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PharmD
Bridging Program Report

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Innovating pharmacy together
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Executive Summary

The University of Waterloo School of Pharmacy developed a unique distance education “Bridging Program” for alumni of its Bachelor of Science in Pharmacy program, enabling them to earn a PharmD. Program development began in earnest in September 2013 and the first students started the time-limited program in January 2015 after the required course and program approvals were granted. The program successfully concluded in 2021 with 182 of our alumni having earned their PharmD.

The program is considered a resounding success, exceeding our original admission projections and with 75% of those admitted successfully completing the program. It met financial projections in terms of tuition revenue generated. Many new relationships were fostered, including with assessors and recognition of prior learning experts who had not previously worked with the School of Pharmacy. Other relationships were solidified, for example with current or former supervisors or preceptors from the School’s existing co-operative education or rotations programs.

Successful delivery of the program contributed to alumni relations throughout the life of the program as it fulfilled the School’s commitment to offering these specific cohorts a path to a PharmD degree. The program administrators and faculty also responded to student and alumni feedback and whenever possible responded sensitively to individual circumstances which were often quite different than those experienced by traditional undergraduate students. This signaled to our graduates that the School is responsive to their evolving lifelong learning needs and has the ability and motivation to tailor programs for the benefit of its alumni.

Many pedagogical innovations were employed during the offer of this program, including fully online problem-based learning and hybrid teaching of a professional practice course and it was the first use of recognition of prior learning in a degree program at the University of Waterloo.

Most of this program was completed prior to March 2020 and the onset of the COVID-19 pandemic; however, it had already introduced innovative approaches for online learning and distance education concepts for working professionals which have proven to be valuable to both our undergraduate and Lifelong Learning programs since the conclusion of the Bridging Program in 2021.

Background

The University of Waterloo launched its School of Pharmacy in 2008 with a Bachelor of Science in Pharmacy (BScPhm) as its approved entry-to-practice degree. At the time this program was launched, a change to PharmD as the entry-to-practice degree in Ontario was anticipated, but the timing of such a change was unknown. As such, the original Waterloo BScPhm program was structured with curricula, prerequisite courses, and experiential placements more aligned with existing North American PharmD programs. Students enrolled in the BScPhm program were advised that they would be given an option to enroll in some type of “bridging” program whenever the provincial move to entry-to-practice PharmD as the standard undergraduate degree occurred.

Once provincial approval was granted, the new entry-level PharmD (ELPD) program at the University of Waterloo (UW) launched in 2015. Through discussions with School of Pharmacy administration and key representatives of the University’s senior administration, including Dr. Mario Coniglio, then Associate Vice-President, Academic, it was determined that approval of this PharmD Bridging Program would be handled as a minor modification of this existing ELPD program. All degree elements, including credit weights,
competency requirements, skills assessed, practice site exposures etc. would have to align, although assessments could be conducted via alternative methods.

During the curricular review process and implementation of changes to its undergraduate program to meet PharmD accreditation standards established by the Canadian Council for Accreditation of Pharmacy Programs, the requirements for any subsequent “bridging” program for those graduates of the BScPhm program were identified. This process resulted in development of individual courses as discussed in the [Courses section](#) as well as PHARM 497 – Clinical Rotation 1: Direct Patient Care Fundamentals with its recognition of prior learning assessments and use of transfer credits.

School of Pharmacy administration agreed that the program should be offered largely via distance education in a flexible format to meet the needs of practising professionals.

During program development consultations occurred with representatives of University departments including Admissions, Institutional Analysis and Planning, Finance, Student Records and the Provost’s Office and were championed by Dr. Mario Coniglio, Associate Vice-President, Academic, Dr. David Edwards, Hallman Director of the School of Pharmacy and Dr. Nancy Waite, Associate Director, Clinical Education. Both individual course and overall program approval was required at several levels within the university.

Program criteria were established as follows:

- All graduates of University of Waterloo Bachelor of Science of Pharmacy program (who graduated from 2011 – 2014) were eligible to apply with no application fee required. No students from any other pharmacy programs would be admitted.
- All students were encouraged to complete a self-assessment questionnaire to assess their suitability for the part-time, online program [Appendix 1 – Self-assessment questionnaire]
- An admission prioritization process was established as high demand and initial course capacities meant that not all students could be accommodated in the first term of the program [Appendix 2 - Admissions information July 2014]
- Students were eligible to apply within 3 years of their BScPhm graduation date
- Students were required to be eligible to practise as a pharmacist or intern in a North American jurisdiction as part of the admission requirements.

As such, the UW Bridging Program students were homogeneous with the same (known) curricular background.

