Enabling competence in prescribing medicines across multiple healthcare disciplines through systematic assessment practices

ASPRINH
ASSESSMENT OF
PRESCRIBING IN HEALTH

ASPRINH Project
Prescribing Assessment Toolkit

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List of Abbreviations

Abbreviation	Meaning
ASPRINH Project	Assessment of Prescribing in Health Project
CbD	Case-based Discussion
CBM	Certainty based marking
CPD	Continuing professional development
EMQ	Extended match/matching question
HMR	Home Medicines Review
HPPP	Health Professionals Prescribing Pathway Project
JCU	James Cook University
KFP	Key feature problem
MCQ	Multiple choice question
MEQ	Modified essay question
Mini-CEX	Mini-clinical evaluation exercise/mini clinical examination
Mini-PAT	Mini-peer assessment tool
MSF	Multisource feedback
NPC	National Prescribing Curriculum
NPS	NPS MedicineWise (formerly National Prescribing Service)
OSCE	Objective Structured Clinical Examination
OTC	Over the counter
PCF	Prescribing Competencies Framework (formal title "Competencies Required to Prescribe Medicines: putting quality use of medicines into practice")
PSA	Prescribing safety assessment
QUM	Quality use of medicines
QUT	Queensland University of Technology
SBA	Single best answer
USYD	The University of Sydney
UWA	The University of Western Australia
TDM	Therapeutic Drug Monitoring
TF	True/false
WPBA	Work place based assessment

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The ASPRINH (Assessment of Prescribing in Health) Project

The ASPRINH Project is a Commonwealth-funded collaborative initiative undertaken by Queensland University of Technology, the University of Sydney, James Cook University and the University of Western Australia. Broadly, the project aims to promote a consistent approach to the assessment of student prescribing competence in a range of health professions.

Debate regarding the ideal prescribing curriculum is evident in the medical literature. However, little has been published regarding the assessment of prescribing competence. As an increasing number of health professions achieve prescribing rights, there is a clear need, in the interests of patient safety, to ensure the competence of those who undertake this task. Within the prescribing process, essential skills can be identified that are relevant to all prescribers. (1) The ASPRINH Project seeks to establish a cross-disciplinary, shared understanding of the core components of prescribing that require assessment in the student context.

A total of ten health professions have been included in the ASPRINH Project, representing professions for which prescribing is either an established component of practice or likely to become so: Dentistry, Medicine, Nurse Practitioner, Occupational Therapy, Optometry, Paramedicine, Pharmacy, Physician Assistant, Physiotherapy and Podiatry.

Project tasks include:
- An extensive review of the curricula for each profession to establish existing teaching and assessment practices related to the prescribing of medicines;
- A review of national practice standards to understand profession-specific expectations of graduates in relation to the prescribing of medicines;
- An investigation of the perceptions and suggestions of key stakeholders in the prescribing assessment process through a series of surveys and focus group sessions;
- Development of an evidence-based document to contribute to a nationally consistent approach to the assessment of student prescribing competence.

Context

Definition

For the purposes of this document, the definition of prescribing adopted by NPS MedicineWise in the Competencies Required to Prescribe Medicines (2) and by the Health Professionals Prescribing Pathway (HPPP) Project (3) will be used:

An iterative process involving the steps of information gathering, clinical decision making, communication and evaluation, which results in the initiation, continuation or cessation of a medicine.

Prescribing in Australia

A number of health professions in Australia have authority to prescribe medicines. The expansion of prescribing rights beyond the medical and dental professions has largely been driven by the need to improve access to medicines. (4) Factors considered important in this expansion include:

- The ageing population and the associated increased burden of chronic disease, often requiring long term use of multiple medications; (5)
- Challenges relating to the size and distribution of the health workforce which, for example, sees reduced numbers of medical staff working outside of major cities. (6)

The prescription of medicines represents a high volume healthcare intervention attracting significant expenditure. The average number of medicines taken by patients aged over 65 years is estimated to be 5.6, and for those aged over 75 years 6.1. (5) In 2013–14, $54.7 billion was spent on *primary health care.* Of this, benefit-paid pharmaceuticals accounted for $10.1 billion, the majority of which was contributed by the Australian Government ($8.5 billion). (7)

International Perspective

The expansion of prescribing rights in Australia mirrors changes occurring internationally. Non-medical prescribing[1] is undertaken according to a number of different models, influenced by the evolution of prescribing within the profession and the associated regulatory processes governing the practice of prescribing. In the USA and Canada, individual states/ provinces are responsible for the regulatory processes related to prescribing privilege, including details of the required education and training. As a consequence, there are significant differences both across and between the two countries in the practice of non-medical prescribing.

The UK initially implemented non-medical prescribing under a supplementary model before introducing independent prescribing in 2006. Pharmacists and nurses have the most experience with prescribing in the UK, predominately in the primary care setting. (8) Between 2% and 3% of the nursing and pharmacist workforce are qualified to prescribe medicines independently in the UK and appear to do so safely and appropriately. (8, 9) In addition to doctors, dentists, optometrists, nurses and pharmacists, appropriately trained podiatrists, physiotherapists and radiographers may prescribe under either an independent or supplementary model; trained dietitians under a supplementary model. (10-12)

In New Zealand, nurse practitioners and designated nurse prescribers are able to prescribe medicines. Prescribing competencies have been developed for the nurse practitioner and are contained within their practice competencies. (13) Registered nurse prescribing competencies have been developed in accordance with the Registered Nurse scope of practice. (14) Pharmacists in NZ may become designated prescribers provided they meet the specified requirements for education and training. (15) Pharmacist prescribing competencies have been developed to support practice. (16) As in Australia, doctors, dentists and optometrists are authorised prescribers and may do so on registration.

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[1] For the purposes of this document, the term *non-medical prescribing* refers to prescribing undertaken by professions not traditionally associated with this role e.g. nurses, pharmacists, physiotherapists.

Prescribing Risk

Prescribing medicines is a complex task, requiring the application of specific knowledge and skill to an individual patient against a backdrop of increasingly complex medicines and an ageing population, who may be taking multiple medicines. Errors associated with prescribing have the potential to cause significant patient harm. Studies undertaken in the acute care setting, where junior medical staff undertake the highest proportion of prescribing, estimate a prescribing error rate of between 7% and 10% of medication orders. (17, 18) Factors contributing to prescribing error are multifactorial (17, 19) and have the potential to impact all prescribing professions and clinical settings.

"Unsuccessful prescribing takes several forms: under-prescribing, overprescribing, inappropriate prescribing, irrational prescribing, and prescribing errors." (20) Page 487

The prescribing curriculum

Junior medical staff report feeling underprepared to complete aspects of the prescribing process, such as calculating drug doses, awareness of possible adverse drug reactions and in their knowledge of pharmacology and therapeutics. (21-23) Students have suggested that changes to their undergraduate training, including an increased emphasis on clinical pharmacology and therapeutics (and its application to practice) (21, 22) and the opportunity to undertake the practical aspects of the prescribing process (18) may improve their prescribing confidence. Dornan and colleagues suggest that the prescribing curriculum should include (among other things) adequate summative assessment of practical prescribing, should be designed to build on theory as practical knowledge increases and should include adequate feedback specifically related to prescribing. (18)

As the number of professions who prescribe medicines increases, adequate preparation of prescribers and the need for students in prescribing professions to demonstrate prescribing ability becomes a significant consideration for higher education providers. Effective education of prescribers regarding the principles of safe and effective prescribing and the associated risks may reduce the potential for prescribing error. (18, 24) Assessment of student prescribing competence prior to the commencement of the prescribing career would seem logical. It has been suggested that students should demonstrate achievement of prescribing ability as a stand-alone skill irrespective of demonstrated knowledge and skill in other areas of practice. (25)

Purpose of the Prescribing Assessment Toolkit

Despite a clear definition of the *competencies* necessary for the safe and effective prescribing of medicines, there are currently no Australian guidelines for the *assessment of prescribing* competence either at an undergraduate or postgraduate level. Specifically, there is no clear consensus regarding what, as a minimum, should be routinely assessed in the undergraduate context in order to demonstrate competence to prescribe medicines, nor how the process of assessment should be undertaken.

The Prescribing Assessment Toolkit (the toolkit) aims to promote a consistent approach to the assessment of prescribing competence through the development of evidence-based assessment recommendations specifically for undergraduates (although these may also be relevant to prescribing clinicians.) Recommendations are based on accepted national prescribing guidelines, available evidence and the views of key stakeholders in the process of developing a safe and effective prescribing workforce. It is hoped the toolkit will serve as a practical reference point to inform essential processes associated with the education and training of prescribers, including curriculum design (with an emphasis on best practice assessment), standards development and regulatory processes and requirements for prescribing professions.

Related initiatives

Competencies Required to Prescribe Medicines

NPS MedicineWise (NPS) published the competencies required for safe and effective prescribing (Competencies Required to Prescribe Medicines, also known as the Prescribing Competency Framework or PCF), in 2012 (2). The PCF provides a standard for all prescribing professions in Australia and details the major components of the entire prescribing process from assessing the patient to monitoring the outcome of prescribed therapy. In addition, professional attributes are highlighted using horizontal themes which underpin specific prescribing tasks and professional practice more broadly. The PCF has been used extensively throughout the ASPRINH Project as the accepted national standard for prescribing.

Health Professionals Prescribing Pathway Project

The Health Professionals Prescribing Pathway (HPPP) project identified inconsistencies in the process of achieving authority to prescribe medicines for professions other than medicine and dentistry. (3) Inconsistencies related to legislation and regulatory authority, educational requirements, local frameworks for prescribing practice and the recognition of prescribing competence both at initial endorsement and in an ongoing capacity.

Recommendations of the HPPP are that prescribing education and training should be (3):
- clearly aligned with the PCF;
- 'assessable' to ensure practitioner competence;
- tailored to the needs of the professional in the context in which prescribing will occur.

In line with these recommendations, education providers have been challenged to develop tools for the assessment of prescribing competence using the PCF as a framework, and to assess existing prescribing curricula for their alignment with the PCF (3). The ASPRINH Project aims to contribute in these areas.

Prescribing Safety Assessment (PSA)

In an attempt to address the prescribing error rate identified in the practice of foundation year medical students in the UK (18), the British Pharmacological Society and Medical Schools Council have introduced a national on-line prescribing assessment known as the Prescribing Safety Assessment (PSA). (26) The PSA is designed to allow students to demonstrate achievement of necessary prescribing competence based on accepted national graduate outcomes. (27) Since 2016, the PSA has become mandatory for all new doctors prior to commencing the foundation year training in the UK. In excess of 7,000 final year medical students from all medical schools in the UK have completed the PSA with the majority of students meeting the required level of competence. (27)

Prescribers other than doctors should also demonstrate an appropriate level of competence in all areas relevant to prescribing. Reid and colleagues studied the use of the PSA in a cohort of pharmacist prescribers and found similar results to those achieved by final year medical students. (28)

A preliminary study investigating the use of the PSA in the context of Australian medical schools delivered promising results in terms of feasibility and student acceptability [*personal communication, email to Dr. Claire Harrison (Senior lecturer, Monash University, Victoria, Claire.harrison@monash.edu) 21 June 2017].* A larger study is to be undertaken in 2017.

Approach to the development of the Prescribing Assessment Toolkit

The toolkit has been developed based on the Australian prescribing standard (PCF) with a focus on the essential components of prescribing that require clear evidence of competence using relevant assessment methods (1). The toolkit follows the four recognised stages of prescribing. (1, 29)

The toolkit has been informed by the data generated by the ASPRINH Project and modified according to critical feedback received from those with a vested interest in the prescribing process, including accrediting and regulatory organisations. The toolkit has been developed with sensitivity to the complex nature of the prescribing task and the different practice scopes within which prescribers will work.

The Prescribing Assessment Toolkit

Principles of Safe and Effective Prescribing

Published Guides for Prescribing

The principles of safe and effective prescribing have been published in international literature. Examples of recognised guides include:

- The World Health Organisation Guide to Good Prescribing (30) which has been applied to a number of medical education programs; (31)
- The British Pharmacological Society: Ten principles of good prescribing; (32)
- The Royal Pharmaceutical Society: A competency framework for all prescribers. (33)

In Australia, the principles of safe and effective prescribing are articulated in detail in the PCF (2) which identifies the elements of prescribing, associated performance criteria and an evidence guide detailing indicators of competence. The principles of the HPPP project remain relevant to all prescribers and provide general guidance for the practice of prescribing. (3)

Essential Prescribing Competencies

Common themes identified in published prescribing guidelines reflect the prescribing process and the required attributes of the prescriber. These include the need to effectively gather specific patient-related information, to consider the options for treatment and understand their expected benefits and risks, to communicate treatment decisions effectively, to monitor prescribed therapy and to practice professionally with a clear understanding of relevant practice scope and both personal and professional limitations.

