Medical Deans
AUSTRALIA AND NEW ZEALAND

Developing a National Assessment Blueprint for Clinical Competencies for the medical graduate

(Competencies Project Stage 3)

Final Report

March 2014

HealthWorkforce
AUSTRALIA

An Australian Government Initiative

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1. Executive Summary

In 2012, Health Workforce Australia provided funding to Medical Deans Australia and New Zealand Inc. (Medical Deans) to develop the National Assessment Blueprint for Clinical Competencies for the medical graduate (Competencies Project Stage 3). This third body of work builds on the previous stages which developed a framework of clinical competencies based on accreditation standards and then identified the common diagnostic and procedural requirements for the medical graduate. This final phase of the project examined the assessment of clinical competencies. The project has developed a suite of clinical assessment resources with the view to providing medical schools with a more rigorous approach to clinical assessment, thereby providing an alternative approach to a National Licencing exam. The resources developed are clinical assessment blueprints for the medical graduate (hereafter called "assessment blueprints").

All Australian and New Zealand medical schools participated in three consultation phases. The initial phase involved data collection via in person semi-structured interviews collecting information on clinical assessment, the use of assessment blueprints, Workplace Based Assessments (WBA) used in basic medical education programs and standard setting for Objective Structured Clinical Examinations (OSCEs). Two further rounds of consultation were held with medical schools gathering feedback on the draft assessment blueprints developed.

A key finding is that there is variation in assessment expertise in Australian and New Zealand medical schools. There is a need for more quality assessment processes within schools and the sharing of assessment expertise across medical schools to ensure competent graduate outcomes. There is also wide spread variation in the use of Workplace Based Assessments, assessment blueprints, OSCE implementation and OSCE standard setting between medical schools. This variation comes back to the availability of assessment expertise within medical schools and the need to develop assessment expertise further.

The clinical assessment blueprints developed for this project were based on information provided from medical schools about the types of blueprints used in schools and the commonalities found between the uses of clinical assessment tools. Early in the project period, it became apparent that the development of a single national clinical assessment blueprint for the medical graduate would not be possible due to the variation found in medical schools' curriculum, clinical assessment programs and the timing of exams. Therefore, a suite of blueprints or assessment frameworks were developed to reflect the different types of blueprints found in schools. The blueprints can be used as a template and modified to suit needs of the user.

This project has provided a forum to discuss the technical aspects of assessment, including blueprinting and OSCE standard setting in Australian and New Zealand medical schools. Assessment expertise is in high demand in medical schools due to the rapid expansion of new medical schools in Australia. This project has facilitated the sharing of expertise by engaging medical school assessment academics in the data collection and obtaining their feedback on the assessment blueprints developed.

There is widespread variation in clinical assessment programs within medical schools, reflecting the diversity of curriculum approaches and lack of clear evidence to support a single 'best' approach to assessment. Ideally, the assessment resources developed by this project coupled with the overview of clinical assessment occurring in medical schools in 2012/13 will assist schools in planning, reviewing and evaluating their clinical assessment programs. It is anticipated that the suite of clinical assessment blueprints will assist medical schools to increase the rigour of their assessment programs by providing a guide to blueprinting. The blueprinting of assessments will facilitate adequate sampling of core clinical requirements in assessment which will in turn further improve confidence that medical graduates achieve the desired learning outcomes, as reflected in the AMC standards.

The success of this project has depended on the goodwill of all Australian and New Zealand medical schools and medical education stakeholder organisations that have participated and contributed to the project over the three phases.

2. Introduction

In mid-2012, Medical Deans received funding from Health Workforce Australia (HWA) to fund a continuation of the Competencies Project to develop the National Assessment Blueprint for Clinical Competencies for the medical graduate.

The aim of the project is to:

> Provide a basis for a more consistent approach to assessment standards and processes of medical graduates across all Australian and New Zealand medical schools in order to be able to benchmark standards and improve graduate outcomes. This will be achieved through the development of a national (trans -Tasman) assessment blueprint focussing on clinical skills and practical procedures.

The project key performance outcomes are as follows:

- Development of an amalgamated assessment blueprint;
- A comprehensive description of which skills could be assessed by what method during the final year of all basic medical programs;
- Identification of best practice scenarios for the assessment of clinical competence;
- Development of a 'national assessment blueprint'
- The dissemination of the 'national assessment blueprint' for clinical competence of medical graduates to all medical schools

This Final Report provides a comprehensive account of the project's methodology, results and final versions of the clinical assessment blueprints.

The report is divided into five sections: Background, Methodology, Results, Discussion and recommendations arising and Conclusion.

There are a number of Appendices attached with the final assessment blueprints accompanying this report as separate excel spreadsheets.

3. Background

Over the last decade, ten new medical schools have been established which has led to an increase in medical student places such that the number of graduates will increase threefold by 2015.[1,2] This rapid expansion has created pressure on medical schools and health services to provide an adequate number of quality clinical placements and quality clinical assessment processes to ensure graduates are competent.

In response to the pressures on clinical placements and large medical student numbers, Medical Deans commenced the Competencies Project which aimed to provide schools with educational resources that would improve the use and quality of clinical placements. The first stage of the project, funded by the Australian Government's Department of Health and Ageing (DoHA), aimed to identify a level of clarity and precision around the training that occurs in a clinical environment by articulating clinical competencies for the medical graduate.[3] The outcome was a framework of clinical competencies based on the AMC's existing accreditation standards.[4]

The second stage of the project, funded by Health Workforce Australia (HWA), identified the common diagnostic and procedural requirements for medical graduates and specified the level of achievement of these skills required at graduation. The common skills were identified via consultation rounds with medical school academics using a modified Delphi technique,[6] and a level of achievement framework based on the Dreyfus & Dreyfus Novice to Expert Model.[7]

The third and final stage of the project was funded by HWA in 2012, to develop a National Assessment Blueprint for Clinical Competencies for the medical graduate. This stage explored the development of a National Assessment Blueprint based on information provided from all Australian and New Zealand medical schools about their clinical assessment programs.

This project has focussed on clinical assessment occurring in the latter half of basic medical education programs as this has been identified as an aspect of medical education under pressure with rising student numbers. There have been a number of projects conducted on written assessment in the first half of basic medical programs. This project is unique in that it focuses on clinical assessment in the latter half of basic medical education programs, and it also focuses on the technical aspects of assessment such as blueprinting.

Blueprinting is a technical component of assessment; it is a document which demonstrates the link between learning outcomes and what is assessed. Blueprinting is described by Newble et al as a fundamental procedure, as a precursor to test construction and item choice, which ensures that test content is mapped carefully against learning outcomes to produce a 'valid examination'.[8] Blueprints may be organised according to various categories such as disciplines, methods, phases or academic years. The development of a trans – Tasman clinical assessment blueprint could provide medical schools across Australia and New Zealand with a more consistent approach to sampling curriculum for clinical assessments. This project also puts forward an alternative approach to a national licencing exam as it encourages a rigorous approach to the sampling of core clinical skills without imposing a single exit exam.

4. Methodology

4.1 Overview
The project methodology involved a number of key activities which contributed to the development of the overview of clinical assessment occurring in medical schools and the development of the national clinical assessment blueprints. These activities can be summarised under; Governing structures: Reference and Writing Groups, literature scan, ethics approval, consultation process, data collection, data analysis, development of assessment blueprints and project evaluation.

4.2 Governing structures: Reference & Writing Groups
The project was governed by a Reference and Writing Group with membership drawn from key stakeholder organisations in medical education. The Reference Group had representatives from organisations across the medical education continuum and its role was to provide strategic advice and direction on the project activities. All draft project material developed was presented to the broader Reference Group for endorsement. The Reference Group met via teleconference four times throughout the project period.

A smaller Writing Group was drawn from the Reference Group and was tasked with developing the project material. The Writing Group was integral to the success of the project with the group meeting face to face for three half day workshops. The Writing Group reviewed and verified the de-identified data analysis from the semi-structured interviews and assisted with the development of the assessment blueprints.

The project was fortunate to retain most of the working group members over the three stages.
A complete list of project Reference and Writing Group membership is included as Appendix A.

