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**Nationwide collaborative development of Learning Outcomes and Exemplar Standards for**

**Australian Pharmacy Programs**

**Abstract**

**Introduction**

Internationally, the preparation of pharmacy graduates for professional practice has evolved, from educating for capacities for practice, to a focus on competencies and most recently on assuring graduate outcomes. Consequently, there is an increasing emphasis on the specification of and accountability around student learning outcomes. This in turn has implications for teaching and assessment.

**Objectives**

The aim of the study was to harmonise the various expectations and regulatory requirements for Australian pharmacy education programs through the development of learning outcomes and exemplar standards for all entry level pharmacy graduates.

**Methods**

Learning outcomes and exemplar standards were developed through a participatory action research framework which involved academic staff representatives from pharmacy schools in Australia, pharmacy student representatives and the Australian Pharmacy Council (APC, the accreditation body for Australian pharmacy programs) involving an iterative process of dissemination and seeking of feedback.

**Results**

The key result from the project was the formulation of national pharmacy learning outcomes and associated exemplar standards (PhLOS) for all students graduating from entry level pharmacy programs. These have been endorsed by both students and academics.

**Conclusion**

Learning outcomes have been developed through a collaborative process for pharmacy programs across Australia through harmonisation of the various expectations and regulatory

requirements for pharmacy education programs. Application of these learning outcomes and exemplar standards will ensure that all graduates of all entry level pharmacy programs will have achieved at least the same threshold regardless of the university from which they graduate prior to entering their internship year.

**Introduction**

The specification of student learning outcomes, "*a statement of what a learner is expected to know, understand and be able to do at the end of a period of learning*" [1] has both pedagogical and regulatory imperatives. First, effective teaching is founded on formulation and communication of appropriate learning outcomes, designing effective learning experiences and aligning assessment to promote and demonstrate achievement of these outcomes. Second, the international movement to increased higher education accountability for quality and transferability of qualifications is supported by clearly specified learning outcomes . [2] [3]

Current Australian government policies on tertiary education reflect this international trend, with increasing expectation of demonstrated accountability by universities. [4] The Australian Qualifications Framework (AQF) is a key tool for quality improvement and accreditation of university programs and learning outcomes are integral to this framework.  AQF criteria define types of qualifications in terms of learning outcomes which identify both complexity and the level of achievement which graduates are required to demonstrate. Outcomes offer prospective students and employers information about expectations of graduates' abilities.

In response to these regulatory and quality drivers, the Australian Learning and Teaching Council (ALTC now Office for Learning and Teaching, OLT) initiated the Learning and Teaching Academic Standards (LTAS) projects, which developed a set of threshold learning outcomes (TLOs) that could be applied to students graduating from any Australian University

program across a number of discipline groupings including a composite grouping of health, medicine, and veterinary science, and science. The project team overseeing the work described in this paper received funding in 2011 from the ALTC/OLT to support the establishment of a nationwide Pharmacy discipline network with the aim of developing learning outcomes and exemplar standards for programs preparing pharmacy professionals. The government's reform agenda also provided direction for the approach of the network — *"Discipline communities will "own" and take responsibility for implementing teaching and learning standards (working with professional bodies and other stakeholders where appropriate) within the academic traditions of collegiality, peer review, pre-eminence of disciplines and, importantly, academic autonomy".* [4] p. 32

In the applied disciplines of professions such as pharmacy there is a range of influences to consider when specifying learning outcomes and standards.  There are regulatory requirements at the program level. These include cross sector requirements of the AQF, discipline requirements such as the Australian Pharmacy Council (APC) program accreditation standards and the National Competency Standards Framework for Pharmacists in Australia [5] and individual university outcomes such as graduate attributes. There are also the societal demands of developing curricula which are responsive to both current and future community needs.  Articulation of learning outcomes provides opportunity to draw together these diverse demands into a clear statement to guide curricula and support collaborative cross-discipline curriculum inquiry.

