculty of Pharmacy, University of Toronto. The MSICU is also the site for a critical care residency rotation, and therefore, the existing rotation was assessed and modified to reflect this change in pharmacy practice.

This article describes how the critical care rotation was modified by the rotation preceptor to enable the resident to gain an understanding of both the concept of PC and the process involved in its provision.

### ROTATION OBJECTIVES

Prior to undertaking any re-assessment and modification of the existing rotation, a set of expectations for the rotation was defined which would provide the framework for the rotation. These expectations were that the clinical rotation must:

- 1) incorporate the philosophy of PC;
- 2) ensure that the patient and individual patient needs are central to all activities involved in the

practice and teaching of the resident;

- 3) provide the resident with a practicing role model who is familiar with the concept and who on a regular basis provides PC;
- 4) ensure that the resident's main focus is to learn and not assist with the workload on the unit;
- 5) be structured using a self-directed, problem-oriented teaching approach which would assist the resident in acquiring skill for life-long learning and which would complement the process involved in the provision of PC; and,
- 6) establish the resident as the individual responsible for his/her own learning needs and continuing education.

The second step was to review the goal of the rotation. The existing goal was for the resident to develop a general knowledge of the pathophysiology and management of common critical care disorders, and to develop a basic skill in monitoring critically-ill patients. In reviewing this goal, it was clear that it was not pharmacy specific as it could also apply to medical and nursing students.

**Jana M. Bajcar, M.Sc. Phm.** is the Director, Pharm.D. Program and Assistant Professor, Faculty of Pharmacy, University of Toronto, Toronto, Ontario, and a Primary Care Pharmacist-Pharm.D. Instructor, Wellesley Hospital, Toronto. At the time of completion of this work, Jana was Clinical Coordinator (Critical Care), Department of Pharmacy, St. Michael's Hospital, Toronto.

**Address Correspondence to:** Jana M. Bajcar, M.Sc. Phm., Faculty of Pharmacy, University of Toronto, 19 Russell Street, Toronto, Ontario M5S 1A1.

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The former goal failed to outline the purpose of learning this knowledge and these monitoring skills relative to the patient's drug related needs and, as well, did not adequately delineate the pharmacist's unique role. In providing PC, pharmacists do not manage medical disorders or problems, but rather drug related problems (DRPs).<sup>2</sup> The management of DRPs involves identifying the actual or potential problems and then solving or preventing them. The second component of the existing goal, developing the "skills in monitoring critically-ill patients", provides little direction since the rationale behind the requirement of these skills is not stated. According to the philosophy of PC, pharmacists monitor patients in order to ascertain progress towards predetermined outcomes and to ensure that no new DRPs have developed. Therefore, the overall goal of the rotation was changed as follows: "to learn and apply the skills, knowledge and values necessary in providing PC to the patients in the MSICU by learning how to manage common DRPs".

On the basis of this goal, individual rotation objectives were modified. The existing objectives were based on diseases managed in the area. Using the focus of the common DRPs encountered on the unit, the objectives were changed to incorporate the knowledge and skills which are necessary to identify, solve, and prevent these DRPs. As well, a systematic process for data collection (patient, drug, and disease) and synthesis was incorporated which enabled the pharmacist to provide PC.

The last component was the revision of the student assessment tool to facilitate the acquisition of skills, knowledge, and values identified as important in the rotation objectives. Regular student assessments by preceptor and student self-assessment were

incorporated into the rotation to provide feedback on the student's progress.

The new rotation objectives are outlined in Appendix A. The first ten objectives deal with the process which must be followed in order to provide PC and can be considered generic for any rotation. Objectives 11 - 13 outline the knowledge/content (drug and disease) and the pharmacy tools which a student should be expected to master during the critical care rotation. These objectives are specific for this rotation. In order to accurately define these objectives, the preceptor must first identify the type and incidence of DRPs commonly experienced by patients on the service. From this list, it can be determined what types of medical conditions, drug therapies, and specific skills need to be emphasized in the rotation. For example, in the revised objectives the disease content is separated into primary medical conditions which lead to MSICU admission and which are commonly associated with DRPs such as respiratory failure or cardiovascular instability and secondary medical conditions which may complicate the patient's care in the MSICU and which are associated with common DRPs such as deep vein thrombosis, alcohol withdrawal, and agitation.