4.3 Literature scan
An early project activity undertaken to inform the development of the National Assessment Blueprint was a scan of the relevant medical education literature on assessment blueprints. A search was conducted using the terms Assessment Blueprints, Clinical Assessment and Workplace Based Assessments on *Medline and Embase* databases.

The literature scan revealed that there are a number of different types of blueprints used in medical education. The most commonly used blueprint was for written exams such as multiple choice question (MCQ) exams, however the General Medical Council's (GMC) Professional and Linguistics Board (PLAB) blueprint is an example of a comprehensive blueprint for knowledge and clinical skills.
http://www.gmc-uk.org/doctors/plab/Blueprint.asp

The literature scan also revealed the importance of blueprinting as a technical component of assessment. Blueprinting should be undertaken for all exams to ensure appropriate curriculum sampling, ensure the use of appropriate assessment tools and to prevent under or over representation of topics in an exam.

4.4 Ethics approval
The Reference Group was consulted early on the merits of submitting an ethics application for this project given that the activities were deemed relatively low risk; the project was not collating data regarding individual assessment items or the results of medical students. A decision was made to submit an ethics application to ensure that the project was conducted in a scholarly and robust manner and to ensure that medical schools and the Chief Investigator (Project Manager) were not at risk during the data collection phase.

An ethics application was submitted in October 2012 with the University of Sydney as the lead Human Research Ethics Committee (HREC) due to the Chief Investigator (Project Manager) being an employee of University of Sydney (all Medical Deans' staff are employees of the University of Sydney).

Ethics approval was granted in November 2012. In March 2013, an ethics modification was submitted in relation to the original interview questions and additional information to be provided to participants. This was due to feedback from participants regarding interview questions which could be better constructed.

Both ethics approvals are attached as Appendix B and C.

4.5 Consultation process

An extensive consultation process was undertaken throughout the project period with all Australian and New Zealand medical schools. The consultation process included a variety of communication strategies consisting of presentations to medical educators, identification of medical school key academics, participant briefing activities, in person semi – structured interviews, telephone interviews, final opportunities for feedback on project material and conference presentations.

Presentation to the Medical Educators Group, September 2012
Early in the project period, a presentation was delivered at the Directors of Medical Education Meeting Sydney, September 2012, the day prior to the MedEd12 Conference. This presentation provided an overview of the project and upcoming activities to a targeted audience of individuals who would most likely be medical school representatives for the project activities. This was a valuable early promotion activity to raise the awareness of the project and to encourage participation.

Identification of medical school participants
Following on from this presentation, Medical School Deans were invited to nominate a key academic with extensive knowledge of clinical assessment within their school to participate in the project. Some schools nominated one person as the key contact, whilst other schools nominated several staff members. The individuals nominated held positions such as Dean, Associate Dean of Teaching and Learning, Program Convenor, Head of Assessment and/or Director of Medical Education.

A complete list of medical school participants is included as Appendix D.

Briefing of medical school participants prior to data collection
All medical school participants were contacted via email and provided with an introductory project brief requesting involvement. This was followed up by a phone call outlining the project activities, requested contributions and intended outcomes.

Semi – structured (face to face) interviews
All participants were provided with interview documents consisting of a Participant Information Statement, Consent Form, Semi – structured interview questions and the Australian Medical Council's (AMC) Graduate Outcomes Statements (GOS) approximately one week prior to the interview. Signed informed consent was obtained prior to the interviews.

The Project Manager travelled to twenty out of twenty–one medical schools to conduct the in person semi – structured interviews, one medical school participated via telephone. For the purposes of this project, Notre Dame Fremantle and Sydney were counted as separate as they have different assessment processes. Therefore the number of participating medical schools is recorded as twenty–one.

The semi – structured interviews were conducted over a period of four months, with all interviews recorded to enable the Project Manager to engage with the participant and to facilitate data analysis post interview. In summary, twenty six interviews were held and over thirty hours of recorded data collected.

A copy of the semi – structured interview questions are included as Appendix E and F.

Telephone interviews
Following on from the semi – structured interviews, medical school participants were contacted again as part of the second consultation phase to provide feedback on the draft assessment blueprints. Participants were provided with instructions, the draft assessment blueprints and semi – structured interview questions prior to a scheduled telephone discussion. Sixteen medical schools participated in the second consultation phase gathering feedback on the draft assessment blueprints.

Final opportunities for feedback on project material
The draft assessment blueprints were considerably revised by the project Writing Group as a result of feedback obtained during the second consultation phase. Medical school participants were provided with a final opportunity for feedback on the drafts during the third consultation phase. The blueprints were circulated to all medical school participants with requests for feedback via email or telephone discussion. Ten medical schools provided formal written feedback on the final versions of the assessment blueprints.

Conference presentations
Presentations were delivered at relevant conferences to promote the project to a wider audience, share preliminary findings and to encourage further participation. Short communications were delivered at the following conferences:

- Health Workforce Australia's (HWA) Inspire 2012 Conference
- Australian and New Zealand Association for Health Professional Educators (ANZAHPE) Conference 2013
- Association for Medical Education in Europe (AMEE) 2013 Conference
- Ottawa Conference 2014, Transforming Healthcare through Excellence in Assessment and Evaluation (future conference in April 2014)

4.6 Data collection
As mentioned previously, the primary mode of data collection was through the semi – structured interviews with medical schools. The interviews had five themes; clinical assessment, assessment blueprints, Workplace Based Assessment (WBA), Objective Structured Clinical Examinations (OSCE) standard setting and how medical schools viewed the development of a National Assessment Blueprint.

The data collection focussed on clinical assessment occurring in medical schools in the second half of a basic medical program as this has been the focus of the Competencies Project. This is the time when students are immersed full time in clinical placements and it is the area of medical education experiencing the most pressure with the increase in student numbers over the last ten years. The importance of early clinical exposure is recognised, however the project has focussed on developing educational resources for clinical placements in the latter half of a program. For the purposes of this project, clinical assessment also refers to practical exams which involve either an observation or a judgement made regarding a student's performance.

Where possible, medical schools provided copies of assessment blueprints used at their institution. The examples of assessment blueprints informed the development of the draft national clinical assessment blueprints.

4.7 Data analysis methodology: overview of clinical assessment
A post interview transcript was provided to participants for review prior to analysis. A descriptive analysis was conducted, focussing on areas of similarities and differences between medical schools' clinical assessment programs. Responses were commonly related to assessment methods, sampling of assessment items in relation to learning outcomes, and setting standards. A summary of the de - identified data analysis was reviewed and verified by the Project Writing Group. This information was then collated to develop an overview of clinical assessment occurring in medical schools in 2012/13 which is presented in the results section of this report.

4.8 Development of assessment blueprints
The assessment blueprints developed were informed by the information provided from medical schools about the use of blueprints at their institutions and the types of clinical assessment formats used in their program. The Writing Group was convened to consider the types of assessment blueprints found in medical schools and to assist with the development of a national clinical assessment blueprint.

One of the project deliverables was to develop an amalgamated national clinical assessment blueprint. The development of a single 'blended' clinical assessment blueprint was not possible due to the differences in medical schools' curriculum, the timing, sequencing and formats of assessments and the wide variations of blueprints used. Draft blueprints were developed based on common

approaches to clinical assessment, primarily common assessment domains and formats. The draft blueprints also reflected the three types of blueprints found in medical schools. These included:

1. Overall high level blueprint:
   Blueprint of a medical school's graduate profiles, graduate attributes or graduate outcomes statements matched against assessment tools
2. Year/Phase blueprint:
   Blueprint highlighting where assessment occurs in the phase/year, what type of assessment format is used and what outcomes/learning statements and levels are being assessed
3. Single examination blueprints:
   Blueprint for an OSCE or written exam mapped to clinical contents and themes, usually with a 3D overlay of age, race, gender and demographics.

The 2013 AMC GOS accreditation standards[9] were used as the basis for the draft assessment blueprints. The AMC forms a common jurisdiction that all Australian and New Zealand medical schools are accredited against. Given the variation in assessment blueprints provided from medical schools, using a common set of accreditation standards was viewed as the most appropriate way of developing a national clinical assessment blueprint relevant to all medical schools. This approach was endorsed by the Writing and Reference Groups.