In Australia both undergraduate and postgraduate programs, across 18 universities, are approved as entry level programmes for subsequent professional training.  Programs

preparing students for practice have no consensus statement of learning outcomes for their students at the point of graduation. The APC, under the Australian National Registration and Accreditation Scheme, specifies mastery of defined professional competencies after a prescribed period of intern training. Consequently, Australian pharmacy graduates are not regarded as competent and are provisionally rather than fully registered. Full registration requires successful completion of 1824 hours of supervised practice, an internship training program and a range of Pharmacy Board of Australia assessments. Therefore, the endpoint of an entry level pharmacy degree with respect to the learning outcomes and standards that students must demonstrate prior to entering their internship is not specified and lacks consistency across different pharmacy programs. A national consensus statement on graduate outcomes and standards for all Australian pharmacy graduates would represent a major advance in pharmacy education as it would facilitate individual program's implementation of those learning outcomes and inform curriculum renewal. Pharmacy programs are situated in a number of different university groupings, for example universities designated as research intensive, or as those which focus on forging partnerships with industry and government. Learning outcomes, as well as supporting accountability of educational institutions, would mean that all graduates of all entry level pharmacy programs are similarly prepared for entering the profession regardless of the university from which they graduate. Learning outcomes would thus serve an integrative function for academics, the profession and the Australian community.

The aim of the study was to harmonise the various expectations and regulatory requirements for Australian pharmacy education programs through the development of learning outcomes and exemplar standards for all entry level pharmacy graduates.

**Methods**

A collaborative, iterative approach, based on a participatory action research framework [6] was employed to develop national consensus agreement on a set of learning outcomes and standards that drew upon national and international standards, national expertise and engaged key stakeholders. Key stakeholders were identified as pharmacy programs, students and the Australian Pharmacy Council (registration body for pharmacy. There was no preconception of the learning outcomes to be developed and their potential intersection with professional competencies at registration. Approaches comprised face to face consultations and discussions, and circulation of briefing documents and draft frameworks for comment. Data were collected and compiled by members of the project team throughout the project. These data included survey results, and summaries of discussions and feedback. Each cycle of consultation and data informed subsequent phases of the project. For all consultation steps, feedback was reviewed by the project team and consensus reached (Figure 1).

Conceptually the project was guided by the understanding that learning outcomes are explicit definitions of all essential domains of learning at the point of graduation. [7] In order to describe the standards, or expected levels of achievement, for each of the learning outcomes the dimensions of breadth, depth, utility and application to practice and proficiency needed to be considered. [8] In the project described in this paper, exemplar (representative) standards were developed to clarify the dimensions of, and operationalise learning outcomes for curriculum development and assessment.

A project team, which drew upon established teaching and learning expertise, successfully applied for project funding.  The six team members were pharmacy academics from six different universities. . The first project team meeting focussed on:

1. Positioning the Australian pharmacy graduate in a developmental continuum from entry to the university program through to exit from internship training. This process drew upon a number of frameworks. The first of these was the graduated professional competency framework developed through previous  work in Australian pharmacy schools [9] based on competency standards for registration. [5]  The second framework was terminology adapted from the Association of American Colleges and Universities Valid Assessment of Learning in Undergraduate Education (AAC&U VALUE) rubrics [10] and the third was work in progress from the Australian Advanced Pharmacy Practice Framework Steering Committee. [11]

2. Designing a highly collaborative approach for the participatory action research process   which included consultations with pharmacy academics with interests in pharmacy education, pharmacy students, APC representatives and individual university representatives who attended network workshops.

Two cycles of consultations were then conducted over two years. The first aimed to establish a shared understanding of the task and evaluate existing frameworks and perspectives to inform development of learning outcomes and standards. The second aimed to develop a set of learning outcomes and standards that had broad support. Face to face consultations included: presentations at two Australasian Pharmaceutical Sciences Association (APSA) pre-conference pharmacy education sessions; student consultations at two National Australian Pharmacy Students' Association (NAPSA) annual conferences;

and two-day fully funded workshops for academic representatives from pharmacy schools, and APC and student representatives (Figure 1).

The first cycle involved consultations with and presentations to 32 students attending a NAPSA executive session and 14 pharmacy educators attending an APSA education session (Figure 1). Presentations briefed participants regarding the nature and role of learning outcomes and standards, explained both the current context for the work and relevant frameworks and sought feedback. Consultations involved participants in examining a number of documents including LTAS Health, Medicine and Veterinary Science threshold TLO [12] , Canadian documentation on levels of performance for pharmacy graduates [13] ,Science TLO documents [14] and the competency framework document. [5] Written feedback was provided by pharmacy educators through a paper based survey which gauged acceptability of adapting tools such as LTAS Health, Medicine and Veterinary Science threshold TLO documents to provide learning outcomes for pharmacy.