Given the complexity of the prescribing task, identification of the essential, core skills as undertaken conceptually by Lum et al (1) may contribute to the assessment process by defining the component parts of the process that require clear and specific assessment. Recently the Royal Pharmaceutical Society has undertaken a review of the Single Competency Framework for all Prescribers originally produced by the National Prescribing Centre in 2012. (34) A key feature of this review process was the simplification of the document from nine competency areas across three domains to ten specific competencies in two domains, representing a deliberate attempt to focus the framework on the key prescribing competencies.

Principles of Assessment

Despite decades of evidence describing the use of various assessment methods in the health profession curricula, the most appropriate method/s to assess prescribing ability, as a discrete component of practice, remains unclear. The general principles of assessment, as defined by the available literature, are highlighted below and should be considered when determining an assessment approach for prescribing.

Goals of assessment

The specific goals of assessment should be defined and may include: (35-37)

- To optimise learning by providing motivation and direction to the learning process through the identification of areas for improvement;
- To identify students who are not considered competent according to established learning outcomes;
- To certify competent graduates;
- To provide a basis for choosing applicants for positions, including training positions, and to provide evidence for promotion and further training;
- To guide institutional review and promote the development of shared values among institutions;
- To input to research; and
- To input to quality assurance processes including review of curricula.

Assessments should evaluate the expected achievements of the student at a particular stage in the course/ program of study and should reflect the defined learning outcomes, which require articulation in measurable terms. (37)

Clarifying the purpose of the assessment may impact the student's response to that assessment. For example, where an assessment is considered formative (to guide learning through the identification of areas for improvement), the student is likely to be willing to acknowledge the areas they consider require improvement. If, however, the assessment is undertaken to demonstrate ability in a summative capacity, the student may hide areas of practice they perceive as insufficient in order to promote areas of strength. (38) Identifying the purpose of the assessment may prevent confusion.

Assessment Format

In general, assessment methods consist of a *stimulus* (the background information to the question and the question itself), which elicits the *response* from the student. The format of each part of the question may vary. For example, written examinations may consist of a stimulus that provides detailed information ("context rich") or minimal information ("context poor"); the response format may be open-ended (e.g. a short answer response or essay) or a multiple choice format. (35, 39, 40)

Simulation-based methods have been used to assess aspects of clinical practice and to aid learning. (41, 42) Simulation may be in the form of mannequins (applicable to the learning and assessment of procedural skills), standardised patients (who may be used in the Objective Structured Clinical Examination (OSCE) assessment process) and computer generated simulated patients. Simulation can be expensive and may not be available to all institutions. Simulation may add to, but should not replace real world clinical assessment.

Workplace based assessments (WPBA) have been developed to assess clinical performance in the workplace. Examples include assessments designed to assess clinical activities (e.g. the mini-clinical evaluation exercise (mini-CEX), discussion of clinical cases (e.g. case-based discussion (CbD)) and those involving feedback from peers and patients (e.g. multi-source feedback (MSF) and the mini-

Peer Assessment Tool (mini-PAT)). This type of assessment may have a positive impact on learning, however their ability to improve practice remains difficult to define. (43)

Each type of assessment carries advantages and disadvantages and may be considered useful for assessment at different stages of the learning process. For example, standardised methods of assessment (e.g. OSCE) are considered useful in the early stages of learning, while assessments in the workplace hold more relevance toward the completion of training and at a postgraduate level. (40)

Certainty-based marking (or confidence based marking) (CBM) is a method of marking multiple choice assessments that requires the student to provide an indication of their confidence in their responses. The marking process is considered to improve student self-reflection and to encourage a deeper understanding of complex decision-making and to discourage guessing. (44) Individual institutions should consider the applicability of CBM to their assessment program.

Feedback

Feedback remains an essential tool to assist learning. (45) In clinical education, feedback can provide essential information regarding performance and support the student to progress by complementing other forms of assessment. (46) Students report a desire to receive more feedback regarding their performance as a way of improving practice (47, 48) and to assist the process of self-reflection. (48)

Feedback may be provided in a formative capacity or in relation to summative evaluation. Although most students appear more likely to engage with feedback when provided formatively, (49) the use of feedback associated with summative assessment may provide a sense of reassurance. (50) Feedback should be specific enough to guide performance change, appropriate to the level of training, (45, 51) delivered in a manner that is descriptive, non-judgmental, sensitive to the learner's context and based on observation. (45, 52)

"Without feedback, mistakes go uncorrected, good performance is not reinforced, and clinical competence is achieved empirically or not at all." (46) Page 778

Choice of assessment method

Each assessment method has its strengths and weaknesses. No single method is adequate to assess all components of clinical practice which may or may not include the prescribing of medicines. (35, 38, 40, 53, 54). The choice of assessment method will always represent a compromise between the ideal and practical (53) and should be guided by the suitability of the method to assess the required knowledge and/or skill. (38, 53)

Established criteria to guide the choice of assessment method are informed by the inherent properties of the method, including its reliability (reproducibility) and validity (whether the method assesses what it purports to) as well as the likely educational impact (on learning) and required resources (human and technical). (55) In addition, the practical context in which the assessment

occurs will influence the choice of method (e.g. the need to assess in a remote setting), as will the availability (and qualifications) of assessors.

Assessment Framework

Acknowledging that no single assessment method is able to provide sufficient information to judge the complexity of medical practice, Miller proposed a now iconic pyramid of assessments to provide a framework for effective assessment. (54) This pyramid has been used by health professions for some time to guide logical assessment practices. As a framework, the pyramid acknowledges the progress of a student from early learning ("knows") through to the ability to perform ("does") with a discussion regarding assessments applicable at each stage.
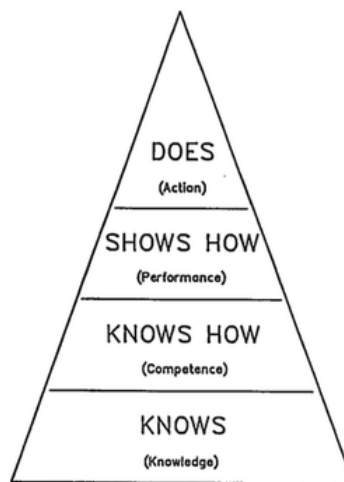
Figure 1 Miller's Pyramid of Assessment (54)

Miller notes that prediction of ability is difficult based on competence assessment and that the ultimate test is what a clinician actually does in practice. (54)

Rethans and colleagues distinguished competence-based assessment (an assessment that measures what doctors can do in a controlled environment) from performance-based assessment (an assessment that measures what doctors do in actual practice) and suggest that measurement of performance is reflected at the "does" level of Miller's original pyramid while assessment of competence occurs at the "shows how" level. (56) The authors note that the impact of factors specific to the workplace (e.g. system-related issues such as patient expectations, time influences and personal factors) on the ability to perform need to be considered, and propose an updated version of Miller's Pyramid for the workplace setting.
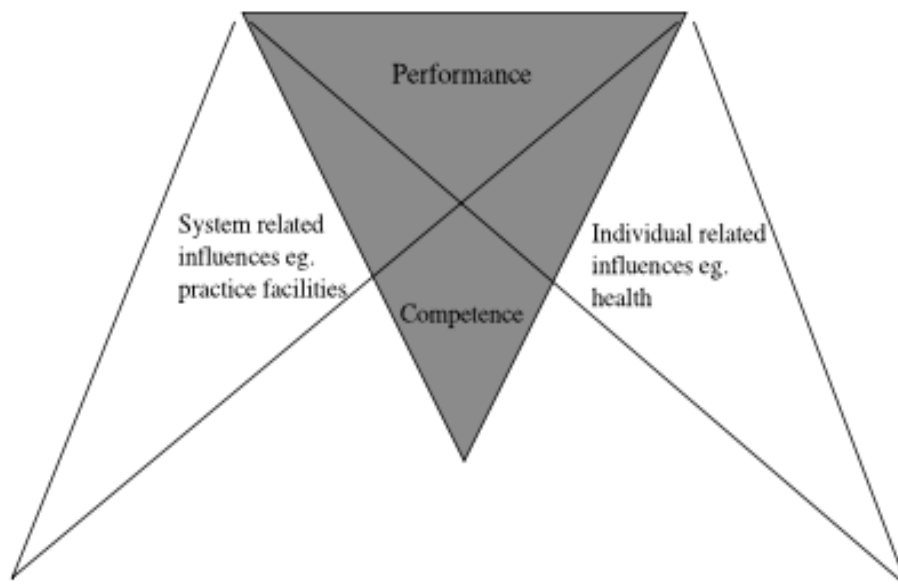
Figure 2 The Cambridge Model for delineating performance and competence (56)

Recently, Cruess et al. have suggested an amendment to Miller's original framework to acknowledge the importance of professional identity and its development within the student. (57) The authors acknowledge that the development of professional identity (located at a new tip of the original pyramid and entitled 'Is') occurs over time, shaped by significant events. (57) As a consequence, assessment of professional identity ('Is') is likely to be undertaken predominately in a formative capacity within the medical curriculum but should be acknowledged within the study program. For the purposes of this document, the original version of the pyramid will be used (refer Figure 1).

"As a compendium of cognitive, psychomotor, and affectual behaviours, clinical skill is easier demonstrated than described. And, like ballet, it is best learned in front of a mirror."(46) Page 777

Considerations specific to prescribing

"There must be no compensatory mechanism which would allow students to graduate without having demonstrated competence in all the outcomes.... including [to] prescribe drugs safely, effectively and economically" (25) Page 634

Assessing prescribing skills

Competence vs Performance

As assessment in health moves toward a competency (or outcomes) based approach to the assessment of performance, (35, 36, 58) an increased use of workplace-based assessments (WPBA) is clear. Many of the essential skills required to prescribe may be assessed using this type of assessment. However, it should be remembered that development of these skills is built over time, with the acquisition of required knowledge and skill. Therefore, the assessment of *competence* (in the early stages of learning) is both relevant and necessary to the development of the ability to *perform* these essential skills. (38)

The importance of context

Prescribing performance requires the application of acquired knowledge and skill to a given clinical context. Evidence suggests that learning to apply appropriate skills and knowledge is subject to social and contextual factors. (18) Logically, therefore, the clinical environment provides an ideal and rich opportunity for students to develop their prescribing skills and for the assessment of these skills.

Practical Considerations

Undertaking assessments in the clinical environment may be subject to variability e.g. the skills, knowledge and availability of assessors, the availability of suitable patients and the time to successfully undertake the assessment process. The structure of the clinical setting available for student experiences may differ between professions and this will impact assessment practices. Such practical issues impact the feasibility of a given assessment and are as relevant to the assessment of prescribing skills as other areas of clinical practice. It is clearly important to address and resolve these issues given the importance of prescribing to practice.

Components vs the whole

The ability to perform the components of prescribing does not necessarily indicate an ability to prescribe safely. (59) Theories of expertise development would suggest that the development of expertise in prescribing requires an overarching ability to constantly self-regulate performance within a complex environment. (59) Consequently, consideration should be given to the use of assessment methods that assess more than the component parts of prescribing, in relevant clinical contexts, particularly in the final stages of undergraduate learning.

"...achieving a predetermined standard of competence in isolated aspects of prescribing is unlikely to make new graduates safe prescribers, because the task, the contexts in which it has to be applied and the interaction between the two are very complex." (59) Page 606

Clear expectations

Assessment of performance in the workplace requires clear articulation of practice expectations, to assist the student to learn and the assessor to accurately gather meaningful information. In the case of prescribing, an understanding of what constitutes safe and effective prescribing, as defined by the Prescribing Competency Framework (2) is important for both the student and assessor.

Non-technical skills

Safe and effective prescribing requires specific knowledge and skills. However, as identified by Rethans et al (56) and further described by others, important 'non-technical' skills are also important to safeguard prescribers from error. (19, 60, 61) Non-technical skills include the ability to manage distractions in the workplace, to be aware of personal limits, to weigh risks and benefits when making a decision, to be prepared, to use available resources, to deal with patients considered challenging (either due to the complexity of their clinical state or practical issues such as language barriers). (19, 60) Novice prescribers do not appear to understand the complexity of the task and therefore do not seek advice where it is warranted. (19) Awareness of prescribing risk, combined with the development (and assessment) of required non-technical skills may serve to reduce prescribing error. Strong mentorship is instrumental to both.

"A strong mentoring system should accompany any comprehensive assessment program. An inadequate system for feedback, mentoring, and remediation will subvert even the most well-conceived and validated examination." (36) Page 233

Assessment Program

If the purpose of assessment is to make decisions regarding student progress, the larger the sample of relevant evidence gathered, the more accurate a picture of student ability is portrayed. (38, 53) The use of a well-constructed program of assessment will contribute to the development of a complete prescribing 'picture'.