The various clinical pharmacy tools commonly used in providing care to patients on the particular service also need to be assessed and placed in perspective relative to the patient's needs on a particular unit. For example, pharmacokinetic dosing is frequently applied in identifying, preventing or solving DRPs in critical care, and therefore, was incorporated into the objectives.

### **ROTATION ACTIVITIES**

The revised responsibilities of a resident during the rotation are outlined in Appendix B. As with

the objectives, the original activities had to be modified to incorporate the concept of PC.

Initially, the critical care rotation was the first exposure for the resident to the provision of PC. Therefore, the first three to four days of the four-week rotation were dedicated to providing a basic understanding of the concept of PC and the steps and skills involved in its provision. The speed at which the resident proceeds through the sessions may vary depending on prior exposure and experience with PC. Also, individuals with more extensive clinical exposure who have acquired a certain structure or process in monitoring patients may experience difficulty integrating the new thought process required for the provision of PC. It was generally noted that residents who had the opportunity to complete, a comprehensive hospital based PC workshop, prior to the MSICU rotation, required less time to complete this portion of the training. The training schedule is outlined in Appendix C.

In order to acquire this knowledge and sense of team cooperation, the resident is scheduled to spend time during the first week with several members of the critical care team (half day with critical care nurse at bedside, one to two hours with each of the other disciplines e.g., the respiratory therapist, physiotherapist, clinical dietitian, and a nurse clinician). This was felt to be important because the patient is the focus not only for the pharmacist providing PC, but also for many other health disciplines who contribute to the patient's overall clinical outcome. As well, the pharmacist should be familiar with the role of other health care professionals so as to delineate where his/her responsibility starts and stops. Finally, the pharmacist may need to depend on other practitioners to assist in determining

the patient's wishes and preferences, in order to accurately decide on the patient's desired clinical and pharmacotherapeutic outcomes.

Initially, the resident is assigned only one patient and is given the time necessary to provide PC. Once the initial patient work-up and pharmacy care plan has been completed and implemented, a second patient is then assigned to the resident. At this point, the resident becomes fully responsible for this new patient as well as for the first patient. Subsequent patients are assigned to the resident depending on the individual resident's ability to provide PC. A new patient is assigned to the resident only if all DRPs have been satisfactorily identified and pharmacy care plans developed and implemented for the former patients. While the initial patient work-up may take two to three days to complete, subsequent patient workups become faster and overall the resident is usually responsible for one to two patients at one time. The total number of patients that a resident is assigned during the rotation will vary, but based on current experience a maximum of six to eight patients have been assigned per rotation. As well, in choosing the type of patient, consideration is given to the resident's past experience and knowledge of the problem (i.e., if a resident is comfortable in managing DRPs pertaining to pneumonia but insecure with problems relating to shock, priority should be given to the latter type of patient even though both are identified in the rotation objectives.)

During the resident's rotation, the preceptor is responsible for providing PC to the other patients in the unit. This enables the preceptor to act as a role model and also allows the student the time and opportunity to thoroughly integrate the PC process and tools.

In order to encourage more self-directed learning and enhance the ability to independently identify learning needs, the resident is required to maintain a Daily Learning Agenda. This is a list of areas that the resident identifies which require further learning, discussion, or clarification. From this list the preceptor, together with the resident, determines the type of patients that should be assigned to the resident, reading material required, and topics selected for formal and bedside teaching sessions.