The second cycle included convening two 2-day workshops, a project team meeting and cycles of feedback via public forums and circulation of documents (Figure 1). The two day workshops involved the project team, student representatives and accreditation representatives. Additionally all 18 Australian pharmacy schools were invited to nominate one participant to attend the fully funded events. There was continuity in participation by universities over the two years of the project with only some changes in attendees. These changes were managed through provision of briefing materials prior to the workshops and introductory presentations recapping the project to date. The first of the workshops used small and large group discussion to develop a shared vision, agreement on the meaning of

'standards' and the learning outcomes to which the standards would be applied. This led to the formulation of the first draft version of the pharmacy learning outcomes and exemplar standards (PhLOS). The project team requested workshop participants discuss the formulated learning outcomes within their home university teaching teams and provide comments and feedback.

The second project team meeting was then convened to work with the draft to develop exemplar standards for the Australian pharmacy entry level graduates with reference to where these standards should be positioned within a professional competency continuum. The project team drew on previous work in Australian pharmacy on graduated competency descriptors, [9] standards statements from UK [15] and Canadian [13] sources and graduate attribute standards from US colleges and universities. [10] The standards developed at this second project team meeting were disseminated to all workshop participants, and were discussed and further refined at the second APSA pre-conference pharmacy education session which hosted 26 participants.

A specific consultation with students was carried out via their provision of feedback at the 2013 NAPSA conference at which there were 310 student registrants, potentially able to complete a paper based survey. Pharmacy learning and teaching projects in Australia have included students as critical stakeholders; [16] this approach was also adopted in this project. This survey, provided information about the development of the learning outcomes and exemplar standards and their purpose and asked students to indicate on a trichotomous scale whether each of the outcomes / standards was too low, just right, or too high. A trichotomous scale was chosen as it presented a straightforward approach for students to

be able to identify the conceptual divisions between the simply worded alternatives. [17] The second two-day workshop focussed on reviewing and finalising the learning outcomes and exemplar standards.

University of New England (Australia) Human Research Ethics approval was obtained (HE11-201, HE12-214).

**Results**

The first project team meeting identified that the Australian pharmacy graduate's level of competency on entering the internship year should be defined as novice middle stage students. [10]

Consultations with academics and with students in Cycle 1 provided key direction for further work. A majority of the pharmacy educators responding to the 2011 APSA survey (10 participants, 71% ) indicated that the LTAS Health, Medicine and Veterinary Science TLO document [12] was 'highly' or 'moderately' relevant to pharmacy in broad terms. A key concern raised at the APSA session was that the LTAS Health, Medicine and Veterinary Science TLO document were not seen to clearly articulate 'levels' of performance in relation to the academic standards. Feedback from participants was that the description and the levels described in the Canadian graduate standards [13] were, with minor modification, consistent with their own views. Consultations with pharmacy students identified that the National Competency Standards Framework for Pharmacists in Australia [5] had limited applicability for new graduates, particularly around leadership and management.

Engagement was high throughout Cycle 2. Academics representing 15 universities (83% universities offering pharmacy programs) participated in the two day workshops. As part of the discussions a list of generic and professional outcomes which could be expected was compiled. This list included:

- Demonstrate professional behaviour, accountability in the commitment to care for and about clients

- Reflect on current skills, knowledge and attitudes and plan ongoing personal and professional development

- Communicate in lay language and professional language, using language appropriate for the context and being empathetic and an active listener

- Knowledge of medications, the pharmaceutical, biomedical, socio-behavioural and clinical sciences and health systems

- Assess client health status where necessary, formulate, implement and monitor management plans and deliver safe and effective collaborative health care

- Promote and optimise the health and welfare of individuals and /or populations

- Retrieve, critically evaluate and apply evidence in the performance of health related activities

- Formulate and distribute pharmaceutical products and therapeutic goods

- Solving problems and making scientifically sound decisions that are relevant to the context

After extensive adjustment the PhLOS were drafted at the conclusion of the first two day workshop of Cycle 2 of the consultation. As can be seen in Fig 1, these were refined and ratified through multiple processes of consultation with minor changes and elaborations over this process. These processes are exemplified by the following feedback provided by one individual university "Demonstrate professional behaviour and accountability in the commitment to care for and about people. Comment/suggestion, could this read Practices

in a professional manner with integrity and maintains accountability in all aspects of practice."