### Courses

Through the curricular review, it was determined that students would be required to complete two advanced didactic courses (one per term) plus meet the requirements of three clinical rotation courses.

The first two courses (PHARM 495 & PHARM 496) were offered via distance education for the first time in the Winter term of 2015 and were developed with the support of the Centre for Extended Learning – N.B. the professional practice course included a live, in-person workshop component. In addition, students were required to complete 3 clinical rotation courses (PHARM 497, PHARM 498 & PHARM 499) to match the late-stage clinical experiences of PHARM 430, PHARM 440 and PHARM 450 in the ELPD program (a key difference between the previously offered baccalaureate degree and PharmD programs).

Once they had successfully completed the two didactic courses, students were allowed to progress to the clinical rotation courses – PHARM 497, PHARM 498, and PHARM 499. Students were required to earn course credits for all three rotation courses to complete the program; however, the first clinical rotation course, PHARM 497, involved a recognition of prior learning (RPL) process (see [Recognition of Prior...](#))
Learning section) to assess each student's existing clinical competence. Depending on the result of this assessment, students could earn course credits (recorded as transfer credits for transcript purposes) for PHARM 498 and/or PHARM 499 via RPL. If course credit was not earned via RPL, students were required to complete that rotation course (i.e., they were required to complete 0, 1, or 2 rotation courses after PHARM 497).

**Figure 1. Waterloo PharmD Bridging Program flow chart showing course sequence**

Completion of the 2 blue box courses brought Bridging Program students to an equivalent curricular point as contemporary ELPD students just PRIOR to them going out on their first patient care (late stage) placement rotation.

**PHARM 495**

The curricular review determined that students in the PharmD Bridging program would require a course in advanced therapeutic topics, to be delivered via the model of integrated patient-focused care (IPFC) which had been used in the last year of their previous baccalaureate program. As all students had experience with traditionally delivered problem-based learning (PBL) for this type of content, it was determined that this approach would be preferred for therapeutic content not covered in the baccalaureate program or where significant changes in practice had recently been implemented [Appendix 3 - PHARM 495 syllabus (course outline)].

However, as students were enrolled in this course as part-time distance education students, modifications to the traditional face-to-face problem-based learning process were needed to translate the experience into a fully online environment. To facilitate this, a pilot course and feasibility study were established several months prior to the launch of the course with volunteer alumni of the Bachelor of Science in Pharmacy program and one experienced PBL tutor using a sample PBL case.
Several important observations and recommendations were gleaned from the pilot study which demonstrated that an online PBL course was feasible and specific considerations could be highlighted to facilitate success. The results of this study were disseminated via a poster abstract (Lifelong Learning in Pharmacy (LLLP) conference 2016) [Appendix 4 – Poster] and subsequent paper in *Currents in Pharmacy Teaching and Learning*.

The course was offered 10 times over the course of the Bridging Program, usually with a maximum of 48 students, organized into tutorial groups of six to eight students who were each assigned to an experienced PBL tutor. The groups met synchronously (biweekly) for seven sessions of three hours each over the course of the term at a day and time determined to be convenient for the group. A total of 236 students successfully completed PHARM 495 over the course of the Bridging Program, which was organized by Dr. Jeff Nagge, author of most of the PBL cases, with course coordination assistance from Professors Barbara Coulston and Laura Beattie.

**PHARM 496**

The above-mentioned curricular review also indicated that Bridging Program students would require an advanced level professional practice course. Course outcomes for PHARM 496 required students to build on their clinical decision-making skills, apply physical assessment skills in practice, apply best practices in expanded/expanding scopes of practice from across North American jurisdictions, design a practice-based research project, identify change management strategies, and develop a personalized continuing professional development plan. The blended learning course was created by Dr. Rita Dhami and delivered primarily via weekly asynchronous modules with a one-day in-person skills workshop conducted approximately midway through the term. The workshop session included an injection training refresher, auscultation and other physical assessment training, reinforcement of skills taught in first half of course and assessment stations with standardized patients and pharmacist assessors. The face-to-face format provided a valuable opportunity for students, faculty, and program administrators to engage in person. While the online content and discussion boards were well received, consistent feedback from students indicated that the in-person workshop was the most valued component of the course [Appendix 5 - PHARM 496 syllabus (course outline) and Appendix 6 - LLLP 2016 poster abstract].

Over the course of the program, PHARM 496 was offered 11 times, and successfully completed by 230 students.