Given that competence is contextual, (35, 36) knowledge and skills developed in one area of practice may not be transferrable to another and this holds relevance to prescribing. Although general principles remain, the specific knowledge and skills required (and the interplay between them) may differ in each context and should be assessed accordingly. It is generally accepted that multiple assessments should be performed in varying contexts and environments as part of an ongoing program of assessment over time. (35, 38, 40, 53)

Within an assessment program, although the inherent properties of each assessment method are important, the combination of assessments within that program is significant. For example, the reliability of an assessment method remains important; however, in practice, the use of an adequate number of assessments in different contexts provides more valuable information. (40, 53)

A blueprint, or grid, may be useful to monitor assessments (including the setting in which they have been undertaken) and to gather adequate assessment information across a range of practice areas, using applicable assessment methods. The design of an effective assessment approach requires considerable thought and should be as well constructed as the design of the curriculum. (53)

"…the preceding discussion constitutes a strong plea for a shift of focus regarding assessment, that is, a shift away from individual assessment methods for separate parts of competencies towards assessment as a component that is inextricably woven together with all the other aspects of a training programme."(53) Page 314

Epstein and Hundert describe a framework for assessment that takes into consideration the level at which the assessment takes place according to Miller's Pyramid and the context in which the task is assessed. (36) A similar type of assessment grid, or blueprint, with specific reference to the essential prescribing skills may be useful to ensure assessment across multiple contexts and using a range of assessment methods (refer Figure 8).

Figure. A Framework for Assessment

		LEVEL OF ASSESSMENT				CONTEXT OF CARE				
		Knows	Knows how	Shows how	Does	New problem	Chronic illness	Emergency	Preventive	Acute hospital
CLINICAL TASKS	Self-assessment and reflection									
	Information gathering from patients and families									
	Relationship-building and professionalism									
	Sharing information, behavior change, and patient involvement									
	Physical examination									
	Patient procedural skills (suturing, drawing blood)									
	Interpretation of diagnostic tests (electrocardiogram, mental status, imaging)									
	Diagnostic reasoning: Psychosocial issues									
	Diagnostic reasoning: Biomedical issues									
	Diagnostic reasoning: Diagnostic uncertainty									
	Clinical judgment: Planning further diagnostic workup									
	Clinical judgment: Generating therapeutic plan									
	Accessing, interpreting, and applying the medical literature									
	Presenting data to colleagues (referral letter, chart note)									
KNOWLEDGE CONTENT AREAS	Basic mechanisms (anatomy, immunology, microbiology)									
	Pathophysiology of disease (dermatology, renal, gastrointestinal)									
	Social science (epidemiology, psychology, culture/diversity)									
	Special topics (spirituality, ethics, economics)									

The grid is filled out according to the type of assessment conducted, ie, standardized patient or simulation, video, postencounter probe, essay, or computer exercises. Each category can be combined with a number designating a category such as the name of a patient, a type of computer exercise, or a team exercise.

Figure 3 A Framework for Assessment (36)

Table 1

Features of assessment methods applicable to prescribing

The following is a targeted summary of the available literature regarding assessment methods used in clinical practice. It is not intended to be an exhaustive review, rather to highlight details of assessment methods that may contribute to the assessment of prescribing.

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
Knows or Knows How *Written examinations consist of a stem (the content of the question), an instruction (what the student is to do) and then the response (possible answers captured in differing formats).* *The stem may provide varying*	Written Examination Single Best Answer Multiple Choice Question (SBA MCQ)	Students choose the most suitable response to a question from a list of possible correct responses.	■ Evidence suggests high reliability (37, 39, 58, 62) due to the ability to examine a breadth of content in a short period of time. (63) ■ The resource impact is low (35, 37, 62) although flawless question writing may be time consuming. (35, 58) ■ In most cases, the student receives little or no feedback regarding their performance, which limits the educational impact. (64) ■ Considered useful for testing factual knowledge (35, 58) although a well-constructed, context-rich SBA may assess the application of knowledge to a clinical scenario. (62, 65) ■ A disadvantage is the possible 'cueing effect' – where a student identifies the correct answer in the list provided but may not have done so spontaneously. (35, 39, 58) ■ Concerns regarding validity have resulted in the development of other formats including the EMQ and MEQ (below).	■ Assessment of specific relevant knowledge e.g. pharmacology, pharmacokinetics, legal requirements pertaining to prescriptions ■ Possible use for the application of knowledge to a given clinical scenario e.g. choice of therapy
	Written Examination True/False Multiple Choice Question	Students choose a 'true' or 'false' response to a question.	■ Evidence suggests poor reliability and validity due in part to a high chance of guessing the correct answer (35, 62) even if the guess is based on incorrect knowledge (39) and the cueing effect described above. (63) ■ Low resource impact – can test a large proportion of content efficiently although questions may be difficult to construct. (35, 62)	■ Assessment of specific knowledge e.g. the normal range for therapeutic drug monitoring, however more effective methods are available

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
amounts of detail and dictates what is measured, rather than the format in which it is captured (39)	(TF MCQ)		▪ Low power at discriminating between high and low performers and difficult to construct to achieve the intended aim. (39, 62) ▪ Although factual knowledge is important to medical education, problem-solving is crucial and some suggest that TF MCQ examinations do not test this well. (62) ▪ The educational impact of a TF MCQ is limited by the fact that often there is no feedback regarding the assessment (as noted above).	
	Written Examination Extended Match Question (EMQ)	Students are provided with several more detailed questions and a long (9-26) list of possible answers which may be used once, more than once or not at all. There are four parts to the question: a theme, a lead-in statement (which provides instructions), the question and list of possible responses.	▪ Involves more complex thought processes and allows the question to be provided with more context (35, 66) and the longer list of possible answers minimises cueing. (35) ▪ Limited evidence suggests the EMQ is reliable and valid provided an appropriate number of questions are included (in this study 100 questions). (66) ▪ One study found the EMQ less powerful than a SBA MCQ to discriminate poor students but superior at identifying students with a higher grade. (67) ▪ Beullens found the EMQ feasible for a final medical examination administering 100 questions within an allocated 4 hours. (66)	▪ Application of knowledge to clinical scenarios e.g. selection of the most likely diagnosis; most appropriate therapeutic management plan; most likely drug cause of a described reaction
	Written Examination Modified Essay Question (MEQ)	Students are provided with a clinical case, the details of which are sequentially revealed and questions posed at each step. Essay	▪ Evidence suggests the MEQ is reliable and valid. (68, 69) ▪ There is evidence that a well-constructed MCQ exam may test problem solving more effectively than a MEQ (70) and that a substantial component of the MEQ exam tests factual recall. (71) ▪ MEQ are difficult to construct to achieve the desired assessment	▪ Understanding of appropriate management options according to case details ▪ Ability to modify treatment plan according to the details of the unfolding case

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
		style responses are written in a booklet.	aims and marking can be time consuming. (72) ▪ When used in small group teaching, Feletti suggests that the MEQ can be used to contribute to learning and that postgraduate clinicians can use writing MEQ questions as a continuing professional development exercise. (68)	
	Written Examination Key Feature Problem (KFP)	Students are provided with a clinical case and are tested on the critical (key) features of the case required to resolve a given clinical problem. Responses include both essay and multiple choice format.	▪ Evidence of validity, provided the key features are identified by an appropriately experienced clinician, (73) and reliability. (74) ▪ Designed to assess clinical decision making in relation to the critical points of a case. ▪ Feasibility can be increased by use of an electronic format. (74)	▪ Recognition of the critical decisions that relate to prescribing e.g. response to possible adverse drug events, possible drug interactions, ▪ Critical decisions regarding choice of therapy and the need to incorporate all aspects of patient care in decisions
Shows How	Oral Examination	The structure of an oral exam varies considerably but essentially involves the presentation of specific case details followed by questioning from examiners. The student may examine a patient, usually without being observed, before being questioned by	▪ Evidence indicates poor reliability (58, 75) due in part to the unstandardised nature of the content (students may be examined on different content and the complexity of each case may vary). Variability in content also reduces the validity of the assessment (75) although the content may be authentic. ▪ Considered anxiety producing for the student (76). It has been suggested that the oral examination tests personality traits rather than subject knowledge. (75) ▪ Intended to evaluate critical reasoning, ethics and problem solving and allows the examiner to further explore the students' abilities in these areas. (77) ▪ Some suggest the oral examination is more suited to the formative assessment process. (78) ▪ The oral examination can be logistically challenging, relying on	▪ Articulation and justification of therapeutic, diagnostic, ethical decisions

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
		examiners (as in the traditional long or short case). Alternatively, the examination may take place without patient interaction.	• the availability of both cases and examiners. (75) • Colton suggested reviewing the results of multiple oral examinations may provide important feedback regarding the curriculum, (79) although this information is not unique to the oral examination.	
Shows How	Objective Structured Clinical Examination (OSCE)	Series of timed simulated stations designed to assess clinical skills. Tests the components of larger tasks e.g. the ability to take a medication history as part of the patient assessment process. Each item is scored using either a checklist or global rating scale.	• Evidence suggests high reliability provided an adequate number of stations and multiple assessors are used. (58, 80) • Validity difficult to assess due to the differing content assessed at each station and the fragmentation of tasks into component skills (58, 81) • Resource intensive method requiring multiple trained assessors. (58, 82) • Variations include those designed to assess specific procedural skills e.g. the Objective Structured Procedural/Practical Examination). (83) • Students may receive feedback regarding their performance, which provides direction for ongoing learning. (81, 84) • Students often find the OSCE assessment format anxiety producing (82) however this may not adversely impact their performance. (85)	• Clinical skills e.g. physical examination, interpretation of laboratory data, preparing and administering medicines, generation of a prescription, communication
Does	Individual Encounter – mini Clinical Examination (mini-CEX)	Students undertake a clinical encounter with a patient that is observed by an assessor. Specific feedback is subsequently provided	• Combines elements of both observation and feedback and may be used for summative or formative assessment. (86, 87) • Feasible (designed to be completed in approximately 30 minutes) (88) and flexible enough to be used in many different clinical settings. (89) • Evidence suggests the mini-CEX is a valid and reliable assessment when used in multiple clinical encounters. (86, 87,	• Demonstration of most aspects of the medicines management cycle: assessment, clinical decision making (including choice of therapy), communication and review can be assessed using the miniCEX

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
		to the student and an action plan agreed.	89-91) ▪ The educational Impact is considered high: the student is provided with immediate feedback, regarding multiple patient encounters of varying complexity, and ideally feedback is provided by multiple examiners (86). In addition, Durning found that the feedback was more likely to include goal setting when the mini-CEX was compared to other forms of assessment. (89) In a formative capacity, students may undertake mini-CEX evaluations on their peers. (88) ▪ Usefulness reliant on the provision of effective feedback and the ability of the examiner to judge observed behaviour. Evidence suggests that examiner differences are low (92) and not improved by specific education. (93)	▪ Provides an opportunity to articulate decision making processes e.g. reason for proposed choice of therapy
	Individual Encounter – Case Based Discussion (CbD)	Students undertake a structured retrospective case review, using medical notes to prompt discussion with mentor.	▪ Feasible, authentic and acceptable although generally used as a formative rather than summative assessment. (94, 95) ▪ Limited evidence of reliability and validity although further research is required. (96) ▪ Usefulness and acceptability reliant on the provision of effective feedback. (94, 97) ▪ Action plans are valued however require time to implement so conducting a CbD at the end of a rotation may not be as useful as doing so at the beginning of the rotation. (97)	▪ Provides an opportunity for the student to articulate their decision making processes as well as knowledge e.g. of pharmacology ▪ Demonstration of ethical management of case and professionalism (although not directly observed by assessor)
	Longitudinal Assessment - Portfolio	Collection of evidence relevant to practice designed to indicate professional development. Portfolios may be written or digital in	▪ May contribute to both learning and assessment in the undergraduate and postgraduate settings. ▪ Portfolios may improve the relationship between student and teacher by increasing awareness of student needs. (98) ▪ Diverse evidence may be included to demonstrate both professional and technical development (35, 99, 100) taking an holistic view of student achievements over time. (100)	▪ Evidence of prescriptions generated with case details ▪ Evidence of self-directed learning (e.g. NPS modules) completed with certification ▪ Case reflections representing all stages of the medicines

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
		format and may mirror post registration requirements.	- Designed to promote self-reflection as a component of life-long learning (100, 101) although does not guarantee student reflection (102) nor the quality of reflection, (101) which appears to influence the validity of the portfolio as a summative assessment tool. (103, 104) - Effective implementation of a successful portfolio program requires clear goals, specific instructions, a flexible format combined with adequate mentoring (101-103) and early introduction within the program. (105) - The time commitment required to complete a portfolio may be considered challenging and students may not engage with the process unless required to do so. (101) - Portfolios may be successfully used in a combined formative and summative format. (103, 105) - The reliability of a portfolio may be improved by providing structure (or standardisation) to the content, increasing the number of assessors and providing criteria for assessment. (105)	management cycle ■ Action plans generated with mentor
	Longitudinal Assessment – Multisource Feedback (MSF) or 360 degree feedback	Student is provided with structured, anonymous feedback from colleagues. Students may nominate assessors or they may be assigned.	- Used in multiple health (and non-health) professions as both a learning tool and summative assessment in both undergraduate and postgraduate settings. - Peers may be asked to provide a global rating of their colleague over time or to rate their ability to undertake a specific task. The ability of the assessor to make those judgements impacts the usefulness of the assessment. (106) - Reliability is improved by increasing the number of peers contributing to the assessment, (106, 107) increasing the number of encounters observed (and ensuring they occur in multiple contexts) and asking multiple questions regarding an area of practice. (106) - Usefulness reliant on the feedback received, which may or may	■ Communication, teamwork, consultative skills ■ Colleagues' perceptions of the student's knowledge and general competence e.g. ability to advise in relation to medicines management