The blueprints were developed using excel spreadsheets with sheets linked via hyperlinks to demonstrate that AMC GOS could be assessed at multiple times, in different formats in a clinical assessment program.

Two of the draft blueprints were based on the AMC GOS Domain 2 (Clinical Practice) and Domain 4 (Professionalism and Leadership) as these statements are most relevant to clinical assessment.

The third blueprint developed was a prototype for an OSCE examination towards the end of a basic medical education program. The draft blueprints were provided to medical schools for feedback and formed the basis of the second and third consultation phases.

There was extensive feedback received from medical schools on the draft blueprints during the second consultation phase. The Writing Group was convened to consider the feedback and to modify the blueprints accordingly.

The blueprints were revised to include a narrative outlining the purpose and potential uses for each document. Definitions were also included for the Workplace Based Assessments tools used in the blueprints.

An additional two blueprints were added to the 'suite', one blueprint highlighting the use of different Workplace Based Assessment in medical schools, the other blueprint mapped the results from the Competencies Project Stages 1 & 2 to the AMC GOS and assessment formats. The final outcome is five clinical assessment blueprints developed to form a 'suite' of assessment resources.

The final versions of the blueprints were circulated to medical schools for a third and final round of consultation. The feedback received from medical schools on the final versions was positive. Ten medical schools provided formal written feedback with minimal change suggested.

The Writing and Reference Group met for a final time via teleconference to endorse the final versions of the blueprints and the overview of clinical assessment occurring in Australian and New Zealand medical schools in 2012/13.

4.9 Project Evaluation
An Education Consultant was secured for the purposes of undertaking a project evaluation as per the contractual requirements. Professor Liz Farmer was successful in securing the consultancy after a targeted expression of interest was sent to individuals recommended by the Reference Group. Professor Farmer attended all Writing Group Meetings (in person); all Reference Group teleconferences, reviewed all project documentation and conducted evaluation activities including interviewing project committee members and medical school participants. The evaluation report will be submitted to HWA with the final project report in March 2014.

5. Results

5.1 Overview
The results are divided into two sections:

Section 5.2 outlines the overview of clinical assessment occurring in medical schools in 2012/13.

Section 5.3 describes the final versions of the clinical assessment blueprints.

5.2 Overview of clinical assessment occurring in medical schools in 2012/13
The following results outline the major findings from the semi-structured interviews with medical schools and offers a snapshot of clinical assessment occurring in Australian and New Zealand medical schools in 2012/13.

5.2.1 Clinical assessment
Medical schools were asked to provide information about their current clinical assessment processes, specifically those occurring in the latter half of the program. They were asked to consider three key questions;
- How clinical assessment relates to the new Australian Medical Council's (AMC) Graduate Outcomes Statements (GOS)
- Types of clinical assessment formats used in medical programs
- Objective Structured Clinical Examinations (OSCE) station development and OSCE collaborations

Clinical assessment and how it relates to the new AMC GOS
As part of setting the scene for clinical assessment occurring in medical schools, interview participants were asked to consider how they assess against the new AMC GOS and at what point in their programs this occurred. The AMC released their new GOS in December 2012, the project consultation phase also commenced at the same time. This was considered a good opportunity to gauge how schools were considering the new accreditation standards.

Most schools stated that they were aware of the new GOS, but they were not a primary driver in the development of their curriculum or their assessment program. Most schools had internally developed learning outcomes that had been mapped to the previous AMC iteration of Graduate Attributes, as summarised in Table 1.

Table 1 How medical schools are assessing against the new AMC GOS and at what point this was occurring in a program.

Common responses	Number of schools responding*
1. Developed assessment against our own graduate profile, statements, learning objectives or outcomes, not the AMC GOS	8
2. We are considering the AMC GOS and how they fit into our curriculum	4
3. We have mapped the new GOS into our current curriculum, learning objectives, graduate profile or learning outcomes	8
4. We would assess against the GOS throughout our course at multiple points with increasing complexity	9
5. The new GOS are not too dissimilar to what we already have therefore we would be meeting the statements (requirements) with our current curriculum and assessment	5

* Some schools provided more than 1 response

Types of clinical assessment formats used in medical programs
Medical schools considered that clinical assessment covered a wide variety of formats and was not confined to assessment occurring during clinical placements. These formats included observation of student performance in a clinical setting, written clinical papers and clinically focussed projects that were designed to assess the application of knowledge. There was variation between schools in their distribution of formative and summative clinical assessments.

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Table 2 Summary of summative and formative clinical assessment tools used in medical schools in 2012/13

Type of assessment	Number of schools using assessment N = 21
Summative Assessment (contributes to overall grade/score)	
Objective Structured Clinical Examinations (OSCE)	21
o Occurring in the second to latter half of a program	8
o As a barrier exam in the second last year followed by a Training Intern year or Pre Internship (PRINT) year with continuous WBA	7
o 6 months before the end of a program followed by an extended PRINT term with continuous WBA	6
Written Clinical Papers	21
o Multiple choice questions (MCQ)	21
o Short answer questions (SAQ)	13
o Extended matching questions (EMQ)	8
o Modified essay questions (MEQ)	3
In-training assessment forms (ITA) **	16
Mini Clinical Evaluation Exercices (Mini CEX)	15
Single station OSCE (similar to a Mini CEX)	1
Short case or mini case (similar to Mini CEX)	4
Case presentations, Case based discussions, Ward presentations	10
Case reports, written case histories, written case presentation, case write up, ward based forms	9
Long case (traditional and observed)	8
Direct observation of clinical performance, bedside examination, observed clinical encounter, observed interview, observed consultation with preceptor	5
VIVA	5
Progress Testing (MCQ format)	5
Script concordance testing (SCT)	4
Multisource feedback (MSF) or 360 feedback	4
Report on student elective terms	3
Projects	
o Quality improvement project	1
o Continuity of care assignment	1
o Patient Intervention Control Outcome (PICO) project	1
Online modules	
o Ethics and patient safety module	1
o National prescribing module	1
Evidence based medicine essay (write up, audit and present)	1
Discharge summary	1
Reflective journals	2
Clinical Knowledge Test (CKT) {end of year MCQ format barrier exam}	1
Compulsory mastery assessment (threshold standard required, no score, multiple attempts allowed)	
Logbooks/portfolios	11
Observed skills mastery	6
Final year readiness to internship test {MCQs 95% required pass mark }	1
Direct Observation of Procedural Skills (DOPs)	1
Patient Safety online unit	1
Clinical skills checklist	1
Required formative assessment (must complete, no score given)	
Mini CEX	4
Critically appraised topics (CATs)	2
Reflective journal/essay	2
Clinical debriefing tutorial	2
Clinical audit project	2
Research paper/research project	2
Clinical exercises	1
Bedside physical examination	1

Clinical reasoning presentation	1
Evidence based medicine (EBM) PEARLs presentation	1
Presentation of prescribed cases	1
Journal club presentation	1
Advanced life support (ALS) barrier	1
Formative assessments (optional; used for feedback)	
Mini CEX	3
OSCE	2
ITAs	2

** Variation in the naming of ITA: Assessment of Professional Standards and Behaviours (APSAB) form, Training Intern (TI) Report, In-training progress report, Clinical participation assessment, End of rotation assessment, Supervisor report, Clinical attachment form, Pre-intern appraisal (PIA) form, Preceptor report and Clinical attachment assessment

OSCE stations and collaborations
An OSCE is a structured round-robin test involving 5 –10 minute 'stations' in which trainees carry out clinical tasks with real or simulated patients and are rated by an examiner at each station. Typically OSCEs have 10 – 15 stations and all students are rated by the same cohort of examiners.[10] Information was gathered from medical schools regarding the development of OSCE stations and whether OSCE sharing collaborations were utilised to develop their exams.

All schools stated that they developed their OSCE stations internally with stations receiving relevant input from discipline leads. OSCE station development undergoes a number of quality assurance processes to ensure coverage of curriculum themes and use of appropriate clinical contexts.

The International Database for Enhanced Assessments and Learning (IDEAL) consortium was the most commonly used collaboration for OSCE station sharing followed by the Australian Collaboration for Clinical Assessment in Medicine (ACCLAiM).