The second project team meeting focussed on development of exemplar standards for the Australian pharmacy entry level graduates. Standards were developed through consideration of a number of sources. For example for the learning outcome "*Formulate, prepare and also supply medications and therapeutic products*" consideration was given to a number of potential standards derived from a range of sources which included:

- With guidance manufacture, label and store standard formulations and modify and develop where no standard formulations exist and apply where appropriate [9]

- Apply pharmaceutical principles to the formulation, preparation and packaging of products[15]

- Ensure that, when they are responsible for the dispensing of medications, all medications compounded, dispensed or sold are appropriate, accurate, effective and safe, and are provided in a manner consistent with all legal requirements [13]

Consultations regarding these standards included electronic communications with pharmacy schools and those with academics participating at a pre-conference (APSA) education session. Students were consulted through a survey (138, 44.5%, students completed surveys) regarding their perceptions of the learning outcomes and exemplar standards and viewed them as being "just right" (Table 1).

The learning outcomes and exemplar standards which have been collaboratively developed (and have been published on the project website) [18] are mapped against the ALTC Health, Medicine and Veterinary Science threshold learning outcomes [12] in Table 2. The ALTC Health, Medicine and Veterinary Science threshold learning outcomes were envisioned as encompassing a number of health related disciplines including pharmacy, mapping of the PhLOs to these was undertaken as their further validation.

**Discussion**

A collaborative, iterative approach, based on a participatory action research framework has been utilised to develop learning outcomes and exemplar standards for pharmacy programs across Australia. These learning outcomes define essential domains of learning at the point of graduation

The principal strength of this project was its highly collaborative, iterative approach to developing a national consensus agreement on a set of learning outcomes and standards for graduates of Australian pharmacy programs. Given this strength, the scope of this project was limited to development of exemplar standards for the learning outcomes at the point of graduation. These exemplars warrant further development including representing a progression in learning during the pharmacy degree. More significantly, the learning outcomes and standards are only a starting point in the discussion of how to best prepare futures focussed pharmacy graduates.

Globally, with respect to quality of pharmacy education the International Forum for Quality Assurance of Pharmacy Education [19] has proposed that there is need for clear student learning outcome expectations for the curriculum. In Australia there is a regulatory imperative for the formulation, communication and achievement of appropriate learning outcomes across all disciplines, including pharmacy, in all universities.

The focus of discussion in literature from a number of discipline groupings is around learning outcomes; early feedback to the project team indicated a desire from Australian pharmacy

academics to have indication of performance levels associated with each outcome, hence our development of exemplar standards. The outcomes developed exhibit desirable criteria such as envisioning the "product" of a degree, being clear and unambiguous and being manageable, serving as a framework for the organisation of an aligned curriculum [20] and are not associated with perceived professional roles. [21]

The PhLOS are a collaborative re-conceptualisation of Australian pharmacy curriculum, informed by the outcomes and standards to be achieved. They afford a number of potential outcomes. First, they reference the current and future needs for pharmacist services and provide opportunities for the integration of nationally-agreed knowledge, skills and attributes into curricula. It is expected that discussion of the relative importance of the sciences in pharmacy practice [22] [23] and pharmacy indicative curriculum and national competencies will be informed and not restricted by the PhLOS. Adoption of learning outcomes, as demonstrated in medicine [24] does not preclude diversity in curriculum design. Second, PhLOS contextualise service teaching which may be provided into pharmacy programs for example by science faculty academics specialising in biochemistry, physiology or pharmacology and highlight the critically important relationship between basic science concepts and their application in practice. Third, the clear alignment of learning outcomes between pharmacy programs and programs in other health disciplines, as revealed through mapping (Table 2) should also facilitate the integration of educational curricula through focus on common outcomes [25] [26] supporting pharmacy graduates' ability to contribute to inter-professional team-based care. [27]]

The potential for mapping of curricula to PhLOs in accreditation requirements for Australian

pharmacy programs is currently under consideration by APC.