Assessment Level	Assessment Method & Format	Description	Features	Application to Prescribing
			not be used by the recipient to improve performance. (108, 109) The source of the feedback (e.g. colleague or patient), its content and specificity may influence the recipient's decision regarding whether to use the information to improve practice. (108) Facilitated feedback may improve the uptake of comments received as part of the peer review process. (109, 110) ▪ Should not be used in isolation, however may provide formative feedback to encourage learning. (107) ▪ A shortened variation of the MSF known as the mini-peer assessment tool (mini-PAT) has been developed to assess foundation trainees in the UK (111) and used in other health professions. (112)	
	Entrustable Professional Activity (EPA)	An EPA describes a component of professional practice that a trainee may undertake once they have demonstrated competence. (113)	▪ Each EPA includes a detailed description of the activity. Behaviour related to the EPA are assessed by the supervisor and the student is deemed either ready to perform with supervision at a distance or not yet ready to do so. ▪ Evidence for entrustment is defined in terms of the recommended assessment methods applicable to the EPA.	EPA evidence for prescribing has been developed. Evidence for entrustment includes: ▪ examples of prescribing ▪ mini-CEX evidence indicative of communication, patient education, reconciliation, medical education ▪ MSF ▪ Pharmacist prescription reviews ▪ Feedback from patients

ASPRINH Project findings

The ASPRINH Project has provided valuable information to inform the development of the toolkit. The key points identified by the project are highlighted below.

Assessment methods employed to assess elements of prescribing

Curriculum mapping across the ten health professions studied identified:

- A multimodal approach to the assessment of prescribing elements
- Large variation in the assessment methods used to assess elements of prescribing
- Written examinations (of various types) are widely used in the assessment of both specific components of prescribing and those that support the teaching of prescribing

Assessment methods considered useful in the prescribing context

The project survey findings indicate that students and representatives of professional, accrediting and regulatory organisations consider assessment methods that involve direct observation of performance the most effective to assess prescribing skills. However, while academic staff considered observed assessments effective for some elements of prescribing, they rated this method as difficult and time consuming in terms of staffing and resources required. Mapping data indicate large variations between professions in the use of observed assessments, with some professions including such methods frequently and others relying on other forms of assessment.

Student perceptions regarding the prescribing curriculum

Students who participated in the ASPRINH Project commented that, although they remember being taught (and assessed regarding) aspects of the prescribing curriculum, they soon forgot these elements and struggled to subsequently draw these teachings together when required to prescribe. This may indicate a lack of visibility related to prescribing as a specific task within the current curriculum.

Conceptual Model of the Four Stages of Prescribing

This conceptual model highlights the common practice components within the prescribing process:
1. to accurately assess the patient
2. to make an accurate and informed clinical decision relevant to the patient's needs
3. to communicate effectively with the patient, family and/or carer and
4. to monitor prescribed therapy.

The central difference between prescribing professions is competency area 2 – the decision to treat and what to prescribe. This competency area is impacted largely by the scope of practice for individual prescribers and the context in which prescribing will occur.

Competency Area 1

Understand the patient
(Information Gathering)

Competency Area 2

Clinical decision making
(includes understanding & tailoring treatment)

Competency Area 4

Monitor and review prescribed therapy

**Competency Area 3**

Communicate the treatment plan

Figure 4 Conceptual Model of the Four Stages of Prescribing

The Essential Prescribing Skills Assessment Guide

Overview of the Essential Prescribing Skills Assessment Guide

A best practice framework for the assessment of student prescribing competence

The Essential Prescribing Skills Assessment Guide (the guide) highlights the essential skills required to safely prescribe medicines, determined through consultation and feedback during the ASPRINH Project. It provides recommendations for appropriate assessment methods that may be used to assess these skills, based on published literature and reflective of the key findings of the project.

An important aim of defining the essential prescribing skills is to improve the visibility of prescribing within the process of assessment, recognising that many of the recommended assessment methods may already be in use, applied to clinical practice in general.

As described by Lum et al (1), the essential components of prescribing are underpinned by specific knowledge and skills, that will also require assessment. These are detailed in the PCF. (2) Typical content which may be included in a curriculum teaching prescribing can be found in Appendix 1, along with relevant assessment methods. Appendix 1 is not intended to be exhaustive; rather to highlight the key features of prescribing that should be included in a prescribing curriculum and reflected in associated prescribing standards. It is assumed that individual professions will include content relevant to their prescribing scope and the clinical context/s in which prescribing will occur.

The essential prescribing skills follow the recognised four stages of prescribing (1, 29) and highlight, within each stage, the skills that require clear assessment in order to demonstrate prescribing competence.

Competency Area 1
Understand the patient

Comprehensive patient interview

Clinical examination & investigations according to scope

Competency Area 2
Clinical decision making

Arrive at an accurate diagnosis

Identify appropriate treatment options

Consider patient and treatment factors to determine the best treatment

Competency Area 3
Communicate the treatment plan

To the patient, family and/or carer

To other health professionals

Competency Area 4
Monitor & review prescribed therapy

Review effectiveness, ineffectiveness, harm

Decide on modifications if required

Figure 5 Overview of the Essential Prescribing Skills Assessment Guide

Competency Area
Based on the 4 stages of prescribing (1) and the Prescribing Competency Framework (2)

Competency Area 1 - Understand the patient

Competency Area 1 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	**Additional Useful Assessments**
CA1.1 Obtain a problem-focused, comprehensive clinical history using appropriate communication, process and deductive skills *PCF: 1.1.1, 1.2.1, 1.2.2, 1.2.3.*	A **comprehensive clinical history** will include details of social, cultural & demographic characteristics. **Appropriate communication** will involve the establishment of a therapeutic relationship and the building of rapport and trust, using appropriate communication strategies. **Appropriate process** will include use of relevant sources of patient-specific information, including the patient and/or family, health record, other health professionals as appropriate.	**Observed Performance Assessment** *Assessment Level:* "Does" *Summative Assessment Example* ▪ mini-Clinical Evaluation eXercise *Formative Assessment Examples* ▪ mini-Clinical Evaluation eXercise ▪ Case-based Discussion* ▪ Portfolio* ▪ Multisource Feedback*	**The following assessment methods may contribute to the demonstration of essential skills (or components thereof)** *Assessment Level:* "Knows how", "Knows" *Formative and/or Summative Assessment Example:* Written Examination using Key Feature Problem and/or Modified Essay Question formats.
CA1.2 Undertake a comprehensive treatment history including adherence to current and previously prescribed and self-initiated treatment/s. Consider risk factors for non-adherence. Reconcile the current treatment history with the clinical history and diagnoses *PCF: 1.2.1, 1.2.3, 1.2.4, 1.2.5.*	A **comprehensive treatment history** will include details of pharmacological, non-pharmacological* and other relevant treatment modalities, as well as an indication of their effectiveness/ineffectiveness/harm and the patient's degree of adherence with prescribed therapy. A complete allergy history will be obtained. **Reconciliation** of the medication history will be undertaken using a systematic process. The patient's goals, beliefs and attitudes will be explored in relation to their existing treatment/s and clinical history.	*Content example: CA1.1, CA1.2, CA1.3, CA1.4.* History taking (including communication skills and reconciliation processes) and physical examination in context with actual patient/s, demonstration of the ability to identify personal and professional limits. Portfolios may contain reflections of patient encounters indicating a growing skill level pertaining to history taking and examination skills, use of investigations, awareness of limitations. Multisource Feedback (MSF) or mini-Peer Assessment Tool (mini-PAT) may provide feedback regarding the ability to engage with patients and establish an accurate history.	*Content example:* reconciliation processes, choice of appropriate investigations (may include justification of decision), understanding of medicines adherence and implications. **Additional Assessment Methods** Oral examinations involving a case presentation with
CA1.3 Demonstrate appropriate profession-specific patient assessment processes including, as appropriate, those pertaining to physical examination and arranging or undertaking relevant investigations *PCF: 1.2.1, 1.2.6.*	**Assessment processes** will include those relevant to the profession (as defined by the profession) and the professional's scope of practice. **Additional information** will be sought from other health professionals where relevant & necessary.	*May contribute to summative assessment within this competency area as part of a program that includes other sources of evidence, but should not be relied on as the only source of evidence.*	

Essential Skills
▪ Represent the core common skills required to prescribe medicines.
▪ Based on the 12 core competencies (1) and developed through consensus across multiple professions.

Comment
▪ Highlights the meaning behind terminology used in the essential skills.
▪ Provides additional detail regarding required learning to support development of essential prescribing skills.

Recommended Assessment Methods
▪ Recommendations based on a combination of evidence regarding the psychometric properties of assessment methods used in clinical practice and feedback received during the ASPRINH Project.
▪ Note that assessments may be formative or summative and should be incorporated to facilitate learning as well as to provide evidence of ability.
▪ Assessments with strong evidence of reliability and validity combined with a logical application to the essential prescribing skills are included in the left hand column.
▪ Those considered useful by ASPRINH Project participants and those that may provide evidence of components of the essential prescribing skills are provided in the right hand column.

Figure 6 Structure of the Essential Prescribing Skills Assessment Guide

The Essential Prescribing Skills

The PCF details the requirements for safe and effective prescribing in Australia and highlights the knowledge, skills and attitudes/ behaviours required to prescribe. The essential prescribing skills outlined in the guide focus on the observable skills that indicate prescribing ability. These skills will be developed through a long-term process involving the learning, practice and assessment of the performance criteria outlined in the PCF. In essence, the essential skills are those that are required to prescribe competently in most situations and are based on the PCF, the identified core prescribing competencies and the findings and consultation obtained during the ASPRINH Project. In order to contribute to an effective assessment program, the essential skills have been grouped according to the four stages of prescribing. For example, shared decision making sits within the clinical decision making stage of prescribing rather than as a separate step.
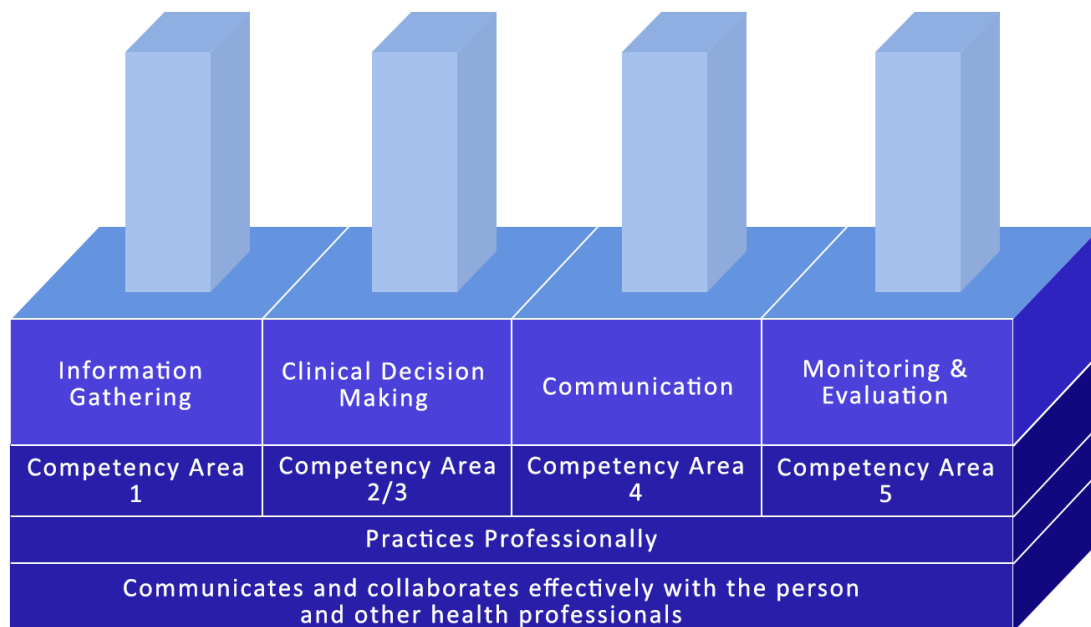
KEY

Essential Prescribing Skills (as defined by the ASPRINH Project)

Prescribing learning outcomes (scope & context dependent)

Four stages of prescribing (as defined by Lum et al (1))

Prescribing Competency Framework (2)

REFERENCES

(1) = Lum E, Mitchell C, Coombes I. The competent prescriber: 12 core competencies for safe prescribing. Australian Prescriber. 2013;36(1):13-6

(2) = NPS: Better choices.Better health. Competencies required to prescribe medicines: putting quality use of medicines into practice: National Prescribing Service Limited; 2012 Available from: www.nps.org.au/health-professionals/cpd/prescribing-competencies-framework

Figure 7 Visual representation of the Essential Prescribing Skills and relationship to the Prescribing Competency Framework

Use of the Essential Prescribing Skills Assessment Guide

The guide may contribute to the development of an assessment program designed to assess prescribing competence. The following general principles, drawn from the available literature, should be considered when applying the guide.