Table 3 Medical school membership in OSCE sharing collaborations

Common responses – collaborations	Number of schools*
Member of (International Database for Enhanced Assessments and Learning) IDEAL	7
Member of Australian Collaboration for Clinical Assessment in Medicine (ACCLAiM)	5
Looking to join ACCLAiM	3
Sharing OSCE stations informally with another school/s	3
Not a member of an OSCE station sharing collaboration	9

*Some schools provided more than 1 response and are members of more than 1 collaboration

It is worth noting that at the time of data collection both the Australian Medical Students Assessment Collaboration (AMSAC) and the Australian Medical Assessment Collaboration (AMAC) projects were in the early phases of sharing OSCE stations and as such have not been included in these results.

5.2.2 Assessment blueprints
There is variation in the use of assessment blueprints in medical schools, with substantial variation in the terminology used to describe the blueprints. Medical schools provided information on the type of blueprint used and where possible a copy of their assessment blueprint(s). From this study it has become clear that the terms assessment blueprint, matrix, summary and sampling framework are all being used interchangeably by medical schools and there is no uniform approach to blueprinting.

There is also variation amongst medical schools regarding whether they blueprint OSCE or MCQ exams and how these exams are blueprinted. Eight medical schools use an OSCE blueprint to determine station content, ensure sampling of clinical scenarios and avoid topic duplication. However, their OSCE blueprint format varied significantly from their MCQ blueprint.

Eight medical schools used a blueprint of an entire year or phase to provide an overall helicopter view of the types of assessment, the timing of assessments and which aspects of the curriculum were being examined. Schools reported that individual courses or disciplines had their own blueprint, however there was not a unified approach across the disciplines within a program.

At the time of the data collection, early in 2013, schools were asked whether the AMC GOS were factored into the development of their assessment blueprints. No medical school had an assessment blueprint developed against the AMC's GOS, however a number of different blueprints were used to determine the content of exams across a program and schools felt that this met the requirements of the GOS by sampling widely across their curriculum.

Table 4 Type of assessment blueprints used in medical schools

Type of assessment blueprint	Number of medical school responses*
Blueprint via year or phase	8
Blueprint for OSCEs	8
Individual courses or disciplines use their own type of blueprint but there is not a unified approach across the program	6
Every exam, written and clinical is blueprinted	5

*Some schools provided more than 1 response

5.2.3 Workplace Based Assessment (WBA)

The definition of WBA which this project has adopted is that WBA is an assessment of what doctors actually do in practice.[11] All schools except for two used WBA in their clinical assessment program. Medical schools provided information on:

- types of WBA used in their program
- which AMC GOS were being measured by WBA
- strategies to ensure equivalence when using WBA
- combining WBA scores at the end of a medical program
- remediation processes undertaken for unsatisfactory WBA results
- how schools included professionalism in clinical assessment and whether professionalism was assessed via WBA
- challenges associated with implementing WBA

Types of WBA used in medical schools

There is variation in the definition of WBA tools used in medical schools. Two schools stated that they do not use WBA as defined by the AMEE Guide 31, which was provided to schools as part of the consultation documents. However, it appears that these schools are using observational assessments of student performance in a clinical setting and this would measure similar skills and attitudes to WBA.

An extract of the AMEE Guide is included as Appendix G.

The most commonly used WBA is the In-Training Assessment form, used summatively and/or formatively to make an overall judgement about a student's performance in a clinical attachment. Schools have modified the name and altered the format of the ITA to suit their purposes (see table 2). Most schools use ITAs as a summative tool to be completed by an appropriate supervisor who has observed the student throughout the course of the attachment. Most schools stated that the ITA was assessing various aspects of clinical skills as well as professionalism attributes.

The next most commonly used WBA was the Mini CEX and this was used in a variety of formative and summative formats across disciplines and attachments. Most schools used the Mini CEX to assess episodic encounters such as history taking or performing a physical examination. The Mini CEX was also favoured by medical schools as an opportunity for students to engage with clinicians within a formative feedback framework.

AMC GOS measured by using WBA

Most schools felt that WBA used in their program assessed against the AMC GOS Domain 2, Clinical Practice. Schools stated that the Mini CEX aligned well with Domain 2, Clinical Practice and measured areas of clinical practice such as history taking, examination and the performance of various procedural skills. Other schools felt that WBA, particularly the ITA, assessed aspects of Clinical Practice and AMC GOS Domain 4, Professionalism and Leadership.

Strategies to ensure equivalence in the use of WBA
The use of WBA has been recognised as opportunistic with many factors influencing if the results can be reproduced. Medical schools were asked to comment on how they ensured equivalence in the use of WBA and provided examples of the strategies implemented to ensure that all students are being measured against the same outcomes. Some of these strategies are outlined in the table below.

Table 5 Strategies used by medical schools to ensure equivalence in the use of WBA

Strategies used by medical schools to ensure WBA equivalence	Number of medical schools*
Same instrument/WBA tool used across rotations/disciplines/block/attachments	7
Repeat the WBA assessment multiple times (ensures sampling)	5
Hold regular meetings of supervisors/staff involved in assessment this helps with equivalence and calibration	3
Instrument has very clear marking criteria	3
Clear instructions are sent to the examiner	2
Assessor training in the use of the instrument	2
Move our examiners between sites to conduct assessments	2
WBA are done in multiple sites, in multiple contexts and by multiple clinicians, this ensures sampling across multiple domains	2
Look at the results of WBA longitudinally (to ensure student has passed every component)	1
Mapped the WBA across our curriculum and have found that the coverage is good against educational outcomes	1
All ITAs are reviewed every 6 weeks by clinical supervisors, ensures equivalence	1

*Some schools provided more than 1 response

Combining WBA results at the end of a program
Medical schools were asked to comment on how WBA results contributed towards an overall grade. Schools are using a variety of methods to combined WBA results to produce an overall grade as outlined in table 6.

Table 6 How WBA scores are used at the end of a medical program

How WBA contribute to the assessment of medical students at the end point of your program	Number of medical schools**
A percentage of the WBA is combined to a total score for the year. The student must pass all components of assessment.	4
Satisfactory completion of WBA is required as part of a student's portfolio and a student must complete the portfolio before they can sit the final written exam + OSCE	1
WBA are used in the last 6 months for extended Pre-internship term assessment. They are a threshold item with a low weighting but students must complete and pass WBA. They are more geared towards feedback	1
Students are given a clinical aggregate score which consists of % of WBA + % OSCE + % progress test	1

** Not all schools responded to this question

Combining clinical placement assessment scores with OSCE results
Medical schools utilise different approaches to combining clinical placement results with OSCE results to limit the effects of compensation. Compensation may result in a student passing a course if they have not scored well in all aspects of assessment. For example a student may pass a course if they score well on an MCQ test, but score poorly in an OSCE. If the results are combined so that the good MCQ result to outweighs the poor OSCE result and the student passes overall, this is compensation.

There are 3 types of compensation for combining clinical assessment results:
1. Conjunctive:
   Clinical attachment results are not combined with OSCE exams, students must pass all components of assessment

2. Compensatory:
   Clinical attachment results are combined with OSCE and if the (weighted) average is higher than the pass score the student passes
3. Limited:
   Clinical attachment results are combined with OSCE results (as under 2 above) but none of the scores may be below a certain minimum (for example, the average has to be 6/10 or higher but none of the scores may be 4 or lower)

Most schools have a threshold requirement that students must pass all components of clinical placement assessments before they can sit OSCE exams. The strategies used by schools to limit compensation and to combine clinical placements scores with OSCE scores are outlined in table 7 below.

Table 7 Combining clinical placement assessment with OSCE results

Common response	Number of schools responding*
Don't combine the results of clinical assessment, students must pass all components of assessment before they can sit the final written and OSCE exam	6
OSCE exam results will be combined with clinical placement assessments to form an aggregated mark but students still need to pass both components	3
Clinical placement marks will be combined with OSCE results via an algorithm to determine an aggregated score	2

*Not all schools responded to this question

Remediation and reassessing failed WBA
Medical schools were asked about measures undertaken at their institution if a student fails a WBA. The responses varied depending on the importance/weighting of the WBA, the type of WBA and why the student failed the WBA. Table 8 summarises the responses below.