Another area that had to be reviewed when changing to PC was the format used by the resident when presenting individual patients both informally to the preceptor on a daily basis and formally to other pharmacy staff (two to three times/rotation). The presentation format which was developed is as follows:

- description of the case using the format outlined in the PMDRP<sup>3</sup>;
- statement of all DRPs with a brief description of why each is a DRP;
- outline of the pharmacy care plan for each DRP (e.g., clinical outcome, pharmacotherapeutic outcome and endpoints, assessment of all available alternatives, therapeutic plan and monitoring plan), and how the pharmacy care plan was implemented; and
- brief follow-up on the progress of each DRP.

Due to time constraints, in the formal presentation only one of the major DRPs is presented in detail.

### EVALUATION

An assessment form was developed with criteria describing specific outcomes that the resident is expected to attain by the end of the rotation (see Appendix D). These criteria are based on the original objectives and are separated into three categories: a) activities, or processes, which pertain to the

provision of PC; b) ICU related knowledge; and c) clinical pharmacy skills or tools which are commonly utilized in the MSICU. A rating out of five is given for each criteria. At the end of each week, both the resident and the preceptor complete this evaluation and discuss the residents process for formative purposes. Together, the resident and preceptor identify areas of deficiency and develop an action plan. The last evaluation, which is completed at the end of the rotation, is used as the final summative evaluation for the entire rotation.

In addition, at the completion of the rotation the resident's ability to identify, prevent, and solve DRPs is evaluated by a practical test. A mock case is used, which incorporates most of the common DRPs encountered by the resident while on the service. The resident is given two hours to work-up the case. Any references required for the case may be utilized by the resident. The assessment is oral and based on the resident's ability to accurately identify the DRPs and develop appropriate pharmacy care plans.

In conclusion, over two years, three hospital pharmacy residents and one Pharm.D. student have completed the revised MSICU rotation. Informal evaluation by the students indicates that the rotation is generally well received. Furthermore, incorporation of PC facilitates teaching by providing an organized, consistent approach to patient care. ☐

### REFERENCES:

1. Canadian Hospital Residency Board Accreditation Standards - September 1990.
2. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990; 47:533-43.
3. Winslade N, Bajcar J, et al. Pharmacist Management of Drug Related Problems (PMDRP) Forms. Faculty of Pharmacy, University of Toronto.

## Appendix A

### Objectives For Critical Care - Medical/Surgical ICU Rotation

**Preceptor:** Jana Bajcar, Clinical Pharmacy Coordinator

**Duration:** 4 Weeks

**Goal:** To learn and apply the knowledge, skills, and values necessary to provide Pharmaceutical Care to patients in the medical/surgical intensive care unit.

**Objectives:**

At the completion of this rotation, the resident will be able to:

