Putting the Heart into Pharmacy: Creation and Implementation of a PharmD Cardiology Rotation in Tertiary Care

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INTRODUCTION

In 2017, the University of Saskatchewan transitioned from offering a Bachelor of Science in Pharmacy program to offering a Doctor of Pharmacy (PharmD) program. With this change came additional time spent in experiential learning, including 32 weeks of advanced practice in the fourth year. This increase in experiential learning strengthens the skills needed for establishing a career in pharmacy. At our institution, the PHAR 483 rotation is a fourth-year specialty care rotation, initiated in 2020 to offer students in their final year experience in caring for patients with complex cardiology conditions. Although this specialty rotation encompasses the same competencies as general hospital rotations, students must apply their skills to cardiac patients with disease states they may not have previously encountered. For example, this rotation involves high-acuity patients with acute coronary syndromes who may need cardiac surgery, which gives students the opportunity to learn about perioperative medication therapy. Given the nature of heart disease, students on this rotation also have a large role in educating patients about health promotion strategies such as smoking cessation. Additionally, care for many of these patients is managed in outpatient cardiology clinics, where students get to practise proper handover of care or may be involved with the initial referral.

Experiential learning must facilitate the achievement of required competencies set out by the Association of Faculties of Pharmacy of Canada (AFPC)[1] (Table 1). Although these competencies are used in evaluating student success for all pharmacy rotations in Canada, according to standardized assessments, preceptors have flexibility as to the experiences provided during each rotation. This paper describes the structure of and experiences provided in a specialty cardiology rotation.

STRUCTURE OF THE ROTATION

Student Activities

The 8-week cardiology rotation implemented at the Regina General Hospital (RGH) in Regina, Saskatchewan, is offered twice annually to fourth-year students (1 student per rotation), under the supervision of primary and secondary preceptors (as described below). Availability of positions was initially limited to test feasibility and to align with the established framework of residency rotations; however, the goal is to offer this rotation a minimum of 3 times yearly. RGH is a 421-bed tertiary acute care centre serving the needs of patients with complex cardiovascular conditions in southern Saskatchewan. The centre has a total of 68 beds in 4 cardiac wards: the cardiac care unit, the cardiac surveillance unit, the cardio-sciences unit, and the surgical telemetry unit. The students care for cardiac patients with multiple comorbidities and complex therapy regimens under the supervision of the secondary preceptors, who provide clinical coverage as ward pharmacists. Students also experience other practice environments, with the opportunity for 1 shadowing day with a pharmacist at the heart function clinic (an outpatient service). The rotation involves approximately 6 weeks of direct patient care and 2 weeks of project time. The components of the rotation are described in the paragraphs below.

Direct patient care within an interdisciplinary health care team: Students conduct workup and prepare pharmaceutical care plans for 1 to 5 patients weekly for a variety of cardiac disease states, including acute coronary syndrome, heart failure, atrial fibrillation, and cardiac surgery. The student's workload depends on patient complexity, with the number of patients under the student's care increasing from the first to the final week of the rotation. Students are expected to use a team-based approach to resolve drug

therapy problems during interdisciplinary rounds, to provide education and discharge counselling to patients, and to ensure continuity of care through written and verbal handover to community health care practitioners. As the students gain more confidence and clinical expertise, they progress to completing tasks more independently.

Research and quality improvement: Students participate in projects prioritized by the cardiology pharmacy team, typically completing a specific section of a research project for which a pharmacy resident is the principal investigator. Students either help with preliminary stages, such as literature searching and protocol development, or with a later stage, such as data collection. These activities are undertaken with assistance from the primary preceptor, who analyzes the data. Subsequently, after student rotations are complete, pharmacy residents, as the main authors for journal submission, prepare the final manuscript.

Targeted activities: Antithrombotics are high-risk medications frequently used for cardiac conditions. Once weekly, students independently complete antithrombotic assessments to ensure safe and effective utilization of these medications, as per local standards on all cardiac wards.[2] The patients selected for student assessment of their antithrombotics are organized by ward and are independent of the student's current patient load for direct patient care (as described above). For each student, the aim is to assess 30 patients weekly, which is comparable to the standard patient load of a ward pharmacist. Students present their recommendations to the cardiology ward pharmacist and address the suggested changes with the interdisciplinary team. Students also provide patient education and ensure affordability for continuity of care after discharge.