**Conclusion**

This project has demonstrated that the various expectations and regulatory requirements for pharmacy education programs can be successfully harmonised at a national level through adopting a highly collaborative iterative approach. The establishment of nationally agreed Pharmacy Learning Outcomes for graduating students clarified expectations of both standards and levels of achievements for students, academics, employers and the professional body. This is likely to accrue benefits to all stakeholders. Additionally the project has been the impetus for more general conversations around assessment with further national meetings and activities planned by the discipline.

**Acknowledgements:**

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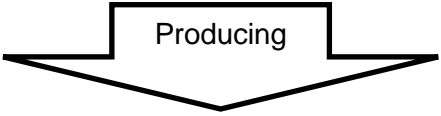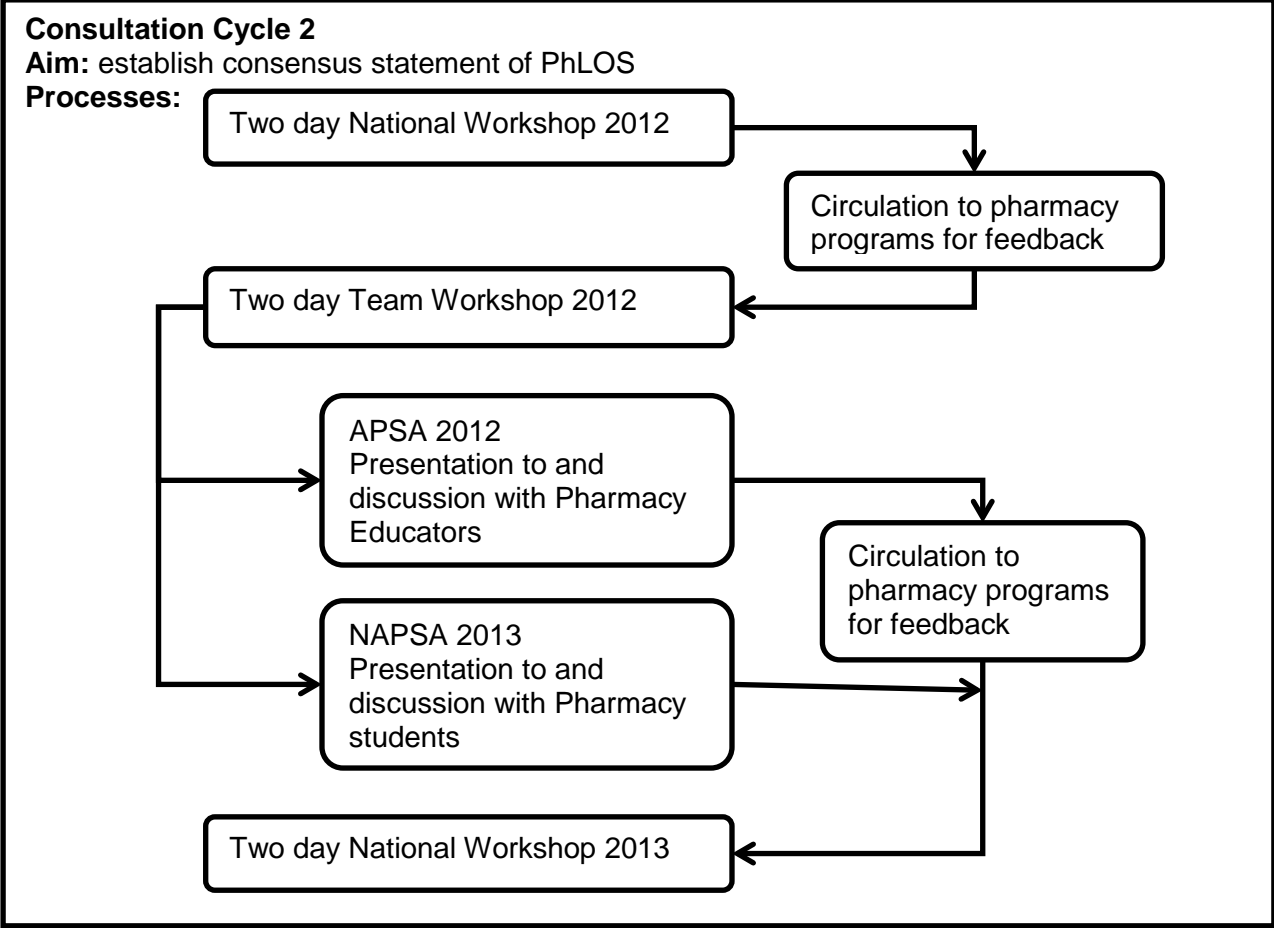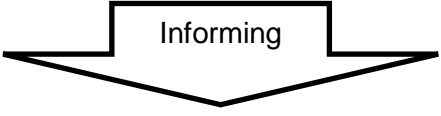
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Figure 1: Flow chart summarising the two cycles of collaborative work undertaken during the project. Australasian Pharmaceutical Sciences Association (APSA); National Australian Pharmacy Students' Association (NAPSA); pharmacy learning outcomes and exemplar standards (PhLOS)