1. Comprehend the role and functions of a pharmacist in caring for critical care patients' drug related needs.
2. Effectively communicate (verbally and in writing) with patients/family and/or health care professionals, for the purpose of determining the patient's desired clinical outcomes, and identifying, solving, and preventing drug-related problems (DRPs).
3. Effectively and efficiently collect relevant patient, drug and disease information through the use of the Pharmacist's Management of Drug Related Problem form.
4. Using the Therapeutic Thought Process, appropriately analyze and interpret patient, drug and disease information, and apply this information to specific patients in order to accurately identify, solve, and/or prevent DRPs.
5. Identify and clearly state all existing DRPs in a patient.
6. Determine the appropriate clinical outcome, pharmacotherapeutic outcome, and pharmacotherapeutic endpoints for each DRP identified.
7. List feasible therapeutic alternatives; compare and contrast them based upon benefits and risks of each drug to the specific patient.
8. For each DRP, choose the optimal therapeutic alternative for the specific patient.
9. Develop and implement a therapeutic plan aimed at resolving or preventing each DRP.
10. Design and implement a monitoring plan, and follow each patient to assess the progress toward the desired outcomes.
11. Document in the patient's medical chart all DRPs which have been identified along with an appropriate justification, pharmacy care plan and follow-up assessment.
12. Acquire knowledge of disease states and management of common DRPs associated with common **medical problems** that are **responsible for ICU admissions**:
  - i) Respiratory Failure:
    - asthma
    - COPD
    - pulmonary infections
    - pulmonary edema
    - AIDS
    - sepsis
    - failure to wean from ventilator
    - excessive narcotic use
    - drug overdose
  - ii) Circulatory Failure
    - septic shock
    - cardiogenic shock (MI, CHF)
    - hypovolemic shock
13. Be able to identify, prevent and resolve most common and most severe DRPs associated with **medical problems** that may **complicate patient's care in the ICU**. Examples of medical problems include:
  - i) Multisystem organ failure
    - renal failure
    - liver failure
    - respiratory failure (ARDS)
  - ii) stress induced gastric bleed
  - iii) deep vein thrombosis/pulmonary embolus
  - iv) pulmonary edema
  - v) volume overload
  - vi) line sepsis
  - vii) nosocomial sepsis (pneumonia)
  - viii) depression
  - ix) ICU psychosis (agitation)
  - x) constipation
  - xi) electrolyte disorders
  - xii) acid-base disturbances
  - xiii) alcohol withdrawal
14. Develop and apply various clinical skills and tools which are used to identify, prevent or resolve common DRPs encountered by patients in the medical-surgical intensive care unit. These skills and tools may include the following:
  - a) drug information retrieval, assessment (critical appraisal) and application
  - b) pharmacokinetic dose calculations (aminoglycosides, vancomycin and phenytoin)
  - c) medical chart documentation
  - d) communication between members of a multidisciplinary team
  - e) self directed learning

## Appendix B

### Responsibilities of the Resident

The resident will:

1. Attend daily physician rounds in the MSICU.
  - a) Prior to daily rounds, the student will, for each patient he/she is responsible for: read the patients chart, obtain updated laboratory values and updated medication list, identify any new patient complaints for the purpose of identifying additional actual or potential DRPs and for appropriate monitoring of previously defined DRPs.
  - b) The resident will actively participate during rounds. He/she will bring to the attention of other health care professionals of actual or potential DRPs, and propose well thought plans for the prevention and resolution of these problems.
2. Use the Pharmacist Management of Drug Related Problem Form (PMDRP), to complete work-ups on assigned patients. The resident will be totally responsible for providing PC to these patients.
3. Using the PMDRP as a basic framework, develop a pharmacy care plan for each patient and document daily progress and follow-up.
4. Present three case presentations to staff pharmacists.
5. Meet daily with preceptor to review and discuss patient issues.
6. Attend the following educational rounds
  - grand rounds (Wed. 1200h - optional)
  - anaesthesia round (Mon 0745h - optional)
  - critical rounds (Tues 0730h - optional)
  - Critical care ethics rounds (Wed 1430h - optional)
7. Maintain a daily learning agenda and review these areas.

## Appendix C

### Introductory Training of the Resident to Provide Pharmaceutical Care

<b>Fundamental Principles of Pharmaceutical Care (PC)</b>	
Session I (2-3 hours)	What is PC? What is the pharmacist's role with respect to caring for a patient in the intensive care unit? Who should receive PC in the intensive care unit? What is a DRP? How can we state DRPs? What are their characteristics of patients admitted to the unit? What are the most common medical problems? What are the common DRPs encountered by the patients in this intensive care unit?
Session II (2-3 hours)	What are the steps involved in providing PC? The teaching version of a pharmacist's workup, The Pharmacist Management of DRPs form (PMDRP), and the development of a Pharmacy Care Plan are discussed in detail and the resident works through the components utilizing examples of typical ICU patients.
Session III (2-3 hours)	Together the preceptor and the resident evaluate DRPs of an actual ICU patient using the PMDRP.
<b>Application of Principles and Tools</b>	
Session IV (1-2 days)	The resident is assigned to one patient. The resident is required to identify all of the patient's DRPs and develop a detailed Pharmacy Care Plan utilizing the PMDRP. A relatively simple patient is chosen to allow the resident to focus on the process. Once completed, the patient is discussed with the preceptor. This initial work-up of the patient may take one to two days to complete.