Table 8 Remediation for failed WBA

Common response	Number of schools responding*
Student will repeat the failed WBA until they reach a satisfactory standard	9
If the student fails the same WBA in the same attachment, they will undertake a directive in the area/discipline of deficit. This can result in the student not being able to take an elective or the student will do a term of targeted remediation during the holidays.	7
Supervisor will hold a discussion with the student and identify appropriate support mechanisms (educational or otherwise).	6
Very rarely do we see a failed WBA, they are all high scoring.	6
Important to consider the overall pattern of results for the student and review WBA fail on a case by case basis.	4
If the student fails a WBA twice, they will repeat the rotation/attachment.	3
Failed WBA will lead to the next rotational supervisor being notified and additional support/remediation will be made available.	2
Student will be required to repeat the failed WBA with the discipline lead as the examiner. The discipline lead will then decide if the student should pass or repeat the rotation.	2

*Some schools provided more than 1 response

5.2.4 Professionalism and clinical assessment
Medical schools provided information on how they include professionalism in clinical assessment and whether they use WBA instruments to assess professionalism. Schools were keen to see how other medical schools were including professionalism in clinical assessment with the general consensus being that this was a challenging area of medical education. Most schools stated that professionalism in clinical assessment was covered in the ITA (or their version of the ITA).

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Table 9 Professionalism in clinical assessment

Professionalism in clinical assessment	Number of medical schools*
Mostly assessed in the In–Training Assessment (ITA) form	11
Part of the assessment criteria for other assessments such as Mini CEX	5
Do not formally include professionalism in our clinical assessment but problems with professionalism will be picked up in the OSCE	3
Use professionalism or ethical dilemma OSCE stations	3
Struggle with professionalism and clinical assessment	2
Use OSCE stations with a standardised patient/actor to rate the student's ability to be a doctor in the future	2
Identified attachments that have more contact time with the student, such as GP, Paediatrics & O&G and asked them to report on student professionalism	1
Each rotation has a professionalism checklist that supervisors are required to complete. Provides twelve opportunities throughout the program to comment on unprofessional behaviour	1
Professionalism aspects are picked up in the peer review form (type of MSF)	1
Six broad areas of professionalism included in the end of attachment report and we ask supervisors to summarise comments under these categories	1
Problems with professionalism will occasionally get picked up in a long case examination	1

*Some schools provided more than 1 response

Challenges with implementing WBA

The introduction of WBA in clinical assessment programs poses challenges for medical schools. Many schools stated that the implementation of WBA is creating issues with reliability, weighting and grade inflation. These issues will be explored further in the discussion section.

5.2.5 Standard setting for WBAs and OSCEs

Medical schools were asked to provide information on assessment standard setting processes undertaken at their institution including:

- Standard-setting measures for WBA and OSCEs, with a particular focus on WBA;
- how schools determine the standards for clinical assessments at the end of a program and whether this aligned with the expected performance of a medical graduate;
- how schools ensure that the outcomes of clinical assessment are the same across different clinical training sites within an institution

WBA standard setting

Most schools agreed that formal standard setting for WBA was difficult due to the variable nature of the assessment (types of patients, clinical context) and because the tool requires a supervisor to make an expert judgement of a student's performance. However, medical schools did provide some examples of how they could ensure equivalence in the use of WBA across a program, in the absence of being able to standard set these assessments. Examples of strategies used by medical schools to ensure equivalence in the use of WBA are outlined below in table 10.

OSCE standard setting

Medical schools were undertaking appropriate standard setting techniques for OSCE exams to identify borderline and competent students. The borderline groups' method,[12] was the most commonly used standard setting technique for OSCEs followed by the borderline regression method.[12] The common strategies and responses to standard setting for OSCEs are outlined in table 10.

Table 10: Standard setting measures for WBA & OSCEs

Standard setting for WBA & OSCEs	Number of medical schools responding*
Standard setting for WBA	
Use clear and explicit marking criteria	12
Expert judgement	9
Assessor training (online or face to face)	5
Don't formally standard set for WBA	4
Created a standardised tool used across rotations/attachments	4
Regular examiner/supervisor meetings to discuss the standards	3
Provide clear instructions to our examiners	2
Use a global rating scale that is the same for WBA and OSCEs and use borderline regression to standard set for WBA	1
Calibrate examiners by moving them between sites	1
Standard setting for OSCEs	
Borderline groups' method	11
Borderline regression method	8
Own method	2

*Some schools provided more than 1 response for WBA standard setting

Ensuring the outcomes of clinical assessment are the same across different clinical training sites within an institution
Medical schools were asked to comment on how they ensure that the outcomes from their clinical assessments are the same across multiple sites. Medical schools were confident that clinical assessment undertaken at multiple training sites, such as different clinical schools in different settings (acute vs. community, urban vs. rural) were equivalent due to various strategies such as examiner training, use of explicit marking criteria and the statistical analysis of results between sites. Table 11 below summarises some of the common responses.

Table 11: Strategies to ensure clinical assessment outcomes are the same across multiple sites

Common response	Number of medical schools responding*
Examiner training/briefing (face to face)	7
Analyse the results from different sites and review any discrepancies	5
Hold high stakes OSCEs at the central campus so this helps with uniformity	3
Explicit marking criteria for each assessment	3
Online and/or video training packages made available to examiners before the exam as a form of calibration	3
All students undertake the same exam	2

*Some schools provided more than 1 response

5.2.6 Developing a National Assessment Blueprint for Clinical Competencies for the medical graduate
Medical schools were asked to comment on how they would view the National Assessment Blueprint for clinical competencies for the medical graduate and whether they would use such a resource. Medical schools provided varied responses and were generally interested to see the outputs from this project however they were hesitant to say whether they would use such a blueprint. Common responses to this question are outlined in table 12.

Table 12 Medical schools responses to developing a National Assessment Blueprint for Clinical Competencies for the medical graduate and whether they would use the resource

Common response	Number of medical schools responding*
Review the document to find any gaps in our processes	4
Keen to collaborate and to develop a shared understanding	3
Anything overly prescriptive will not be viewed favourably	3
Best to develop guidelines on blueprinting	3
Interested to see what is developed on a National level	2

Definitely review and consider it (the National Assessment blueprint)	2
We have our own processes and this is our main driver	2

Some schools provided more than 1 response

5.3 Final versions of the assessment blueprints

5.3.1 Overview
The final versions of the assessment blueprints accompany this report as a separate excel spreadsheet.

The final output is five clinical assessment blueprints for the medical graduate that medical schools can use as templates which can be modified to suit their purposes.

5.3.2 Medical Deans' National Clinical Assessment Framework for the medical graduate
The Medical Deans' National Clinical Assessment Framework for the medical graduate considers the AMC GOS against common clinical assessment formats used in the latter half of basic medical education programs. This type of framework would be useful for schools undergoing accreditation to demonstrate they are meeting the AMC standards; schools could map against the standards using this document as a template. The document promotes the consideration of a curriculum against accreditation standards using an integrated whole of program approach, across multiple systems.

The framework is based on the AMC GOS Domain 2, Clinical Practice and selected statements from Domain 4 Professionalism and Leadership. These statements have been selected as the structure of the framework for 3 reasons:

1. The AMC GOS form a common jurisdiction that all Australian and New Zealand medical schools are accredited against

2. Domain 2, Clinical Practice is the most relevant aspect of the AMC standards for developing a clinical assessment blueprint for the medical graduate

3. Professionalism is linked to clinical practice therefore selected statements from the AMC GOS Domain 4, Professionalism and Leadership were included in the clinical assessment framework

The AMC GOS are listed in the rows and the common body systems are listed in the columns. The assessment formats included are WBA and OSCEs. The blueprints focus on clinical assessment for the medical graduate as the data collection for this project has identified WBA & OSCEs as the most commonly used clinical assessment methods in Australian and New Zealand medical schools in 2012/13.

The blueprint could be populated by presenting complaints in the primary care context however, medical schools can adapt/use the blueprint as they wish. This type of document would most likely be used by a curriculum committee, with the committee adding assessment methods they feel are appropriate and modifying the template to suit their needs. The use of body systems in the National Clinical Assessment Framework is an example of one way of organising a blueprint. The blueprint could be organised using assessment tools, attachments, years/phases or primary presentations.