General Principles

1. Use multiple sources of evidence

Prescribing, like many aspects of clinical practice, is context specific. The ability to undertake essential prescribing skills safely and effectively in one context does not necessarily translate to another. It is therefore advisable to undertake multiple assessments in different contexts relevant to the prescriber, in order to establish a complete picture of the student's ability.

2. Scaffold the essential prescribing skills by teaching and assessing supporting learning outcomes

The assessment of essential prescribing skills provides evidence of prescribing ability. The learning program designed to support development of these skills requires well-constructed strategies that incorporate the 'prescribing lens' from an early stage. Frequent demonstration of competence over the course of the program will be important prior to the demonstration of performance.

3. Use assessment methods in both a formative and summative capacity

Students will develop the essential prescribing skills at various points along their learning path. Assessment should be incorporated frequently in a formative capacity and subsequently summatively at appropriate times to reflect the development of these skills. Where possible, students should be familiar with the methods used formatively prior to their use in high-stakes summative assessment.

4. Provide students with ample opportunity to practice

Students find it challenging to integrate previously learned knowledge and skills in the prescribing process. Many medical students report a lack of confidence in their ability to prescribe medicines. (21-23) Students have suggested that their confidence to prescribe may be improved by an increased opportunity to practice these skills. (22)

5. Provide effective feedback

Students appreciate feedback. The successful integration of learned knowledge and skills may be supported by the provision of well delivered, tailored feedback associated with both formative and, where possible, summative assessments.

6. Encourage reflection

Prescribing, like many clinical skills requires ongoing review and maintenance. The importance of establishing the ability to self-reflect is well recognised and highly relevant to prescribing as an error-prone, high risk component of practice.

7. Incorporate prescribing elements in the curriculum blueprint

Multiple assessment methods are required to effectively assess all aspects of prescribing. In order to ensure the assessment program is complete and context sensitive, the use of an assessment blueprint with clear links to the learning outcomes may be useful.

8. Use trained assessors where possible

Trained assessors are key to the assessment of the essential prescribing skills. Assessors need to be familiar with the expectations of prescribers and competent in the observation of performance. Ideally, assessment should be combined with effective feedback to contribute to the learning process. Appropriate training of assessors in the provision of feedback to support this process may be required.

9. Ensure students are aware of the Prescribing Competency Framework

The essential prescribing skills are embedded in the PCF. Students should become familiar with the PCF and its relevance to practice as their knowledge and skills develop. Awareness of prescribing risk and the skills that may prevent error will be enhanced by an understanding of the PCF.

10. Improve the visibility of prescribing

Students find it difficult to weave together the different threads of prescribing. This impacts their confidence to prescribe. Frequent formative assessment and the development (and recognition) of prescribing skills from an early stage may assist students to view prescribing as a significant component of practice. The guide groups skills in a logical fashion. For example, gathering a treatment history, reconciling that history with clinical details and reviewing adherence are included together. It is hoped that this may contribute to the formation of prescribing skills and improve the recognition and visibility of the task of prescribing.

Practical notes

- Recommendations should be considered with due regard to the recognised strengths and weaknesses of each assessment method (refer Table One) remembering that the essential prescribing skills are observable skills that will therefore require *demonstration* rather than *description* to be accurately assessed. Consequently, although aspects of the essential skills may be assessed using methods considered appropriate to assess knowledge, true demonstration of skill will in most cases require observation.

- While the potential resource implications of undertaking assessment using the methods recommended may be high, the importance of developing a safe and effective prescribing workforce (and the potential patient safety implications of not doing so) should be given equal consideration.

The Essential Prescribing Skills Assessment Guide

Competency Area 1 - Understand the patient

Competency Area 1 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	Additional Useful Assessments
CA1.1 Obtain a problem-focused, comprehensive clinical history using appropriate communication, process and deductive skills *PCF: 1.1.1, 1.2.1, 1.2.2, 1.2.3.*	A **comprehensive clinical history** will include details of social, cultural & demographic characteristics. **Appropriate communication** will involve the establishment of a therapeutic relationship and the building of rapport and trust, using appropriate communication strategies. **Appropriate process** will include use of relevant sources of patient-specific information, including the patient and/or family, health record, other health professionals as appropriate.	**Performance Assessment** *Assessment Level:* "Does" *Summative Assessment Example* ▪ mini-Clinical Evaluation eXercise *Formative Assessment Examples* ▪ mini-Clinical Evaluation eXercise ▪ Case-based Discussion* ▪ Portfolio* ▪ Multisource Feedback* *Content example: CA1.1, CA1.2, CA1.3, CA1.4.* History taking (including communication skills and reconciliation processes) and physical examination in context with actual patient/s, demonstration of the ability to identify personal and professional limits. Portfolios may contain reflections of patient encounters and other evidence indicating a growing skill level pertaining to history taking and examination skills, use of investigations, awareness of limitations. Multisource Feedback (MSF) or mini-Peer Assessment Tool (mini-PAT) may provide feedback regarding the ability to engage with patients and establish an accurate history. **May contribute to summative assessment within this competency area as part of a program that includes other sources of evidence, but should not be relied on as the only source of evidence.*	**The following assessment methods may contribute to the demonstration of essential skills (or components thereof)** *Assessment Level:* "Knows how", "Knows" *Formative and/or Summative Assessment Example:* Written Examination using Multiple Choice (Single Best Answer), Key Feature Problem or Modified Essay Question formats. *Content example:* reconciliation processes, choice of appropriate investigations (may include justification of decision), understanding of medicines adherence and implications.
CA1.2 Undertake a comprehensive treatment history including adherence to current and previously prescribed and self-initiated treatment/s. Consider risk factors for non-adherence. Reconcile the current treatment history with the clinical history and diagnoses *PCF: 1.2.1, 1.2.3, 1.2.4, 1.2.5.*	A **comprehensive treatment history** will include details of pharmacological, non-pharmacological* and other relevant treatment modalities, as well as an indication of their effectiveness/ineffectiveness/harm and the patient's degree of adherence with prescribed therapy. A complete allergy history will be obtained. **Reconciliation** of the treatment history will be undertaken using a systematic process. The patient's goals, beliefs and attitudes will be explored in relation to their existing treatment/s and clinical history.		
CA1.3 Demonstrate appropriate profession-specific patient assessment processes including, as appropriate, those pertaining to physical examination and arranging or undertaking relevant investigations *PCF: 1.2.1, 1.2.6.*	**Assessment processes** will include those relevant to the profession (as defined by the profession) and the professional's scope of practice. **Additional information** will be sought from other health professionals where relevant & necessary.		

Competency Area 1 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	Additional Useful Assessments
CA1.4 Appropriately demonstrate the identification of gaps in personal knowledge and skills and the willingness to seek advice or refer the patient when in doubt *PCF: 2.2.9, H1.2.2.*	Clear demonstration of the **recognition of personal and professional limits** and the development of an appropriate plan relevant to the management of the patient.	**Competence Assessment** *Assessment Level:* "Shows How" *Summative Assessment Example* Objective Structured Clinical Examination or use of other standardised, simulation-based assessment. *Content example: CA1.1, CA1.2, CA1.3, CA1.4.* History taking (including communication skills and reconciliation processes) and physical examination, demonstration of the ability to identify personal and professional limits.	**Additional Assessment Methods** Oral examinations involving a case presentation with questions may provide formative evidence of history taking skills, understanding of investigations and recognition of personal and professional limits. However, the poor reliability of this method when used summatively should be recognised.

Relevant Section of the Prescribing Competency Framework referenced in the Essential Skills

Elements: 1.1, 1.2, 2.2, H1.2
Performance Criteria: 1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 2.2.9, H1.2.2

*Non-pharmacological treatment is taken to include interventions that *do not* have a pharmacological mechanism of action. This may include physical techniques (massage, exercise), mind-body techniques (biofeedback, acupuncture), mind-based techniques (cognitive behavioural therapy, hypnosis, relaxation/meditation, mindfulness), aids such as spectacles, orthotics, community support or a combination of the above.

Competency Area 2 – Clinical decision making

Competency Area 2 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	**Additional Useful Assessments**
CA2.1 Review available information regarding the patient and identify the key health and medication related issues. Make or review the diagnosis *PCF: 1.2.2, 1.2.5, 1.3.1.*	**Available information** may include findings of an interview with the patient (clinical history), examination, investigations or information provided by another health professional.	**Performance Assessment** *Assessment Level:* "Does" *Summative Assessment Example* ▪ mini-Clinical Evaluation eXercise *Formative Assessment Examples* ▪ mini-Clinical Evaluation eXercise ▪ Case-based Discussion* ▪ Portfolio* ▪ Multisource Feedback* *Content example: CA2.1, CA2.2, CA2.3, CA2.4, CA2.5, CA2.6, CA2.7, CA2.8, CA2.9.* Patient negotiation regarding choice of therapy, possible modifications to existing therapy, diagnostic reasoning and generation of an accurate diagnosis, patient referral, demonstration of the ability to identify personal and professional limits, involvement of other health professionals, development of a review plan. Portfolios may contain reflections of patient encounters and other evidence indicating a growing understanding of the interpretation of examination and investigations, generation of a diagnosis, pharmacological intervention. Multisource Feedback or mini-Peer Assessment Tool (mini-PAT) may provide feedback regarding the ability to establish an appropriate treatment plan and contribute to the multidisciplinary decision making process. **May contribute to summative assessment within this competency area as part of a program that includes other sources of evidence, but should not be relied on as the only source of evidence.*	Oral examinations involving a case presentation with questions may provide formative evidence of diagnostic ability, identification of appropriate therapy, the ability to seek guidance and determine an appropriate review plan. However, the poor reliability of this method when used summatively should be recognised.
CA2.2 Consider whether existing treatment may be contributing to current health issues. Consider whether existing treatment has achieved the identified goals. Accordingly, consider the need to modify existing treatment *PCF: 3.2.6, 5.1.4.*	**Explore the contribution of existing treatment to the patient's overall health** for example, has the treatment achieved agreed goals, caused toxicity, been ineffective, interacted with other treatment? Is the patient adhering to the treatment? Has the treatment been used for the required/agreed duration? **Modifications to existing treatment** may include dose adjustment, cessation or initiation of additional treatment.		
CA2.3 Determine whether current symptoms are modifiable by treatment *PCF: 2.1.1, 2.1.2.*	**Treatment** may be pharmacological or non-pharmacological* and should be considered within the boundaries of relevant practice scope.		
CA2.4 Determine the most appropriate treatment option (pharmacological and/or non-pharmacological) taking into consideration relevant patient and treatment information *PCF: 2.1.2, 2.2.1, 2.2.3.*	**Relevant patient and treatment information** will include the patient's comorbidities, existing treatment/s, complementary therapies and agreed goals.		
CA2.5 Negotiate with the patient the goals of treatment; respecting their beliefs, needs and attitude to the treatment options *PCF: 3.1.1, 3.2.1.*			

Competency Area 2 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	Additional Useful Assessments
CA2.6 Proactively seek advice where required and use available resources effectively. Demonstrate an understanding of personal and professional limitations and refer the patient to another health professional where appropriate *PCF: 2.2.9, 3.2.2, H1.2.2.*	**Available resources** may include protocols, guidelines and the advice of colleagues.	**Competence Assessment** *Assessment Level:* "Shows How" *Summative Assessment Example* Objective Structured Clinical Examination or use of other standardised, simulation-based assessment. *Content example: CA2.1, CA2.2, CA2.3, CA2.4, CA2.5, CA2.6, CA2.7, CA2.8, CA2.9.* Patient negotiation regarding choice of therapy, possible modifications to existing therapy; diagnostic reasoning and generation of an accurate diagnosis, patient referral, demonstration of the ability to identify personal and professional limits, involvement of other health professionals, development of a review plan. *Assessment Level:* "Knows how", "Knows"	
CA2.7 In collaboration with the patient, select the most appropriate treatment according to both treatment and patient factors *PCF: 2.2.1, 2.2.3, 2.2.4, 2.2.6, 3.2.1, 3.2.3, 3.2.4.*	**The most appropriate treatment** will include consideration of pharmacological/ non-pharmacological properties, route, dose, frequency, cost, intended/agreed duration of treatment as well as patient preference and beliefs.		
CA2.8 Modify the treatment according to patient specific factors *PCF: 2.2.3.*	**Patient specific factors** to be considered when modifying the treatment include patient age, weight, agreed goals, need for dose adjustment according to renal/hepatic dysfunction, recognition of the possible impact of existing treatment/s.	*Formative and/or Summative Assessment Example:* Written Examination using Multiple Choice (Single Best Answer, Extended Match), Key Feature Problem and/or Modified Essay Question formats. *Content example: CA2.1, CA2.2, CA2.3, CA2.4, CA2.7 (in part), CA2.8, CA2.9 (in part).* Ability to interpret investigations, generate a diagnosis from presented details, apply pharmacological principles to findings, select appropriate pharmacological therapy (including dose, frequency, duration, route).	
CA2.9 Determine when the various components of treatment should be reviewed and agree to a plan for this with the patient *PCF: 3.3.1.*			
Relevant Section of the Prescribing Competency Framework referenced in the Essential Skills			
Elements: 1.2, 1.3, 2.1, 2.2, 3.1, 3.2, 3.3, 5.1, H1.2			
Performance Criteria: 1.2.2, 1.2.5, 1.3.1, 2.1.1, 2.1.2, 2.2.1, 2.2.3, 2.2.4, 2.2.6, 2.2.9, 3.1.1, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.6, 3.3.1, 5.1.4, H1.2.2.			