**Recognition of Prior Learning (RPL) (PHARM 497)**

Students were required to demonstrate competence in all the elements of the 3 late-stage patient care rotations (matching the requirements of the entry-level PharmD degree). However, many of the students in the Bridging Program had already been practising as fully qualified pharmacists for 4 or more years at the time of their entry to the clinical rotations segment of the PharmD Bridging Program. Program administrators wanted to be able to give students credit for competencies already achieved through informal or nonformal learning but needed to be able to assess and document these in a standardized manner to ensure “equivalence” with the ELPD. Administration also wanted the program to be flexible and attractive to students and avoid unnecessarily duplication of learning and wasting of resources.

Recognition of prior learning (RPL) is a process used to systematically validate skills, knowledge, and abilities, whether acquired through work, life experience or formal training, giving credit for this learning or competency acquisition. This type of process, also called “prior learning and recognition” (PLAR), is often used to give credit to mature students entering college programs and is also used in a few university programs across Canada (see [Canadian Association for Prior Learning Assessment](https://www.caplacanada.ca/)).

Program administrators were unable to find an existing model for a recognition of prior learning process.
suitable for the clinical competencies in this program, so a custom-built process was designed. Multiple avenues of research and investigation were pursued to inform this unique design [Appendix 7 - CPhA 2014 - Developing a RPL Process poster]. As this type of process had never been used in a degree program at the University of Waterloo, the involvement of key representatives of the Provost’s Office, School of Pharmacy leadership team, Curriculum and Assessment Committees, as well as representatives from the Centre for Teaching Excellence was key to garnering the needed institutional support.

A three-part assessment was developed [Appendix 8 - Presentation to AFPC 2017 (explaining the RPL process)] which included appropriate tools, rubrics, and assessor training. Most students continued to work in their usual practice setting, submitting written case reports which were assessed by practising pharmacists familiar with the patient scenarios presented for assessment. Students also submitted online portfolios for review and grading and were assessed in an oral case discussion, either in-person or online [Appendix 9 - Presentation to Lifelong Learning in Pharmacy Conference 2018 (Use of Recognition of Prior Learning in a PharmD Bridging Program)].

Recruitment, training and supporting appropriate assessors was a significant part of the PHARM 497 Course Coordinator’s role. A total of 82 pharmacist assessors participated in the program over the course of the program, most from within Ontario, but a few with specialized expertise from other provinces in Canada who assessed remotely and connected online. The course was first offered in the Fall term of 2015 and last offered in Winter term of 2021.

Due to the high stakes nature of PHARM 497, a rigorous quality assurance process was implemented in all elements of student assessment. This included video/audio recording of oral case defense sessions, verification checks of portfolio materials submitted and double marking of written case submissions. All written cases (10 for each student/term) were initially marked by two qualified assessors. If the grades submitted for an individual case were within 10%, then the final grade for that case was determined by the average of those 2 grades. If, however, there was more than 10% difference between the 2 initial grades, then the case was re-graded by one of three Senior Assessors contracted by the School. These Senior Assessors also assisted with formative case marking, oral defense assessments, assessor training and feedback.

Overall grades in the course rose as more students entered the program and took the course. We think it likely that they became more aware of expectations and prepared for the workload. Throughout the program, an increased incidence of adjudication was noted with submissions of poorer quality [Appendix 10 Details of PHARM 497 results]. Deductions for professionalism lapses and late submissions dwindled over time, as students were warned of the risks and penalties in a beginning-of-term course announcement.

Over the 16 offers of the course, it was found that students who struggled most with the course were students who:

- Underestimated the workload
- Practised in specialty areas without much exposure to generalist areas of practice
- Were not involved in clinical decision making in their workplace on a routine basis e.g., those working in a government, corporate administrative or retail managerial position
- Were beginning a new job or took a volunteer patient care position in order to find cases for the course.

Students were encouraged to enroll in the course while in a familiar practice setting.
Clinical rotation courses

PHARM 498 & PHARM 499

[See Appendix 11 - PHARM 498 Syllabus/Course Outline].

Students received notification of any requirement to complete one or more patient care rotations along with their final grade from PHARM 497 and were asked to set three to five personal learning objectives for the preceptor-supervised placement. Students were not allowed to self-arrange these placements, which were conducted under the supervision of the School of Pharmacy Experiential Coordinator, Patient Care Rotations, in collaboration with the relevant Regional Clinical Coordinator and assigned preceptor (link to manual, School website for rotations). While the rotation structure, length, and assessment rubrics for PHARM 498 and PHARM 499 were the same as those in the ELPD program for PHARM 430, 440 and 450 rotation courses, students in the PharmD Bridging Program could request that their rotation(s) be completed on a part-time basis to facilitate their continued employment in their usual practice site or other personal obligations.