Figure 1: National Clinical Assessment Framework for the medical graduate screenshot
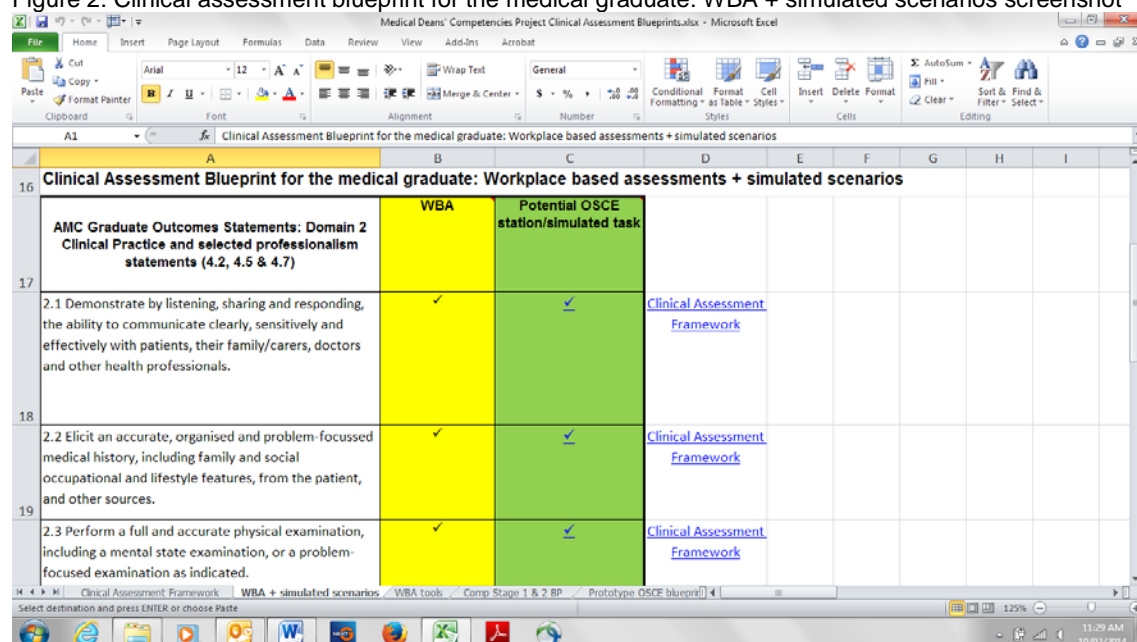
5.3.3 Clinical Assessment Blueprint for the medical graduate: Workplace based assessments + simulated scenarios

This is a clinical assessment blueprint for considering the AMC GOS from Domain 2 Clinical Practice and selected statements from Domain 4 Professionalism and Leadership against clinical assessment tools such as WBA and potential simulated scenarios such as OSCE. The blueprint identifies which GOS could be assessed by WBA or via a potential OSCE/simulated task.

The user could include different assessment tools to suit their program. The blueprint could help promote a programmatic approach to assessment where by multiple assessment tools are used to gain an overall view of performance.

This could be a useful template for demonstrating the outcomes of clinical assessment against accreditation standards.

Figure 2: Clinical assessment blueprint for the medical graduate: WBA + simulated scenarios screenshot

5.3.4 Clinical Assessment Blueprint for the medical graduate: Workplace based assessments + simulated scenarios (WBA tools)

This is a clinical assessment blueprint for considering the AMC GOS from Domain 2 Clinical Practice and selected statements from Domain 4 Professionalism and Leadership against common clinical assessment tools such as WBA and potential simulated scenarios such as OSCEs. The WBA used in this blueprint are the most common formats found in medical schools in 2012/13 as identified by the data collection from the Medical Deans' Competencies Project. This information is included as comments in the WBA columns (red triangle in the corner of the cell).

This blueprint could be used as a template and modified by the user to suit their purposes. The user could include different assessment tools as appropriate to their program. The blueprint could promote a programmatic approach to assessment where by multiple assessment tools are used to gain an overall view of performance. The WBA mapped to GOS have been selected based upon information provided by medical schools, however the user can modify the tools selected as they wish.

The WBA formats listed include Mini Clinical Exercise (Mini CEX), Case-based Discussion (CbD), In-Training Assessment form (ITA), Multisource Feedback (MsF) and Direct Observation of Procedural Skills (DOPS).

Figure 3: Clinical Assessment Blueprint for the medical graduate: Workplace based assessments + simulated scenarios (WBA tools) screenshot

5.3.5 Clinical Assessment Blueprint for the medical graduate: Competencies Project Stage 1 & 2 results

This blueprint maps the new AMC GOS from Domain 2 and selected statements from Domain 4 to the Medical Deans' Competencies Project Stage 1 & 2 results, WBA formats and potential simulated and OSCE scenarios. Columns containing the individual WBA tools have been hidden (columns E, F, G, and H & I). The user could choose to hide or unhide the columns.

The user can modify this blueprint as they wish, adding or deleting different assessment formats or mapping their own curriculum outcomes to the AMC GOS & WBA. There are hyperlinks which link the potential OSCE/simulated scenario to the corresponding cell in the prototype OSCE blueprint.

This blueprint may be useful for schools as the AMC GOS are mapped against the Medical Deans' Clinical Competencies which break down the broad GOS into individual competencies that are measurable. The clinical competencies are then mapped to WBA tools and potential OSCE/simulated scenarios.

Figure 4: Clinical Assessment Blueprint for the medical graduate: Competencies Project Stage 1 & 2 results screenshot

AMC Graduate Outcomes Statements: Domain 2 Clinical Practice and selected professionalism statements (4.2, 4.5 & 4.7)	Stage 1 Competencies Project Framework of Clinical Competencies identified	Stage 2 Competencies Project common diagnostic and procedural skills	WBA	Potential OSCE station/simulated ta
2.1 Demonstrate by listening, sharing and responding, the ability to communicate clearly, sensitively and effectively with patients, their family/carers, doctors and other health professionals.	1. Listens and responds empathetically using verbal, non verbal and written formats. 2. Recognises and deals with barriers to effective communication in a range of settings. 3. Communicates professionally and considerately with the health care team for optimal patient outcomes. 4. Interacts professionally with the general public.	n/a	✓	✓
2.2 Elicit an accurate, organised and problem-focussed medical history, including family and social occupational and lifestyle features, from the patient, and other sources.	1. Takes a relevant, logical and comprehensive history. 2. Applies the key components of the patient history during the clinical interview. 3. Communicates effectively for the purposes of conducting a clinical interview. 4. Elicits relevant lifestyle, occupational, social and family history whilst conducting a clinical interview. 5. Tailors questions in the clinical interview according to knowledge of symptoms of common medical conditions.	n/a	✓	✓

5.3.6 Prototype OSCE blueprint

This is an example of a blueprint for a single exam, in this case the OSCE. This blueprint has been developed to guide sampling for an OSCE held at the end of a basic medical education program or for the final OSCE in a program. The OSCE prototype has been developed based on the commonalities that exist between medical school OSCE assessment blueprints.

The common OSCE assessment domains are listed in the rows and these have been mapped to the AMC GOS from Domain 2 Clinical Practice & Domain 4 Professionalism and Leadership. The columns list the common clinical attachments occurring in the latter half of a basic medical education program as identified by the Medical Deans' National Clinical Training Review Report (2008). The data collection and analysis for this project revealed that there are similar clinical attachments occurring across medical schools in the latter half of a program in 2012/13. Column B includes drop down boxes for demographics, settings, and body systems to guide sampling. Drop down boxes are replicated in the corresponding rows across the blueprint.