Presentations: Each student is responsible for a formal 1-hour presentation, in a format of their choice, to the cardiology ward pharmacists or members of the interdisciplinary team. Presentations are mutually beneficial and demonstrate the student's familiarity with new studies, guideline updates, or investigations in clinical "grey areas".

Therapeutic discussions: Students are given readings and learning objectives to be completed before student-led discussion with a secondary preceptor. These discussions with a cardiology expert allow students to gain exposure to disease states with which they might otherwise be unfamiliar.

Preceptors

The cardiology pharmacist team consists of 6 front-line pharmacists (including K.R.) and 1 senior pharmacist, who is the clinical coordinator (K.T.). The average pharmacist-to-patient ratio on the cardiology wards is 1:30.

Preceptorship for the cardiology rotation is structured with 1 primary preceptor (the clinical coordinator), who oversees the achievement of rotation competencies,

TABLE 1. Examples of Alignment of AFPC Competencies with Selected PHAR 483 Activities

PHAR 483 Activities	AFPC Competencies
Direct patient care within an interdisciplinary health care team • Uses the patient, hospital chart, and health care team to gather relevant patient information • Applies appropriate resources and patient information to make clinical interventions, demonstrating problem-solving and critical thinking skills • Establishes relationships with the cardiology team during rounds and maintains these relationships during the rotation • Communicates medication regimens to patients and encourages them to be stewards of their own health	Scholar Care provider Collaboration Health advocate
Research • A unique learning opportunity that provides the student with exposure to research • Involvement in independently drafting components of the research protocol, including the background, purpose, and methods sections • Provision of documents and manuscript examples to students, to guide them in preparing the first draft • Demonstration of self-directed learning, with appropriate integration of feedback on drafts	Professional Communication
Independent activities • Communicates verbally and in writing concerning drug therapy problems identified during antithrombotic assessments • Demonstrates respect and shared responsibility with other team members • Hands over patients to ward pharmacist when appropriate	Communication Collaboration
Presentations • Participates in health promotion and disease prevention efforts • Uses a variety of strategies to present information, and demonstrates fundamental knowledge of the presentation topic	Scholar Leader-manager Communication Health advocate
Therapeutic discussions • Communicates verbally with the preceptor and has meaningful discussions on important cardiovascular conditions • Completes the "pre" questions before the therapeutic discussion day	Professional Communication

AFPC = Association of Faculties of Pharmacy of Canada, PHAR 483 = course designation for cardiology rotation.

and multiple secondary preceptors (the front-line pharmacists), who facilitate the rotation's activities. The primary preceptor builds foundational skills with the student in the first weeks of the rotation and provides formal rotation feedback to the student. The secondary preceptors are involved in therapeutic discussions, presentation guidance, and review of students' interventions. As students become more independent, time spent with the primary preceptor decreases, while the involvement of the secondary preceptors increases. One strength of this rotation is the use of cardiology pharmacists as preceptors, since they are familiar with the expected level of performance and the pharmacy curriculum, making their formative feedback more valuable. Other health care providers are less familiar with the curriculum and therefore would require more time-intensive preceptor development.[3] Nonetheless, informal feedback from other health care providers is requested and valued.

This rotation involves peer-to-peer learning with students on other specialty rotations and a layered learning model, whereby students interact with pharmacy residents when they are on rotation. For example, students and residents provide care for the same patients, which allows the resident to serve as an informal preceptor for the student. Therapeutic discussions are also completed jointly, to allow students and residents to learn from one another. Layered learning works well within a cardiology rotation, because for many patients, experiencing a cardiac event is one of their first major interactions with the health care system. Often, these patients are discharged with an overwhelming number of new medications, and students have the opportunity to educate them and to improve both their adherence with the medication regimen and their understanding of disease states. Therefore, the layered learning model allows more patients to be counselled about high-risk medications before discharge by shifting preceptors' clinical responsibilities to the residents, which frees up the secondary preceptors to provide care to additional patients; this approach also allows residents to develop preceptor skills.