**Project Team Meeting (2011)**
Scope issues and strategies for development of learning outcomes and standards

Informing
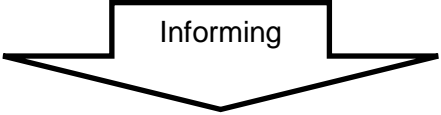
**Consultation Cycle 1**
**Aim:** Establish shared understanding of task and evaluation of existing frameworks
**Processes:**
1. Consultation and survey with pharmacy educators at 2011 APSA conference
2. Consultation with pharmacy students at 2012 NAPSA conference

Informing

**Consultation Cycle 2**
**Aim:** establish consensus statement of PhLOS
**Processes:**

Two day National Workshop 2012

Circulation to pharmacy programs for feedback

Two day Team Workshop 2012

APSA 2012
Presentation to and discussion with Pharmacy Educators

Circulation to pharmacy programs for feedback

NAPSA 2013
Presentation to and discussion with Pharmacy students

Two day National Workshop 2013

Producing

**PhLOS**

**Table 1:** Student survey completed at the 2013 NAPSA conference, items were scored on a trichotomous scale; outcome / standard is too low, outcome / standard is just right, and outcome / standard is too high, Results, presented as the percentage of students scoring the learning outcome / standard as just right. Results for three learning outcomes and associated exemplar standards are presented, students responses for other learning outcomes and exemplar standards were similar (results not shown).

| Learning Outcome | Associated Exemplar standards | % of students (n=138, 44.5% response rate) scoring the learning outcome/standard as "standard/outcome is just right" |
|---|---|---|
| Demonstrate professional behaviour and accountability in the commitment to care for and about people | | 100 |
| | *Comply with relevant codes of conduct and legal requirements in professional practice and the provision of patient care* | 88 |
| | *Behave professionally and ethically* | 88 |
| Demonstrate team and leadership skills to deliver safe and effective practice | | 83 |
| | *Demonstrate effective intra- and inter-professional relationships and work effectively in partnership to achieve negotiated, agreed-upon objectives* | 67 |
| | *Support a constructive team climate* | 74 |
| | *Demonstrate leadership skills for health care delivery* | 74 |
| Formulate, prepare and also supply medications and therapeutic products | | 91 |
| | *Manufacture standard formulations, modify, develop and evaluate formulations where no standard formulations exist* | 83 |

| | | |
|---|---|---|
| | *Supply and dispose of medicines safely and efficiently, consistently within legal requirements and best professional practice.* | 82 |
| | *Clarify medication orders, assess appropriateness of prescribed medicines, use pharmaceutical calculations to verify the safety of doses and administration rates and follow systematic dispensing procedures* | 89 |

Table 2: Final Pharmacy learning outcomes and exemplar standards mapped against the Australian Health, Medicine and Veterinary Science Threshold Learning Outcomes [12]