The Administrative Coordinator, Patient Care Rotations, acted as initial liaison with the students helping to identify their preferred timeframe, geographic location and (if applicable) practice site type for their required rotation. While offering no guarantees, School of Pharmacy staff did try to accommodate these requests as much as possible. Preceptors met all the School of Pharmacy usual requirements for training, registration in good standing etc. and as well were selected to facilitate quality learning experiences for these working professional students and screened to avoid potential conflicts of interest [Appendix 12 - Preceptor and Rotation requirements].

As many Bridging Program students had 4 or more years’ experience practising as qualified professionals, there were a few initial challenges in getting them to accept the requirement for them to be placed and evaluated in a supervised setting. However, most took advantage of the learning and networking opportunity and provided almost universally positive feedback about the value of the placement rotations, even some of the most initially skeptical students.

Feedback from student (used with permission):

“Taking part in the day-to-day activities of a retail pharmacist at the rotation site helped me develop and refresh my skills very early on in the rotation. I spent the following weeks building on my knowledge and skills. I was given the opportunity to take part in all duties and responsibilities related to the position of a retail pharmacist all the way from answering drug information questions to managing the drug distribution system. I appreciate to have been given the chance to experience, observe, and take part in ongoing and new pharmacist duties in a retail setting which have expanded and are quite different than my regular institution practice setting. Seeing what takes place in a retail setting firsthand has helped me greatly in becoming a more insightful hospital pharmacist and has helped me in attempting to make the hospital to retail transition as smooth as possible upon discharge from the hospital.”

- Sanaz Riahi

Student Outcomes, Feedback and Lessons Learned

Overall results:

Of the 416 students eligible for this program, 244 (59%) applied within the designated time frame and were admitted to the program.

The four eligible cohorts were represented in the Bridging Program as follows:
Of the 244 admitted, 182 (74.6%) successfully completed the program and earned their PharmD.

### Total students admitted

<table>
<thead>
<tr>
<th>Students</th>
<th>244</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 students</td>
<td>46</td>
</tr>
<tr>
<td>2012 students</td>
<td>63</td>
</tr>
<tr>
<td>2013 students</td>
<td>73</td>
</tr>
<tr>
<td>2014 students</td>
<td>62</td>
</tr>
</tbody>
</table>

62 students did not complete the program and exited at various points in the program for a variety of personal and professional reasons:

### Total students completed

<table>
<thead>
<tr>
<th>Students</th>
<th>182</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed after PHARM 497 (Level 3)</td>
<td>107</td>
</tr>
<tr>
<td>Needed 1 rotation (Level 2)</td>
<td>69</td>
</tr>
<tr>
<td>Needed 2 rotations (Level 1)</td>
<td>2</td>
</tr>
<tr>
<td>2011 students</td>
<td>29</td>
</tr>
<tr>
<td>2012 students</td>
<td>56</td>
</tr>
<tr>
<td>2013 students</td>
<td>55</td>
</tr>
<tr>
<td>2014 students</td>
<td>42</td>
</tr>
</tbody>
</table>
Overall results: Rx2012 had the highest completion rate. Students typically had three years from their point of admission to complete their degree requirements. Students could petition to the School of Pharmacy Petitions Committee for an extension to their program deadline, for legitimate interruptions to their study plan, such as parental leave, change in employment, serious illness etc. Over the course of the program 47 students were granted extensions, typically of 12 months’ duration. Of these, 36 completed the degree within their allotted extension time.

### Feedback

As per usual University quality assurance processes, a course evaluation survey was circulated to each student at the conclusion of each term [Appendix 13 - Sample PHARM 497 feedback]. Several additional feedback opportunities were presented to students, assessors, and other stakeholders, including PHARM 498 preceptors, School of Pharmacy staff and faculty and Regional Clinical Coordinators who often assisted with rotation placements in their respective regions. Selected feedback is included in Appendix 14 – Stakeholder Feedback. A structured research study was conducted by Principal Investigator Dr. Nancy Waite under ORE#31095 UWPharmD Bridging Program: Assessing Recognition of Prior Learning (RPL). [Appendix 15 – Research Proposal/Survey]. Some results from this research are included in Appendix 9.