*Non-pharmacological treatment is taken to include interventions that *do not* have a pharmacological mechanism of action. This may include physical techniques (massage, exercise), mind-body techniques (biofeedback, acupuncture), mind-based techniques (cognitive behavioural therapy, hypnosis, relaxation/meditation, mindfulness), aids such as spectacles, orthotics, community support or a combination of the above.

Competency Area 3 - Communicate the treatment plan

Competency Area 3 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	Additional Useful Assessments
CA3.1 Discuss with the patient, carer and/or family details of the treatment plan. Provide written and verbal information as appropriate or required by law *PCF: 2.2.6, 2.2.7.*	**Details of the treatment plan** will include the name of the chosen treatment/s, dose, frequency, how to administer, likely duration and instructions regarding when to seek advice and how to know if the treatment has been effective, ineffective or harmful.	**Performance Assessment** *Assessment Level:* "Does" *Summative Assessment Example* ▪ mini-Clinical Evaluation eXercise *Formative Assessment Examples* ▪ mini-Clinical Evaluation eXercise ▪ Case-based Discussion* ▪ Portfolio* ▪ Multisource Feedback*	**The following assessment methods may contribute to the demonstration of essential skills (or components thereof)** *Assessment Level:* "Knows" *Summative Assessment Example:* Written Examination using Multiple Choice (Single Best Answer, Extended Match) or Modified Essay Question formats.
CA3.2 Ensure the patient, carer and/or family understand the details of the treatment plan *PCF: 3.2.7.*	It is expected that **effective communication skills** are demonstrated. These will include (but are not limited to) active listening, awareness and appropriate management of cross cultural communication requirements and the ability to adapt communication for patients with disabilities (e.g. hearing loss, aphasia, intellectual/ cognitive impairment).	*Content example: CA3.1, CA3.2, CA3.3, CA3.4, CA3.5.* Provision of information to the patient/carer to support the patient's understanding of the treatment plan, documentation of patient encounters, communication with other health professionals regarding the treatment plan, demonstration of the ability to generate a safe, appropriate and legally correct prescription.	*Content example:* Legal requirements relevant to prescribing, Pharmaceutical Benefits Scheme (PBS) requirements for prescribing.
CA3.3 Document details of the agreed treatment plan *PCF: H1.1.2.*	**Details of the plan for review** of prescribed treatment/s should also be discussed and documented.	Portfolios may contain reflections of patient encounters and other evidence indicating a growing understanding of communication methods applicable to discussing treatment plans with the patient and other health professionals, culturally sensitive communication skills, legal requirements relevant to prescribing.	**Additional Assessment Methods**
CA3.4 Communicate details of the treatment plan to other health professionals including modifications to existing therapy where applicable *PCF: 4.2.1, H2.5.4.*	**Consider the need for informed consent** when providing details of the treatment plan to other health professionals.	Multisource Feedback or mini-Peer Assessment Tool (mini-PAT) may provide feedback regarding communication skills used when communicating with patients/carers and other health professionals, (including those involved in dispensing and administering the treatment).	Oral examinations involving a case presentation with questions may provide formative evidence of an understanding of legislation and regulatory requirements in relation to prescription generation. However, the poor
CA3.5 Ensure medicines are prescribed accurately and according to legal and regulatory requirements *PCF: 4.1.1.*	**Prescribed medicines** should comply with recognised safety recommendations including use of standardised ordering charts and systems.	*May contribute to summative assessment within this competency area as part of a program that includes other sources of evidence, but should not be relied on as the only source of evidence.*	

Competency Area 3 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	Additional Useful Assessments
		Competence Assessment *Assessment Level:* "Shows How" *Summative Assessment Example* Objective Structured Clinical Examination or use of other standardised, simulation-based assessment e.g. standardised role play using clear criteria to assess communication and provide feedback. *Content example: CA3.1, CA3.2, CA3.3, CA3.4, CA3.5.* Provision of information to the patient/carer to support the patient's understanding of the treatment plan, documentation of patient encounters, communication with other health professionals regarding the treatment plan, demonstration of the ability to generate a safe, appropriate and legally correct prescription.	reliability of this method when used summatively should be recognised.
Relevant Sections of the Prescribing Competency Framework referenced in the Essential Skills			
Elements: 2.2, 3.2, 4.1, 4.2, H1.1, H2.5 **Performance Criteria:** 2.2.6, 2.2.7, 3.2.7, 4.1.1, 4.2.1, H1.1.2, H2.5.4			

Competency Area 4 - Monitor and review prescribed therapy

Competency Area 4 Essential Skills	Comment	Applicable Assessment Methods	
		Strongest Evidence Assessments	Additional Useful Assessments
CA4.1 Use appropriate indicators to review prescribed treatment including patient information, clinical indicators and, where appropriate, the results of Therapeutic Drug Monitoring *PCF: 5.1.1, 5.1.2, 5.1.3.*	**Sources of evidence** should be sought and interpreted according to the professional's scope of practice and advice sought where relevant.	**Performance Assessment** *Assessment Level:* "Does" *Summative Assessment Example* - mini-Clinical Evaluation eXercise *Formative Assessment Examples* - mini-Clinical Evaluation eXercise - Case-based Discussion* - Portfolio* - Multisource Feedback* *Content example: CA4.1, CA4.2, CA4.3, CA4.4.* Patient consultation including review of current therapy and/or modifications to current therapy, communication of modifications to the treatment plan with other health professionals, demonstration of the ability to identify personal and professional limits. Portfolios may contain reflections of patient encounters and other evidence indicating a growing understanding of monitoring strategies, review of medications prescribed and the management of adverse effects and allergies. Multisource Feedback or mini-Peer Assessment Tool (mini-PAT) may provide feedback regarding communication with other health professionals and/or patients. **May contribute to summative assessment within this competency area as part of a program that includes other sources of evidence, but should not be relied on as the only source of evidence.* **Competence Assessment** *Assessment Level:* "Shows How" *Assessment Example*: Objective Structured Clinical Examination or use of other standardised, simulation-based assessment e.g. role	Oral examinations involving a case presentation with questions may provide formative evidence of the ability to interpret monitoring and associated action/s taken. However, the poor reliability of this method when used summatively should be recognised.
CA4.2 Identify treatment options based on interpretation of information gathered *PCF: 2.2.1, 2.2.3, 5.1.4.*	**Interpretation of the results of monitoring** should be undertaken in consultation with other health professionals as appropriate.		
CA4.3 Decide, in collaboration with the person and/or other health professionals, whether therapy should be ceased, modified, continued or initiated depending on the results of monitoring and review *PCF: 3.2.2, 3.2.6, 5.1.4, 5.2.3.*	**Decisions regarding changes to the treatment** plan should be made according to the professional's scope of practice.		
CA4.4 Communicate the findings of the review and recommendations with the patient and other health professionals as appropriate, seeking advice and referring the patient when indicated *PCF: 5.2.1, 2.2.9, H1.2.2, H2.5.4.*	**Details of the review** should be provided to other health professionals, respecting their previous prescribing choices and highlighting the findings of the review and associated changes made (if any). Appropriate communication methods should be employed e.g. electronic, written and/or verbal to ensure timely provision of information.		

		play sessions using clear criteria to assess skills and provide feedback.	
		Content example: CA4.1, CA4.2, CA4.3, CA4.4. Patient consultation including review of current therapy and/or modifications to current therapy, communication of modifications to the treatment plan with other health professionals, demonstration of the ability to identify personal and professional limits.	
		Assessment Level: "Knows how", "Knows"	
		Assessment Example: Written Examination using Key Feature Problem and/or Modified Essay Question formats.	
		Content example: CA4.1, CA4.2. Appropriate indicators of therapeutic effectiveness, identification of possible adverse effects related to prescribed therapy, appropriate modifications to therapy.	

Relevant Sections of the Prescribing Competency Framework referenced in the Essential Skills

Elements: 2.2, 3.2, 5.1, 5.2, H1.2. H2.5
Performance Criteria: 2.2.1, 2.2.3, 2.2.9, 3.2.2, 3.2.6, 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.2.1, 5.2.3, H1.2.2, H2.5.4.

Example Assessment Blueprint

The essential prescribing skills represent the culmination of knowledge and skill learnt over the entire program of study. As noted earlier, these skills will develop at different points along the learning process and will consequently be assessed at various stages. In order to ensure all essential skills are assessed adequately using multiple assessment methods and in varying contexts, the use of an assessment blueprint may be of benefit.

The following example shows possible methods of assessing developing skills in the second year of a generic program of study. Note that assessment items may assess multiple skills (for example OSCE stations may assess CA1.4, CA2.1, CA2.2, CA2.6 in Unit B below). When viewed over the entire program, it is possible to see how assessment may reinforce and highlight developing skills. Given that this example represents second year units, a limited number of essential prescribing skills are expected to have developed in their entirety at this stage, however components of those skills will be assessable.

Year Two

Essential Prescribing Skill	Unit A – Advanced Body Systems					Unit B – Clinical Pharmacotherapeutics					Unit C – Personal Skills Development					Unit D – Evidence-based Practice					Assessment Detail
	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	
CA1.1						No	History Taking	U	F1 RP / F1 RP / **S1 OSCE**	CV D **CV**	No	History Taking	U	F3 RP / **S1 OSCE**	CE, CV **Any above**						**Assessment Type** CP = Case Presentation RP = Role play P = Practical WE = Written Examination
CA1.2						No	Adherence	U	F1 RP / **S1 OSCE**	IM **CV**											
CA1.3	Yes	Physical Exam	U	F2 P / **S1 OSCE**	MSK **MSK**																F= Formative S=Summative
CA1.4						No	ID Need to refer	U	**S1 OSCE**	D	No	Personal Limits	P	**S1 CbD**	Multiple						**Clinical Context** CE = Care of the Elderly
CA2.1	Yes	Interpret Findings; Diagnose	U	**S1 OSCE**	IM	Yes	ID Med Issues	U	F1 CP / **S1 OSCE**	IM D											CV = Cardiovascular Medicine D = Diabetes ID = Infectious Diseases IM = Internal Medicine MSK = Musculoskeletal Anatomy
CA2.2						Yes	Med Rec	U	F1 CP / **S1 OSCE**	CV D											
CA2.3						No	Pharma-cology	U	**S2 WE**	IM D											
CA2.4						No	Pharma-cology	U	**S1 WE**	CV						No	EBM	U	**S1 WE**	Multiple	**Setting** U = University setting P = Placement / Work Integrated Learning
CA2.5											No	Negotiation	U	F1 RP / **S1 OSCE**	CE CE						

Year Two

Essential Prescribing Skill	Unit A – Advanced Body Systems					Unit B – Clinical Pharmacotherapeutics					Unit C – Personal Skills Development					Unit D – Evidence-based Practice				
	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context	Threshold	Assessment Content	Setting	Assessment Type	Clinical Context
CA2.6						No	Use of Resources	U	**S1 OSCE**	**D** (same as for CA1.4**)**	No	Seek Advice	P	**S1 CbD**	**Multiple**					
CA2.7																				
CA2.8						No	Modify Dose	U	F1 WE **S1 WE**	IM **D**										
CA2.9						No	Monitor Rx	U	S1 CP **S1 OSCE**	IM **CV**										
CA3.1																				
CA3.2																				
CA3.3																				
CA3.4											No	Comm HP	U	**S1 OSCE**	Multiple					
CA3.5																				
CA4.1						No	RV TDM	U	**S1 WE**	**ID**										
CA4.2						No	ID Tmt Option	U	F1 **S1 OSCE**	CV **IM** (same as for CA2.9)										
CA4.3																				
CA4.4											No	Comm HP	U	**S1 OSCE**	Multiple (same as for CA3.4 above)					

Assessment Detail

Assessment Type
CP = Case Presentation
RP = Role play
P = Practical
WE = Written Examination

F= Formative
S=Summative

Clinical Context
CE = Care of the Elderly
CV = Cardiovascular Medicine
D = Diabetes
ID = Infectious Diseases
IM = Internal Medicine
MSK = Musculoskeletal Anatomy

Setting
U = University setting
P = Placement / Work Integrated Learning

Figure 8 Example Assessment Blueprint

Worked Assessment Example

The following table provides an example of the use of various assessment methods to assess Competency Area 1 within a program of study, with reference to the General Principles outlined above (pages 33, 34). As skills develop, assessment methods shift to include those applicable to assess observable skills; leading ultimately to the assessment of the essential skills. In addition to the methods included below, longitudinal assessments such as multisource feedback may be considered and may include patient feedback regarding aspects of care such as communication during history taking. For all assessments, consideration should be given to the applicable professional scope of practice.