The common attachments listed in the OSCE prototype include:
Emergency Medicine and Critical Care
General Practice and Community
General Medicine/Medicine
Obstetrics and Gynaecology
Psychiatry and Mental Health
Paediatrics
Surgery
Geriatrics
Others

The assessment domains that were common across medical school OSCE blueprints and included in this prototype OSCE blueprint include:
History taking
Physical examination
Clinical reasoning
Professionalism
Procedural skills
Communication skills

The demographics to guide sampling across populations and systems are listed in the column B and include drop down boxes that the user can select from. The demographics, settings and body systems include:

Age: child (0–17), adult (18–65), elderly (65+) {select from drop down box}
Gender: Male/Female {select from drop down box}
Indigenous: Aboriginal, Torres Strait Islander, Maori Pacifica, Others {select from drop down box}
Settings: Rural, Remote, Metropolitan, Inpatient, Outpatient, Ambulatory and Community {select from drop down box}
System: Cardiovascular, Respiratory, Gastrointestinal, Neurological, Endocrine, Reproductive/Genitourinary, Musculoskeletal and Mental Health {select from drop down box}

Two examples of history taking OSCE stations have been included to demonstrate how the drop down boxes could guide sampling for OSCE stations across demographics, settings and body systems. The remainder of the blueprint has been left blank so that medical schools can adapt/use as they wish.

This document could be used as a template and modified to suit the user and their program. The user could add common conditions, change the assessment domains, change the demographics, increase or decrease the number of stations or modify the disciplines/attachments to suit their needs.
The document could be used as a planning tool to guide sampling across a curriculum for an OSCE exam, or it could be used retrospectively as a quality audit tool to identify gaps in curriculum coverage in assessments. Schools could have stations in mind first and then use the variables within the blueprint to ensure sampling across different demographics, settings, disciplines and assessment domains.

Figure 5: Prototype OSCE blueprint: screenshot

In summary, five clinical assessment blueprints for the medical graduate have been developed based on accreditation standards. The blueprints could be used as templates by medical schools to consider and modify as they wish, with the five levels reflecting the different levels of blueprinting possible within a program.

6. Discussion and Recommendations arising

6.1 Overview

The discussion is organised into three sections:

- Clinical assessment in medical schools and recommendations arising
- Sound practice in clinical assessment
- Novel approaches in medical school assessment programs

6.2 Clinical assessment in medical schools

6.2.1 Clinical assessment and the AMC GOS

Medical schools emphasised that they have their own set of graduate outcomes, profiles or learning objectives, which makes their curriculum unique. Schools stated that they assessed against their own curriculum not the AMC GOS.

However, in considering the new GOS most schools were confident that they would already be covering the GOS in their curriculum and they were preparing to undertake mapping activities to ensure alignment with the GOS.

Most schools stated that they assessed against the GOS at multiple points and used multiple modalities. It will be important to test these assertions by demonstrating that assessment can in fact be mapped to the new AMC GOS. Schools wished to emphasise that clinical learning occurred, and was assessed early in the program, usually from the first week and was not confined to the second half of their program.

Recommendation 1: That medical schools map their assessments against the Australian Medical Council's Graduate Outcomes Statements to ensure coverage.

6.2.2 Clinical assessment formats

Medical schools are using a wide variety of clinical assessment formats to ensure that their students graduate with the required knowledge, skills and attitudes to practice as a competent new intern.

6.2.3 OSCEs

All schools hold OSCEs however there are significant differences in the administration of these exams. There are variations in the number of stations, minutes per station, number of examiners and type of patients (real vs. standardised).

The timing of when an OSCE is scheduled in a medical program also varies. Some schools hold OSCEs as part of their major high stakes barrier exam in the final year of a program, whereas other schools hold their barrier OSCE in the second last year or six months before the end of a program. In the latter the OSCE is followed by an extended Pre – Internship term (PRINT) with continuous Workplace Based Assessments occurring over the final period.

6.2.4 Written exams

All schools use a variety of written clinical exams in the latter stages of their programs and stated that although these exams occur outside the clinical setting they are considered part of a clinical assessment program as they are clinically focused and often test clinical reasoning. The most common format of written clinical exam used by medical schools is the multiple choice question (MCQ).

6.2.5 WBA

All schools appear to use summative and/or formative WBA. Two schools claimed to not use WBA, however described methods for observing performance in a clinical setting, suggesting that terminology was again an issue. The most common type of WBA used was the In – Training Assessment (ITA) form for the assessment of student performance whilst in a clinical attachment, although several inter-changeable terms were used when referring to an In – Training Assessment form.

6.2.6 OSCE collaborations

Overall, schools were positive about joining OSCE collaborations. The primary reason for joining assessment collaborations was to expand the number of OSCE stations available within an existing item bank. This was particularly relevant for new medical schools. Other reasons included the opportunity to benchmark clinical assessment results with other medical schools (similar to what is occurring in the ACCLAiM collaboration) and the sharing of assessment expertise across institutions.

It appears that, the current OSCE station sharing arrangements are not meeting the needs of medical schools as schools are involved in several collaborations. Presently, there is no single collaboration that involves all Australian and New Zealand medical schools. Most schools stated that the sharing of OSCE stations was important and they were keen to collaborate with other medical schools.

The development of an assessment collaboration which includes all Australian and New Zealand medical schools will enable schools to share expertise, assessment material and allow for the benchmarking of assessment data. Assessment expertise and clinical academics are in high demand in Australian medical schools and the establishment of an assessment collaboration which involved all Australian and New Zealand medical schools would help to share this expertise and enhance assessment programs.

The collaboration could facilitate the sharing of assessment material and items between schools, which would in turn allow for the sharing of assessment data and informal benchmarking. This would be a desirable outcome as schools would be able to benchmark their results against other schools and use the data to improve their assessment programs and curriculum such as occurring in the Australian Medicine Assessment Collaboration (AMAC).

Recommendation 2: That Medical Deans Australia and New Zealand establish an assessment collaboration that addresses the needs of all Australian and New Zealand medical schools. The Medical Deans' Medical Education Collaboration Committee (MECC) should facilitate the exchange of assessment material, assessment expertise and joint assessment research.

6.3 Challenges in implementing WBA in medical schools

The introduction of WBA in clinical assessment programs poses challenges for medical schools in terms of reliability, weighting and grade inflation.

6.3.1 Reliability

The reliability of WBA, the ability to reproduce the same result in different clinical contexts with different examiners is a common challenge for medical schools. This creates difficulties for those medical schools that are using WBA in only the summative format, for pass/fail decisions in clinical attachments. The ideal situation would be to use multiple formats of WBA to gather enough evidence so that a defensible decision can be made about a student's level of competence. This would address the issue of reliability; multiple assessments with widespread sampling would provide robust evidence regarding performance if the results were the same across multiple assessments.

6.3.2 Weighting

The weighting of WBA continues to be a challenge for medical schools. Some schools have increased the weighting of WBA to get students to place more emphasis on the assessment. An increased weighting also promotes the importance of the WBA. However, this still creates concerns about the reliability of the assessment if it is not repeated throughout the attachment. Other schools have decreased the weighting on WBA due to reliability concerns but this has created challenges in getting students to take the assessment seriously. Once again the ideal situation would be to use multiple WBA throughout the attachment, with different assessors and with different assessment weightings and then use this information to gain a complete picture of a student's competence.

6.3.3 Grade inflation

Some schools cited concerns with the tendency for grade inflation with WBA and whether some students were passing when they should really be failed. These schools have given their WBA a low weighting or used WBA as a formative tool only and relied on other formats of clinical assessment for pass/fail decisions. Once again, a preferred approach would be to take multiple snapshots of a student's performance with multiple supervisors and aggregate the scores to form an overall picture of

a student's performance. This would reduce the effect of grade inflation and potentially identify those students that required additional support to bring them up to standard.

6.3.4 Observed performance
Of the two schools that did not use WBA, one school stated that their students are not part of the health service and are in a learning environment, therefore are not undertaking true WBA; whilst the other school stated that the implementation of WBA would be too burdensome for their clinicians. However, both schools used assessments which involve the direct observation of a student's performance in a clinical attachment.

6.3.5 ITAs
Sixteen out of twenty–one medical schools use some form of ITA for the assessment of a student's performance in a clinical attachment. Given that this is the most commonly used WBA tool in clinical attachments, and that schools agree that the ITA assesses both clinical skills and professional attributes, a streamlined approach to the use of ITAs would benefit all medical schools, clinical supervisors and the health service.

Recommendation 3: That medical schools follow a programmatic approach to WBA; taking multiple episodic snapshots of a student's performance, aggregated over time with the results used to make an overall judgement about a student's competence based on rich assessment data.