Student Feedback

Pharmacy students undergo 2 formal evaluations, at the midpoint (week 4) and end (week 8) of the rotation. The University of Saskatchewan provides structured evaluations based on AFPC competencies, with specific criteria to evaluate the student's success. The evaluations are discussed formally by the student and the primary preceptor, with contributions from the secondary preceptors. In addition to the formal evaluations, timely feedback is provided regularly throughout the rotation by all preceptors. The expectations of both students and preceptors are clearly outlined during orientation, and if any issues with competency achievement are identified during the rotation, the primary preceptor addresses them early on.

EXPERIENCES, CHALLENGES, AND FUTURE IMPLICATIONS

Students make positive contributions to patient care and are valued by other health care providers. For example, Mead and Pilla[4] reported that over 3.5 years, a total of 2868 interventions were completed by 16 pharmacy students in a family medicine setting, accounting for an estimated cost savings of US$55 892, with prescriber acceptance rates of about 80%. Similarly, the students in the cardiology rotation described here routinely intervene on drug therapy problems, and their involvement in direct patient care at RGH has resulted in higher rates of predischarge medication review and counselling for patients who are taking high-risk medications. For example, during one rotation, 22 interventions were logged, of which 100% were appropriately documented and 75% involved high-alert medications such as anticoagulants. The number of interventions logged is likely an underestimate, given that reporting of metrics had low uptake by students.

Students support research endeavours by collecting pertinent information and providing insights that may potentially benefit future patients. The students complete formal evaluations of the rotation itself and the preceptors; all of these evaluations have been positive, and many students recommend this rotation to their peers. Additionally, all students who have taken this rotation to date were successful in achieving the AFPC competencies. Informal feedback from the pharmacist team and other health care providers has also been positive. Through discussions and listening to student perspectives, this rotation can also help to re-inspire preceptors about their daily work and can help cardiology ward pharmacists and allied providers stay up to date with current practice trends.[5] Ultimately, pharmacy students represent an underutilized resource, and this rotation has maximized their benefit to our health care system.[6]

There is a hospital pharmacist shortage in Canada, leading to understaffing and burnout, and necessitating the promotion of hospital pharmacy and residency programs.[7] The rotation described here builds hospital pharmacy skills and incorporates residency activities, such as research and presentations. This type of exposure to hospital pharmacy practice can increase a student's desire to pursue a residency and a career in hospital pharmacy.[8] This concept has proven true within this cardiology rotation, with 4 (67%) of the 6 students who have completed the rotation going on to complete a residency and 5 (83%) pursuing a career in hospital pharmacy. The layered learning model, involving both students and residents, is an effective component of this rotation. This process helps facilitate delivery of the rotation and is a potential strategy for preparing the residents to serve as preceptors in the future. This model is especially important given constraints on the number of pharmacy preceptors available. The layered learning model also helps

to reduce the demand for preceptors and prevent burnout. In the future, the plan is to accept multiple students at one time and to use peer-to-peer learning.

Important lessons have been learned by implementing this specialty cardiology rotation at RGH. Students arrive with different backgrounds, experiences, and desired career paths, which requires preceptors to establish appropriate goals during orientation and tailor the rotation to each student's needs while achieving AFPC competencies. Another challenge is operating specialized and generalized rotations concurrently in the same hospital. To address this challenge, students on general hospital rotations rotate through other, noncardiac wards (e.g., critical care, oncology). Protecting preceptor time to engage in activities such as therapeutic discussions can also be difficult. However, the clinical coordinator delegates leadership and teaching responsibilities to others and in turn provides clinical coverage, thereby increasing team engagement.

SIGNIFICANCE FOR PRACTICE

This article has outlined the benefits and structure of a specialty cardiology rotation. The PHAR 483 rotation offers a novel pharmacy experience allowing students to navigate complex cardiovascular conditions. Rotation feedback from both students and preceptors has been positive, with their contributions improving patient care.

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