Table 2 Worked Assessment Example

Assessment Activity	Assessment Method	Comments
Early in program Describe your process for obtaining a clinical history from a patient in the outpatient clinic of a teaching hospital	Written examination – essay style	▪ Demonstration of an understanding of process *(General Principle 2)*
Mid program Take a clinical history from your fellow student (simulated case details provided). Feedback will be provided	Role play +/- video capture with feedback provided by staff and/or peers	▪ The assessment could be repeated multiple times formatively with varied case details *(General Principles 1, 3, 4)* ▪ Feedback may be provided by teaching staff and/or fellow students, provided clear guidelines are established regarding how to do so *(General Principle 5)* ▪ Students should be given an opportunity to self-assess according to the PCF *(General Principles 6, 9, 10)*
Mid program Reflect on a patient interaction in which you felt it was difficult to obtain a comprehensive clinical history. What strategies did you use? Did you feel you were able to overcome the difficulties?	Oral examination - with questions Reflective journal during placement/clinical experience	▪ Supporting assessment. *(General Principles 2, 6)*
Later in program *CA1.1* Obtain a problem-focused, comprehensive clinical history using appropriate communication, process and deductive skills	Mini-CEX – Final year OSCE – Later years	▪ This represents a potential summative assessment providing evidence of history taking and communication skills. The assessment could be repeated in multiple contexts *(General Principles 1, 10)* ▪ Ideally immediate, tailored feedback should be provided to the student who should be provided an opportunity to self-assess according to the PCF *(General Principles 5, 6, 8, 9)*

Assessment Activity	Assessment Method	Comments
Early in program What proportion of patients adhere strictly to prescribed medicines? Why is this an important consideration to health professionals? Describe a strategy that may be employed to investigate medicines adherence	Written Examination – e.g. Extended Match, Key Feature Problem, Modified Essay Questions. Context rich questions may be useful to provide clinical context to the questions and to identify some elements of reasoning related to adherence	▪ Demonstration of an understanding of the concept of medicines adherence and the relevance to prescribing practice *(General Principle 2)*
Mid program Demonstrate an accepted strategy for investigating adherence with prescribed medicines (case details provided)	Role play +/- video capture with feedback provided by staff and/or peers	▪ The assessment could be repeated multiple times formatively with varied case details *(General Principles 1, 3, 4)* ▪ Feedback may be provided by teaching staff and/or fellow students, provided clear guidelines are established regarding how to do so *(General Principle 5)* ▪ Students should be given an opportunity to self-assess according to the PCF *(General Principles 6, 9, 10)*
Mid program Demonstrate the process of medication reconciliation Describe the relationship between reconciliation and patient safety	Case presentation – presented orally with peer and staff questions OSCE	▪ The assessment could be repeated multiple times formatively with varied case details *(General Principles 1, 3, 4)* ▪ Feedback may be provided by teaching staff and/or fellow students, provided clear guidelines are established regarding how to do so *(General Principle 5)* ▪ Students should be given an opportunity to self-assess according to the PCF *(General Principles 6, 9, 10)*
Later in program *CA1.2* Undertake a comprehensive treatment history including adherence to current and previously prescribed and self-initiated treatment/s. Consider risk factors for non-adherence. Reconcile the current treatment history with the clinical history and diagnoses	Mini-CEX – Final year OSCE – Later years Role play – Early years	▪ This may be repeated multiple times in a formative capacity and then used as a final assessment. Initial formative role play exercises may use fellow students or teaching staff, provided the general principles of effective feedback are observed. *(General Principles 1, 3, 4, 5, 7, 8, 10)* ▪ At the conclusion of the exercise, the patient could provide feedback regarding demonstrated communication skills (using a standardised checklist) according to the principles of effective feedback. *(General Principle 5)* ▪ May also be used as a reflective exercise during placement/clinical experience using the PCF as a guide *(General Principles 6, 9)*

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Appendix 1: Examples of Learning Content within each Competency Area

Published guidelines to inform the prescribing curriculum have been produced in Australia and internationally. The majority of these have been designed for the medical curriculum, however may hold relevance to other prescribing professions.

The Royal Australian College of Physicians (RACP) has produced Entrustable Professional Activities (EPA) for the development of skills in many clinical areas, including prescribing (see also Table 1). (113) EPAs detail the required skills to undertake professional activities and propose applicable learning methods. (113) As such the EPA may inform the prescribing curriculum.

The Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists (ASCEPT) has published a standard for pharmacology education in medical graduates. (114) This standard highlights the knowledge, skills and attitudes medical graduates should achieve by graduation. ASCEPT, in partnership with the RACP, and as part of the EVOLVE initiative, (115) have developed a guide to prescribing that highlights practices and interventions applicable to safe and effective prescribing. (116)

In the UK, the General Medical Council (GMC) (117) and British Pharmacological Society (BPS) (32, 118) have published documents intended to guide the development (or redevelopment) of the medical curricula, including elements applicable to prescribing. The Royal Pharmaceutical Society (RPS) recently released an updated edition of the Competency Framework for all Prescribers. (33) The World Health Organization has produced a Guide to Good Prescribing that has been used internationally to inform prescribing related education practices. (30)

Against this backdrop of local and international guidelines, prescribing professions must consider the context in which they will prescribe medicines and determine the appropriate curriculum to support the development of prescribing skills and knowledge. The following provides an indication of content that *may* be included in a curriculum designed to develop the Essential Prescribing Skills. It is not intended to be exhaustive, rather a representation of how the Essential Prescribing Skills may be developed across a program of study based on the knowledge and skills that support prescribing practice, as outlined in the PCF. Assessment methods included provide an indication of those that may contribute to evidence, including those identified as frequently used by ASPRINH Project contributors. Choice of assessment methods should be guided by the available evidence (as outlined in the toolkit), feasibility and the likely place prescribing will occupy within the professional scope of practice.

Competency Area 1- Understand the Patient

Competency Component	Typical Learning Content	Possible Assessment Methods
Knowledge		
Relevant biomedical sciences	- Anatomy - Physiology - Pathology - Pathophysiology - Microbiology - Immunology - Medicinal Chemistry	Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to demonstrate knowledge of biomedical sciences, clinical medicine, pharmacology
Clinical medicine	- Signs and symptoms of ill health - Natural progression of disease - Impact of internal & external influences on disease - The clinical needs of particular populations	
Relevant clinical examination procedures and investigations	- Applicable investigations and examinations that will contribute to the diagnosis - Clinical resources that may aid investigation and management e.g. telehealth - Clinical guidelines (local, national, international) - Process required to arrange investigation - Process required to undertake examinations including use of equipment - Ethical implications of the examination and investigation processes - Awareness of scope of practice and its impact on the clinical examination and diagnostic processes	
Pharmacology and pharmacotherapeutics	- Pharmacology, Clinical pharmacology, Pharmacotherapeutics - Pharmacokinetics, Pharmacodynamics, Pharmacogenetics - Pharmacoepidemiology, Pharmacoeconomics - Additional considerations for special populations e.g. paediatrics, pregnancy, geriatrics	
Components of a clinical history	Existing and previous diseases, current management approach	
Components of a treatment history	Details of prescribed medicines, allergies, adverse drug reactions, previously used medicines, self-prescribed medicines, over the counter (OTC) medicines, complementary and alternative therapies, illicit medicines	
Medicines adherence	- Risk factors for, and implications of medicines non-adherence - Strategies for assessing and encouraging adherence	
Indicators of the need to transfer or refer	- Specific findings that indicate the need for referral or transfer of the patient - Professional role and scope	
Skills		
Obtain and synthesise relevant information	- Use appropriate sources of information - Understand situations requiring additional information and/ or when referral may be warranted - Consider the accuracy and completeness of	Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to demonstrate

Competency Component	Typical Learning Content	Possible Assessment Methods
	information obtained	knowledge of appropriate investigations
Obtain and reconcile an accurate history	▪ Use an appropriate process and effective communication skills to determine an accurate treatment and clinical history ▪ Use an appropriate strategy to investigate the patient's current level of adherence with medicines ▪ Assess the risk of self-harm or harm to others	▪ Objective Structured Clinical Examination e.g. to demonstrate communication, history taking skills
Perform clinical examinations according to scope of practice	▪ Undertake the process of physical examination according to scope ▪ Understand situations requiring additional knowledge/ skill relevant to the physical examination ▪ Understand appropriate equipment/ tools relevant to the examination	▪ Observation of performance e.g. mini-CEX, CbD* to demonstrate communication and/or examination
Identify investigations relevant to the clinical situation	▪ Understand the relevance of the investigation to the patient ▪ Consider the benefit/ harm of the investigation including the cost (to the patient/ healthcare system), ethical implications for performing or not performing investigations, and the practical aspects impacting the patient (e.g. the need to travel, possible discomfort, readiness to accept and manage clinical issues)	▪ Multisource feedback* e.g. to demonstrate communication Additional methods frequently used by ASPRINH Participants:
Communicate effectively with the patient and/ or family to establish a therapeutic relationship	▪ Use communication styles and skills appropriate to the development of a therapeutic relationship e.g. motivational interviewing skills ▪ Use written and verbal communication skills and understand how to tailor to the patient ▪ Demonstrate an approach to the patient, family and/or carer that includes empathy, sensitivity, humanity and an understanding of disease and its impact	▪ Written reflection ▪ Written and orally presented research assignment ▪ Case presentation
Communicate effectively with other health professionals	▪ Use communication styles and skills relevant to collaborating with other health professionals ▪ Demonstrate an appropriate response to requests from other health professionals regarding patient assessment ▪ Request and respect the input of other health professionals as appropriate to the assessment of the patient ▪ Use written and verbal communication skills specific to the healthcare team including recording of details of the consultation and plan ▪ Maintain a collaborative, respectful approach	

*Depending on the availability of assessors and the structure of clinical exposure, this may be more useful as a formative assessment method.

Competency Area 2 - Clinical decision making

Competency Component	Typical Learning Content	Possible Assessment Methods
Knowledge		
Medicines Medicines information	▪ Principles of quality use of medicines (QUM) ▪ Regulation of scheduled medicines: classification, scheduling process, availability, evidence, implications for prescribing ▪ Unscheduled medicines: availability, evidence, implications for prescribing ▪ Complementary and alternative medicines relevant to scope of practice: availability, evidence, implications for prescribing ▪ Approved indications and 'off license' use of medicines with examples relevant to scope of practice ▪ Common sequencing of treatment options (e.g. first line, second line and rationale) ▪ Valid and reliable sources of information about medicines and how to access ▪ Reliable and appropriate sources of information for the patient and the legal requirements associated with providing (e.g. consumer medicines information)	▪ Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to demonstrate knowledge of the principles of QUM
The influence of culture, beliefs, social factors on treatment choice	▪ Influence of culture on treatment choices, patient goals and possible outcomes of therapy ▪ Factors that may impact the patient's motivation and/ or ability to adhere to prescribed medicines and strategies to address ▪ Impact of lifestyle, social structure, personal beliefs on treatment choice	
Skills		
Generate a diagnosis based on information gathered and according to scope of practice	▪ Synthesise information obtained from investigations and examination to determine a differential diagnosis ▪ Refine the diagnosis based on additional investigations as appropriate ▪ Apply appropriate reasoning processes, use of available resources and appropriate interpretive skills when making clinical decisions, including making the diagnosis ▪ Accurately diagnose according to the scope of practice	▪ Objective Structured Clinical Examination e.g. to demonstrate negotiation ▪ Observation of performance e.g. mini-CEX, CbD* to demonstrate choice of therapy ▪ Self-directed learning e.g. on-line modules produced by NPS MedicineWise involving choice of therapy ▪ Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to demonstrate drug dose calculation
Determine the need for treatment	▪ Consider the need for therapy and justify according to patient requirements and findings of patient interview, examination and/or investigation(s)	
Determine the most appropriate therapy	▪ Identify appropriate non-pharmacological and/or pharmacological therapy ▪ Access, interpret and critically appraise appropriate evidence regarding considered pharmacological therapy, including its place in therapy ▪ Consider the cost, availability, benefits and possible risks, possible interactions with existing therapy and/or illness, efficacy, medicine-specific details such as pharmacokinetics, safety, monitoring requirements, administration method and likely duration of therapy for the chosen medicine(s).	