**Appendix D**  
**MSICU Rotation Assessment (Abbreviated version)**  
 **Resident Self-Assessment**       **Preceptor Assessment**

**RESIDENT:** \_\_\_\_\_

**PRECEPTOR:** Jana Bajcar, Clinical Pharmacy Coordinator

**TIME PERIOD:**     **End of first week**                       **End of second week**

**End of third week**                       **End of fourth week**

For each category assess the student's performance using the following scale:

- 1- Performed significantly below expected standard and requires major improvement
- 2- Performed slightly below expected standard and requires minor improvement
- 3- Performed at expected standard
- 4- Performed slightly above expected standard
- 5- Performed significantly above expected standard

**Provision of Pharmaceutical Care:**

1. Has an adequate comprehension of Pharmaceutical Care (PC), and is able to clearly articulate the pharmacist's role and functions required for the provision of PC to patients in Intensive Care.

1            2            3            4            5

Comments: \_\_\_\_\_

2. Appropriate and accurately determines the patient's or family's desired clinical outcomes (for the patient) through communication with the medical team.

1            2            3            4            5

Comments: \_\_\_\_\_

3. Accurately and efficiently collects relevant patient, drug and disease information through the use of the Pharmacist's Management of Drug Related Problem Form (PMDRP). Specifically, is able to accurately and thoroughly complete the form, and appropriately utilize the form in order to provide PC to the patient.

1            2            3            4            5

Comments: \_\_\_\_\_

4. Through the use of the Therapeutic Thought Process, accurately and efficiently analyzes, interprets, and integrates patient, drug and disease information, and applies it to a specific patient in order to accurately identify the drug-related problems. Specifically, for each step of the Therapeutic Thought Process, appropriately identifies the type and depth of information required, relates the information to the patient, makes a decision, and adequately justifies this decision

1            2            3            4            5

Comments: \_\_\_\_\_

5. Accurately identifies, and clearly states, all existing drug-related problems (DRPs).

1            2            3            4            5

Comments: \_\_\_\_\_

6. For each DRP, accurately determines and states the clinical outcomes, pharmacotherapeutic outcome, and pharmacotherapeutic endpoints.

1            2            3            4            5

Comments: \_\_\_\_\_

7. For each DRP, accurately and thoroughly lists all feasible therapeutic alternatives, and compares these alternatives based on efficacy, time frame, toxicity, drug interactions, convenience, and cost in order to determine the best alternative for the specific patient.

1            2            3            4            5

Comments: \_\_\_\_\_

8. For each DRP, accurately chooses the optimal therapeutic alternative and adequately justifies the decision.

1            2            3            4            5

Comments: \_\_\_\_\_

9. Accurately and thoroughly develops a therapeutic plan aimed at resolving or preventing each DRP. Clearly communicates this plan verbally and in writing to physicians and nurses.

1            2            3            4            5

Comments: \_\_\_\_\_

**Appendix D (continued)**

10. Designs and implements a monitoring plan, and follows each patient to determine whether the desired outcomes have been achieved. Specifically for each DRP, defines the positive and negative indicators accurately, and designs a comprehensive plan which will ensure that these indicators are assessed at appropriate intervals.

1            2            3            4            5

Comments: \_\_\_\_\_

11. Follows-up the patient at appropriate intervals to ensure that progress is being made toward the desired outcomes. When the patient is transferred to the floor, communicates with other clinical pharmacists to facilitate, and to ensure, continuity of patient care.

1            2            3            4            5

Comments: \_\_\_\_\_

12. Documents in the patient's medical chart, using the formal Pharmacy Notes, the DRPs which have been identified, along with, the appropriate "Data" (history, objective and subjective signs and symptoms, drugs, etc.), "Assessment" (justification for the DRP), "Plan" (pharmacy care plan: Desired Outcomes, Therapeutic Plan, Monitoring Plan) and Follow-up assessment. Specifically, the documentation is accurate, succinct, and grammatically correct.