| Health, Medicine and Veterinary Science TLOs<br><br>Upon completion of their program of study, healthcare graduates at professional entry-level will be able to: | Pharmacy learning outcomes and Exemplar Standards<br><br>Upon completion of their program of study, pharmacy graduates (at end of degree prior to internship) will be able to: |
| --- | --- |
| Demonstrate professional behaviours | Demonstrate professional behaviour and accountability in the commitment to care for and about people<br><br>Exemplar Standards<br>*Comply with relevant codes of conduct and legal requirements in professional practice and the provision of patient care*<br>*Behave professionally and ethically*<br>*Recognise own professional limitations and seek support if necessary* |
| Retrieve, critically evaluate, and apply evidence in the performance of health-related activities | Retrieve, critically evaluate and apply evidence in professional practice<br><br>Exemplar Standards<br>*Find, evaluate and synthesise research findings and report as required*<br>*Use a systematic approach to accessing and reviewing literature, integrating critical content and effectively formulate responses / recommendations to translate literature into practice*<br>*Apply multiple approaches for solving problems that apply within a specific context* |
| Deliver safe and effective collaborative healthcare | Demonstrate team and leadership skills to deliver safe and effective practice<br><br>Exemplar Standards<br>*Demonstrate effective intra- and inter-professional relationships and work effectively in partnership to achieve negotiated, agreed-upon objectives*<br>*Support a constructive team climate*<br>*Demonstrate leadership skills for health care delivery* |
|  | Make, act on and take social responsibility for clinically, ethically and scientifically sound decisions |

| | Exemplar Standards<br>*Make ethically sound decisions incorporating principles of ethical reasoning, relevant codes of conduct and legislation, incorporating the patient perspective*<br>*Apply sound scientific principles to support decision-making*<br>*Access and critically evaluate evidence to support safe, rational and cost-effective use of medicines and other health care products*<br>*Determine and facilitate patient preferences for treatment* |
|---|---|
| | Communicate in lay and professional language, choosing strategies appropriate for the context and diverse audiences<br><br>Exemplar Standards<br>*Apply key principles of communication*<br>*Effectively and appropriately use communication technologies*<br>*Adapt communication to address challenging communication situations (e.g. conflict, disability, mental health, differences in culture and health literacy)*<br>*Present information in a timely, professional and effective manner* |
| Reflect on current skills, knowledge and attitudes, and plan ongoing personal and professional development | Reflect on current skills, knowledge, attitudes and practice; planning and implementing for ongoing personal and professional development<br><br>Exemplar Standards<br>*Evaluate and reflect on practice, recognizing unsafe or less than optimal practices, accept responsibility for rectifying these situations where possible*<br>*Reflect and respond to feedback, identify own learning needs, plan for further development and apply learning to improve practice* |
| PHARMACY SPECIFIC application of the following competencies:<br><br>Promote and optimise the health and welfare of individuals and/or populations<br><br>Assess individual and/or population health status and, where necessary, formulate, implement and monitor management plans in consultation with patients/clients | Apply pharmaceutical, medication and health knowledge and skills<br>• Within their scope of practice, in the assessment of individual health status and medication needs, and where necessary, develop, implement and monitor management plans in consultation with patients/clients and other health professionals to improve patient outcomes<br><br>• To promote and optimise the health and welfare of communities and /or populations |

| | |
|---|---|
| /carers/animal owners/communities | Exemplar Standards<br>*Demonstrate evidence-based clinical practice by locating, evaluating, synthesising and applying evidence, and evaluating outcomes*<br>*Collaborate with patients, the public and other healthcare professionals to provide patient-centred, collaborative care and improve patient outcomes*<br>*Communicate effectively (verbally, non-verbally and in writing) about medication management and other health care needs within a practice environment.*<br>*Develop accurate, efficient patient therapeutic and monitoring plans that incorporate best practice and respect the autonomy of the patient*<br>*Support individual and community access to health and associated resources required to prevent disease and promote health and well-being.*<br>*Develop patient and medication safety protocols*<br>*Manage adverse drug events, errors, and incidents in a fair manner consistent with current best practices, including disclosure and formal reporting.*<br>*Interpret, access and respond in a prompt and effective/timely manner to medication-related requests* |
| | Formulate, prepare and also supply medications and therapeutic products<br><br>Exemplar Standards<br>*Manufacture standard formulations, modify, develop and evaluate formulations where no standard formulations exist*<br>*Supply and dispose of medicines safely and efficiently, consistently within legal requirements and best professional practice.*<br>*Clarify medication orders, assess appropriateness of prescribed medicines, use pharmaceutical calculations to verify the safety of doses and administration rates and follow systematic dispensing procedures*<br>*Develop quality management systems including maintaining appropriate records*<br>*Use a safe and consistent approach to medication provision with review and regular quality checks in place.* |