Competency Component	Typical Learning Content	Possible Assessment Methods
	• Consider the impact of the chosen medicine on the patient, including their previous response to therapy, ability to administer the chosen medicine(s), allergies, previous adverse events and other patient-specific factors such as their beliefs, goals and preferences • Consider the implications to the wider community of choosing the medicine e.g. cost, possible development of antibiotic resistance • Recognise the need for advice/input from other health professionals when deciding on the treatment plan	Additional methods frequently used by ASPRINH Participants: • Case Presentation • Written or orally presented research or report
Discuss the treatment options with the patient Negotiate a treatment plan	• Provide the patient with key aspects of the therapy considered most appropriate and relevant to support the patient to understand and adhere to the treatment plan • Respond to questions from the patient and/or carer or family • Support the patient in their decision making • Consider the patient's goals of therapy, beliefs and cultural influences when negotiating treatment • Provide information to the patient regarding the medicine and treatment plan using effective communication strategies (including verbal and written communication as appropriate) • Reach an agreement with the patient regarding the treatment plan	
Tailor medicines to the patient's particular clinical needs	• Consider the properties of the drug (pharmacokinetic, possible interactions with existing therapy, administration requirements including route) • Consider the patient (comorbidities, clinical parameters such as renal function, allergies, previous successes and failures of treatment, beliefs and goals, cultural influences, factors that may impact ability to adhere to the medicine, cost, access and eligibility criteria, occupational restrictions) • Calculate an appropriate dose of the medicine specific to the patient's needs and informed by relevant investigations where available • Determine an appropriate plan to review the treatment plan for effectiveness, ineffectiveness and/ or harm	
*Depending on the availability of assessors and the structure of clinical exposure, this may be more useful as a formative assessment method.		

Competency Area 3 - Communicate the treatment plan

Competency Component	Typical Learning Content	Possible Assessment Methods
Knowledge		
Legal requirements pertaining to prescription writing	▪ Legal components of a prescription ▪ Specific requirements for the prescribing of controlled drugs	▪ Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to demonstrate knowledge of legal requirements when writing prescriptions ▪ Self-directed learning e.g. on-line modules produced by NPS MedicineWise requiring completion of a mock e-prescription
National and state systems governing the writing of prescriptions	▪ Healthcare systems and their impact on prescribing medicines e.g. hospital vs primary care settings and the specific requirements of each setting ▪ State legislation applicable to prescribing medicines ▪ The Pharmaceutical Benefits Scheme (PBS) format and requirements for prescribing medicines ▪ Format and requirements for non-PBS eligible prescriptions	
Common errors associated with prescription writing and how to avoid	▪ Australian Commission on Safety and Quality in Health Care published material regarding accurate prescribing ▪ Electronic prescribing and its potential impact on prescribing error ▪ Safeguards inherent in the prescribing system	
Skills		
Work effectively with other members of the healthcare team to develop and communicate the treatment plan	▪ Liaise with other health professionals where appropriate to determine the most appropriate treatment choice, dose, method of administration ▪ Communicate treatment decisions, including modifications to existing therapy, to other members of the healthcare team ▪ Document accurate and complete clinical details and treatment decisions including expected benefits and monitoring requirements	▪ Objective Structured Clinical Examination e.g. to generate a mock prescription, discussion of treatment plan with patient ▪ Observation of performance e.g. mini-CEX, CbD* to demonstrate generation of a mock prescription, communication with patient ▪ Multisource feedback* e.g. to demonstrate collaborative skills ▪ Mock prescription audit to identify compliance with legal requirements
Write or generate an accurate prescription compliant with legal and regulatory requirements	▪ Use electronic prescription generation where available or prepare accurate and legible handwritten prescription ▪ Use the National Inpatient Medication Chart (NIMC) as appropriate when prescribing in a public hospital ▪ Prepare prescription in accordance with legal requirements (including, where appropriate, those pertaining to the prescription of controlled drugs), PBS requirements and healthcare facility policy and procedures	
Discuss the treatment plan with the patient	▪ Provide key information to help the patient understand and adhere to the treatment e.g. the reason for taking the medication and anticipated benefits, possible adverse effects and how to manage, monitoring requirements, physically how to administer the medicine and how frequently, how the medicine fits with other therapies the patient is taking	Additional methods frequently used by ASPRINH Participants: ▪ Case Presentation ▪ Written or orally presented research ▪ Written reflections

*Depending on the availability of assessors and the structure of clinical exposure, this may be more useful as a formative assessment method.

Competency Area 4 - Monitor and review prescribed therapy

Competency Component	Typical Learning Content	Possible Assessment Methods
Knowledge		
Therapeutic drug monitoring (TDM)	▪ Drugs for which TDM is recommended and available	▪ Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to demonstrate knowledge of high risk medicines and the appropriate monitoring
Medicines considered high risk for adverse events and their monitoring requirements	▪ Medicines associated with adverse events ▪ Medicines associated with drug interactions and management	
Home Medicines Review (HMR) Service	▪ Understand the benefits of an HMR and the patients for whom this service may be beneficial ▪ Understand the process for arranging a HMR	▪ Self-directed learning e.g. on-line modules produced by NPS MedicineWise
Skills		
Identify monitoring requirements of chosen therapy and document the review plan	▪ Identify high risk medicines that require specific monitoring ▪ Identify appropriate indicators of effectiveness, ineffectiveness and harm within the context of the goals of treatment ▪ Determine an appropriate duration of therapy and when the patient should return (or visit another health professional) for review of prescribed therapy ▪ Consider the need for, and recommend, a home medicines review as appropriate ▪ Document the review plan	▪ Objective Structured Clinical Examination e.g. to demonstrate interpretation of monitoring and required modifications ▪ Observation of performance e.g. mini-CEX, CbD* to demonstrate ordering of and/or interpretation of monitoring ▪ Written Examination e.g. multiple choice, (SBA, EMQ), MEQ, KFP e.g. to indicate knowledge of appropriate monitoring according to drug and clinical factors provided ▪ Self-directed learning e.g. on-line modules produced by NPS MedicineWise
Therapeutic Drug Monitoring (TDM)	▪ How to arrange TDM ▪ Interpretation of TDM results and the ability to translate this information to an appropriate modification to therapy	
Interpret information obtained	▪ Interpret information from a variety of sources to determine if prescribed therapy has been effective, ineffective and/or harmful ▪ Determine if agreed goals of therapy have been achieved and if not whether to modify treatment or cease	Additional methods frequently used by ASPRINH Participants: ▪ Case Presentation ▪ Orally presented research ▪ Oral examination or viva voce

*Depending on the availability of assessors and the structure of clinical exposure, this may be more useful as a formative assessment method.

Appendix 2: ASPRINH Project Methodology

Mapping Procedure

Part A: Curriculum Mapping

Review of the curricula for the ten professions was undertaken between April 2015 and June 2016. A mapping template was developed by the research team and the following process was followed at each collaborating institution:

- Learning Outcomes for each unit of study were reviewed for applicability to the study
- Learning Outcomes identified as teaching elements of prescribing (as articulated in the PCF) were recorded using the template
- Assessment methods applied to the mapped learning outcomes were identified and recorded on the mapping template
- Ambiguities identified with specific learning outcomes were discussed between the site and project manager and an outcome agreed
- At each site, a second check was undertaken, either by the research partner or by a representative member of the academic staff for the appropriate profession
- Final draft of the mapping was forwarded to the project manager who undertook an independent review of learning outcomes and comparison with the completed draft. Modification of the draft was undertaken as appropriate to ensure consistency in mapping across all professions
- Learning Outcomes were reviewed to determine whether they specifically taught an element of prescribing or whether they were considered necessary teaching to support the element of prescribing e.g. patient assessment requires knowledge of anatomy and physiology. Learning outcomes considered supportive of the learning process, but not specific to the element were recorded as such
- A final high level independent check of the mapping was undertaken to ensure a consistent approach had been applied across all professions

Part B: Professional Standards Mapping

Review of nationally accepted practice standards for the ten professions was undertaken between April 2015 and June 2016. A mapping template was developed by the research team and the following process was followed at each collaborating institution:

- Practice standards were identified in consultation with expert reference group members. In general, a combination of a professional competency/ standard document and codes of ethics/ conduct were reviewed to identify expectations of a graduate
- Standards were reviewed to identify components which specifically mapped to the PCF at the performance criteria level
- Mapped standards were identified as mapping completely (i.e. clearly evident in the practice standards), partially (i.e. elements of the prescribing competency evident, however do not completely map) or not at all. Elements which partially map may do so because they are not specific to medicines or because part, but not all, of the element was identified
- The majority of practice standards mapping was completed at QUT and checked and moderated internally using two independent researchers
- Mapping completed at partner sites was checked and recorded by the project manager

Surveys and Focus Groups

Surveys were developed to obtain insight into the thoughts of those who have a vested interest in the prescribing process and its assessment. Respondents included:

- Final year students across all professions studied
- Purposive sampling of academic staff across the four collaborating institutions
- Members of representative professional organisations, accrediting organisations and regulatory boards.

Surveys were developed for each participant group and contained a core group of common questions investigating specific assessment methods considered most effective to assess each element of prescribing as described in the PCF. In addition, questions relevant to each respondent group were posed. All surveys were conducted using an on-line format and Key Survey[R] Software. Staff and student surveys were conducted between March 2016 and June 2016. The survey of professional organisations, accrediting and regulating bodies was undertaken between July and September 2016.

The Student Survey

The student survey consisted of three parts:

- An investigation into the confidence of students to prescribe medicines
- Student perceptions regarding which elements of prescribing they had been taught
- Student suggestions regarding how the elements of prescribing should be assessed.

Example question

You have recently graduated as a Nurse Practitioner and are working in the Emergency Department of a large teaching hospital. Your next patient is a 19-year-old male with acute asthma. Please indicate how confident you are, right now, that you will be able to undertake the following tasks:

- *Obtain a medical history from the patient*
- *Obtain a medication history from the patient*
- *Determine the most appropriate choice of therapy (pharmacological, non-pharmacological or a combination thereof) for the patient.*

Rating Scale:

- *Very Confident (I could teach a colleague how to complete this task)*
- *Confident (I feel comfortable with this task and would not need assistance to complete)*
- *Almost Confident (I feel unsure about some aspects of this task but could complete with assistance*
- *Not Confident (I would struggle to complete this task).*

The Staff Survey

The staff survey mirrored the student survey in terms of the perceptions of which elements of prescribing students had been taught and suggestions for assessment. However, instead of the questions relating to confidence, the staff survey obtained thoughts regarding specific assessment methods, their perceived usefulness to assess prescribing, and the practicalities and resource requirements for various assessment methods. This was intended to provide information regarding why particular assessment methods are chosen (or not so).

Example question

NPS MedicineWise defines prescribing in terms of a number of components. Please indicate the level of teaching/ exposure your students have experienced for each of the following components.

Prescribing Component 1 Understands the patient and their clinical needs e.g. establishes a therapeutic relationship with the patient and other health professionals, performs a comprehensive assessment of the patient, explores and generates diagnoses

Rating Scale:
- *Students have been comprehensively taught and/or exposed to this*
- *Students have received limited teaching and/or exposure to this*
- *Students have not been taught or exposed to this.*

The Survey of Professional, Accrediting and Regulatory Organisations

The intention of this survey was to determine the perceptions of key stakeholder organisations regarding assessment practices specific to prescribing and to gather thoughts more globally regarding aspects of prescribing practice. Core questions regarding the most effective assessment methods for elements of prescribing were included (as for the staff and student surveys). Additional questions related to the use of the PCF and other prescribing guides, the need for prescribing competence assessment and ongoing fitness to prescribe medicines.

Example question

The NPS MedicineWise Prescribing Competency Framework details the steps required to prescribe safely and effectively for all prescribing professions. Each of these steps may be assessed in the student context.

Do you consider it important to also assess the prescribing process as a whole?
What method of assessment do you consider most effective to assess the prescribing process as a whole?

Focus Groups

Focus groups were conducted with both academic staff and final year students and were designed to further explore some of the initial findings of the survey. It became apparent from the survey responses that there were inter-professional differences in the meaning of terms associated with prescribing (e.g. medication history) and the assessment methods used.

Focus groups were held at individual institutions, audio-recorded and transcribed verbatim.

Example Focus Group Questions
- *Is the task of prescribing formally assessed anywhere in the course?*
- *Which method of assessment, in general, will prompt you to learn most deeply? (student focus group)*

Appendix 3 Acknowledgements

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