Some of the most gratifying feedback about the program has come from alumni several years after their completion of the program:

*I know that I utilize what I have learned through the PharmD program daily as a clinical pharmacist working in a hospital setting...I've also had colleagues comment on how Waterloo produces some of the best pharmacists and am proud of the school and the program so thank you.*

- Rx2013 alumnus
**Key learnings**

- You need institutional support and a “champion” at the highest levels to successfully implement novel programs such as RPL at a university
- There is a need for adjudication in high stakes “subjective” assessment where a difference exists between 2 grades assigned by independent assessors
- A novel program such as this has significant training requirements for assessors. We found that:
  - Facilitated training in small groups with a standardized case improved inter-rater reliability
  - Assessors benefited from training on how to write effective feedback. (All feedback underwent a final review by the course coordinator to edit spelling/grammar errors, to ensure clarity and appropriate language, and to avoid overtly conflicting remarks among assessors.)
  - A grading guide was provided describing expectations for all competencies at all rating levels
  - Keeping % grades hidden from assessors within the fillable form pdf rubrics improved consistency
- Use senior assessors to grade the midpoint oral defense session, as they provided the most comprehensive feedback.
- Using a small pool of experienced assessors gave the most consistent results
- You can never have enough communication with both internal and external stakeholders about a new program

**Recommendations**

- Best practices in RPL would guide us to offer the RPL assessment as an option to the three required placement rotations (vs. being a mandatory program component) if we were offering this program again
- Implement Senior Assessors/adjudicators throughout the program
- Recording of high stakes assessment e.g., oral examinations was worthwhile for quality assurance, training, and adjudication purposes

**Conclusions**

**a. Measures of success – alumni relations, financial, external relationships built**

The program is considered to have been a complete success, exceeding our original admission projections by almost 20% and concluding with 75% of those admitted successfully completing the program. It met financial projections in terms of tuition revenue generated with initial demand for courses far exceeding capacities.

Many new relationships were fostered both internally with representatives of different University of Waterloo departments and externally with pharmacist assessors and recognition of prior learning experts. Many of these individuals had not previously had a relationship with the School of Pharmacy or the University of Waterloo. Other relationships were solidified, for example with current or former supervisors and clinical preceptors from the School’s existing co-operative education and rotations programs.

Successful delivery of the program was an important contributor to alumni relations throughout the life of the program as it fulfilled the School’s commitment to offering students from these specific cohorts a path to a PharmD degree. The program administrators and faculty also responded to feedback and whenever possible responded sensitively to individual circumstances which were often quite different than those experienced by undergraduate students. This has provided our graduates with confidence that the School is
responsive to their evolving lifelong learning needs and has the ability and motivation to tailor programs for the benefit of its alumni. It has also provided insight to program administrators regarding the challenges experienced by working professionals which has informed the development of future lifelong learning programs.

b. **Novel educational methods used**

There were many pedagogical innovations employed during the offer of this program including online problem-based learning, online/distance education professional practice education with an in-person skills workshop, and it was the first use of recognition of prior learning in a degree program at the University of Waterloo.

c. **Ability to deliver content remotely/online (prior to COVID-19 pandemic)**

Most of this program was completed prior to March 2020 and the onset of the COVID-19 pandemic; however, it had already introduced innovative approaches for delivering content to working professionals, for example fully online problem-based learning with synchronous online tutorials and hybrid professional practice courses offered primarily via asynchronous weekly lessons. There were many lessons learned (see publications in Appendices) which have been subsequently used in other courses and continuing professional development offerings.

d. **Publications/presentations – see Appendices**

e. **Knowledge gained of RPL**

As predicted, the custom-designed recognition of prior learning course was an expensive and time-consuming process for students, faculty, and administration, but overall, a very worthwhile addition to the program. Despite the work involved, most students indicated that they preferred the RPL process to mandatory completion of 3 supervised rotations. Best practices in RPL would guide us to offer the RPL assessment as an option to the 3 required placement rotations if we were offering this program again.

We now have 3 current University of Waterloo employees who directly participated in the RPL assessment process who can share best practices and experiences with others at the institution and with pharmacy and other colleagues nationally and internationally.

11. **Acknowledgements**

We thank Rita Dhami, Brad Jennings, Jeff Nagge, the volunteers from the 495 pilot study: Kim Adamczyk, Artyom Korenevsky, Denise Kreutzwiser, Allam Hallan, Jenny Reid, Stephan Sadikian, Kayleigh Sinasac, Patricia Stefancisc, and Amanda Tavone; all the facilitators and assessors for PHARM 496 and 497, Passant Al-Shaikh, Laura Beattie, Stephanie Chiu, Mario Coniglio, Barbara Coulston, Lisa Craig, Renate Donnovan, Dave Edwards, Debbie Ellen, Ken Manson, Chintan Patel, Ken Potvin, Mary Power, Eric Schneider, Marlee Spafford, Andrew Tolmie, Bronwyn Tolmie, Stacey Verhaeghe, Nancy Waite, Samantha Yau, and PHARM 498 and 499 preceptors.