1            2            3            4            5

Comments: \_\_\_\_\_

**Knowledge:**

1. Has acquired and demonstrated an appropriate level of knowledge of disease states (pathophysiology), and management of common DRPs associated with common **medical problems**, that are **responsible for ICU admissions**:

(Indicate 1-5)

Respiratory Failure:

- asthma \_\_\_\_\_
- COPD \_\_\_\_\_
- pulmonary infections \_\_\_\_\_
- pulmonary edema \_\_\_\_\_
- AIDS \_\_\_\_\_
- sepsis \_\_\_\_\_
- failure to wean from ventilator \_\_\_\_\_
- excessive narcotic use \_\_\_\_\_
- drug overdose \_\_\_\_\_

Circulatory Failure

- septic shock \_\_\_\_\_
- cardiogenic shock (MI, CHF) \_\_\_\_\_
- hypovolemic shock \_\_\_\_\_

2. Has acquired and demonstrated adequate knowledge required to identify, prevents and resolve most common or most severe DRPs associated with **the following medical problems** that may **complicate patient's care in the ICU**. Examples of medical problems include:

(Indicate 1-5)

- Multisystem organ failure \_\_\_\_\_
- renal failure \_\_\_\_\_
- liver failure \_\_\_\_\_
- respiratory failure (ARDS) \_\_\_\_\_
- Stress induced gastric bleed \_\_\_\_\_
- Deep vein thrombosis/pulmonary embolus \_\_\_\_\_
- Pulmonary edema \_\_\_\_\_
- Volume overload \_\_\_\_\_
- Line sepsis \_\_\_\_\_
- Nosocomial sepsis (pneumonia) \_\_\_\_\_
- Depression \_\_\_\_\_
- ICU psychosis (agitation) \_\_\_\_\_
- Constipation \_\_\_\_\_
- Electrolyte disorders \_\_\_\_\_
- Acid-base disturbances \_\_\_\_\_
- Alcohol withdrawal \_\_\_\_\_

**Appendix D (continued)**

**Skills, tools and attributes:**

1. Accurately identifies when additional drug information is required, locates the appropriate and relevant information, critically analyses and interprets the information, accurately applies the information to the patient situation.

1            2            3            4            5

Comments: \_\_\_\_\_

2. Independently calculates the patient dose requirements, and interprets serum drug levels, for the following drugs, using pharmacokinetic principles:

(Indicate 1-5)

- aminoglycosides            \_\_\_\_\_
- vancomycin                \_\_\_\_\_
- phenytoin                  \_\_\_\_\_
- theophylline                \_\_\_\_\_

3. Communicates ideas and questions clearly and succinctly to the other members of the health care team.

1            2            3            4            5

Comments: \_\_\_\_\_

4. Undertakes independent self-directed learning by maintaining a daily learning agenda, selecting areas which require further emphasis (together with preceptor), utilizes resources appropriately, and completing the learning in the selected areas within the appropriate time frame. In addition, appropriately identifies when assistance is required from the preceptor.

1            2            3            4            5

Comments: \_\_\_\_\_

5. Accepts responsibility for the patient and for own learning. This can be demonstrated by regularly attending rounds, completing any required preparation within the appropriate time frame (prepared for therapeutic discussions, completion of PMDRP and Pharmacy Care Plans, Case presentations), completing all activities required for patient care within the appropriate time frame (e.g., ensure that issues which have to be dealt with by the end of the day are done so before going home, prepared to discuss patients at rounds.)

1            2            3            4            5

Comments: \_\_\_\_\_

6. Provides well prepared and organized case presentations, using appropriate audiovisual accessories. Presentations are easily understood, well paced, and information provided is at an appropriate level of depth for the audience. Is able to answer questions accurately, thoroughly, clearly but succinctly.

1            2            3            4            5

Comments: \_\_\_\_\_

General Comments: \_\_\_\_\_

\_\_\_\_\_

Areas Which Require Further Emphasis:

Plan

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_