Recommendation 4: That medical schools base summative decisions on multiple observations, with multiple observers in different contexts. All WBA programs should optimise summative and formative assessments. All assessment should be accompanied by effective feedback.

Recommendation 5: That Australian and New Zealand medical schools should collaborate to develop a set of WBA tools, taking into consideration existing models.

Recommendation 6: That medical schools work with the health system to ensure that all workplace assessors are adequately trained and resourced to undertake their WBA processes.

6.3.6 Remediation of WBA
Medical schools have a varied approached to remediating a failed WBA. The majority of schools deal with a fail result on a case by case basis, with a poor result at the very least signalling that something may be impacting on that student's performance.

Generally speaking, a student would not fail an attachment based on a single failed WBA result. The fail result would trigger actions usually starting with a discussion between the student and the supervisor who conducted the assessment. A faculty member of staff within the medical school would be notified of the result and then a decision made as to what support the student needed - educational or otherwise.

Most schools stated that a WBA could be repeated until a satisfactory standard was reached, particularly if the WBA was formative. Whilst other schools took a combination of approaches including repeating the assessment, remediation in the same attachment, identification of knowledge or skills gaps, utilisation of educational or other support services and the undertaking of supplementary exams.

Many schools commented that it was rare for a student to fail a WBA as the marks were usually on the high end of the scale. Grade inflation of WBA is a common finding and further highlights the challenges of utilising WBA tools in professional entry medicine and the need for repeated formats to ensure adequate sampling and reliability.

6.4 Assessment blueprints in medical schools

The use of assessment blueprints in medical schools is a mixed practice. Some medical schools use a variety of blueprints at different levels throughout their program, whilst other medical schools blueprint every exam. At the other end of the spectrum some medical schools are not using any form of blueprint. The AMC accreditation standards for 2013 recommend the following:

> *5.2.2 The medical education provider has a blueprint to guide the assessment of students for each year or phase of the medical program*

> *5.4.1 The medical education provider regularly reviews its program of assessment including assessment policies and practices such as blueprinting and standard setting, psychometric data, quality of data, and attrition rates*

Blueprinting is a technical aspect of assessment undertaken to ensure construct validity, the use of appropriate assessment tools and to ensure that item test production is suitable. Assessment blueprinting will also ensure sampling of topics across exams and will avoid over – or underrepresentation of content in assessments.

A blueprinting process, particularly for the end of a program/final phase of a basic medical education program would ensure education providers, government and the public that medical schools are considering their assessment programs deeply and are linking assessment back to the curriculum.

Recommendation 7: That medical schools develop blueprints for their whole of program or phases and blueprint for individual assessments such as OSCEs & written exams.

Recommendation 8: That medical schools draw on the assessment resources developed from this project and use these as a template or a guide to developing an approach to blueprinting within their program.

6.5 Standard setting

6.5.1 OSCEs

Medical schools are undertaking appropriate standard setting processes for their OSCE exams using techniques such as the borderline groups' or borderline regression methods to determine a cut score for each OSCE station and identifying borderline, pass or failed students.

Interestingly, a number of schools switched from borderline groups to borderline regression methods due to their experience in the ACCLAiM collaboration. These schools stated that borderline regression asks the examiner to make a finer grade of distinction between pass, fail or borderline students and therefore provides more reliable results.

Schools stated that they use online assessor training to help standard set prior to OSCEs. Most schools acknowledged that assessors were too busy to attend training before OSCE examinations so they developed online modules including videoing examples of borderline, clear pass and clear fail cases for OSCE stations. Examiners can view these training modules in their own time as a form of calibration. Medical schools involved in the ACCLAiM collaboration have found this approach beneficial.

6.5.2 WBA

Standard setting for WBA is difficult and medical schools use a variety of methods to calibrate WBA. Standards are usually left up to the expert judgement of an experienced clinician knowing the standards for a new intern.

Schools stated that most supervisors assessing medical students also assess interns and registrars so they have a good understanding what level a medical student should be at by the end of a program. It is when WBA are used halfway through a basic medical education program that the standards for medical students are less well defined.

6.5.3 Equivalence across sites
Many schools have dispersed teaching models so they use various strategies to ensure that the outcomes of clinical assessment are the same across training sites. Some of these strategies include the training of assessors, uniformity of exams, use of explicit assessment criteria articulating the expected standard of performance and the statistical analysis of results between sites.

Other strategies that schools have developed to ensure the equivalence of clinical assessment include the rotating of examiners and/or students between sites and regular interdepartmental meetings to discuss assessment results and expected standards.

Schools also stated that they were confident that their assessment programs were fair because throughout the course of the program, students had multiple different types of clinical assessment conducted by multiple examiners in multiple contexts. Many different examiners reaching the same judgement about a student's level of competence is strong evidence that a student is competent or otherwise.

6.6 Determining the standard of a new medical graduate
Medical schools provided examples of a number of techniques to ensure that the standards of their program are calibrated against the expected performance of a new intern. Two broad categories of responses were identified: quality assurance measures and the use of experienced assessors. Schools also cited anecdotal positive clinician feedback regarding the level of their graduates as evidence that their students were performing well.

6.7 Quality assurance measures
The quality assurance processes undertaken to ensure that medical students are examined and assessed at the expected level of performance for a new intern were:
- Blueprinting exams to ensure content and construct validity assessing competencies for the new intern
- Assessment items are written by groups of academics and clinicians rather than by a single author to capture multiple perspectives
- Appropriate sampling to increase reliability of exams (large number of OSCE stations)
- Appropriate use of standard setting processes such as Angoff method for written exams and borderline groups' or regression methods for OSCEs
- Use of clear, explicit, criterion referenced marking sheets for examiners
- Analysis of exam results, including item difficulty, multi-site score comparison
- External reviews of assessment programs

These methods provided schools with the confidence that their assessment programs were reliable and identified students that needed assistance whilst passing students who were capable of practicing as new intern.

6.7.1 Experienced assessors
Many schools commented that the use of experienced clinician assessors who understood the level of a new intern was an important factor to setting the standard of clinical exams. An experienced clinical supervisor has a tacit understanding of the level of a new intern and marks assessments accordingly.

6.7.2 Positive clinician feedback
There was an informal feedback loop from clinicians to medical schools regarding the standard of their recently graduated students and schools stated that clinicians have provided positive feedback that their graduates are performing well as interns.

Schools also stated that they had regularly asked the Directors of Clinical Training whether they could detect any difference in the standard of medical graduates across schools. One medical school stated a response from a Director of Clinical Training was:

> *"We can't tell the difference. We can't tell whether an intern has graduated from medical school a, b or c. There is no difference."*

6.8 Professionalism in clinical assessment

The assessment of professionalism in medical schools varies with many schools stating that this was a challenging aspect of the curriculum. Most schools were interested to see how other schools were including professionalism in their clinical assessments and were keen to learn from their experiences.

Many schools stated that their version of an ITA form covered the assessment of professional behaviour whilst other schools had specific professionalism themed OSCE stations. Many schools stated that problems with an individual student's professionalism was often raised outside the assessment process and was usually brought to the attention of the school through a reporting mechanism. As a result, most schools have established a separate pathway outside of their formal assessment processes to deal with unprofessional behaviour. This could involve:

- review with a disciplinary/conduct board/behaviours committee
- clearly articulating the expected standards of behaviour
- leading by example
- developing red/yellow card systems for unprofessional behaviour
- signing student codes of conduct
- developing graduation oaths regarding professionalism

Some schools felt unsupported by their university when dealing with professionalism issues as the universities had a different approach for determining professional standards to that of the medical school. Often decisions made by the medical school to exclude a student based on professionalism concerns were overturned by the university after an appeals process.

Recommendation 9: That medical schools ensure that their assessment of professionalism is integrated into clinical assessments in a similar way that other curriculum themes are integrated into assessment. That medical schools ensure that professionalism is assessed by a variety of formats i.e. ITA forms, mini CEX, MSF, VIVA and OSCE stations and professionalism criteria are incorporated into the marking rubrics.

6.9 Examples of sound practice in medical school assessment programs

Examples of sound practice in assessment programs were identified during the data collection for this project. The cases fall into the following categories:

- Clinical assessment
- OSCE
- Assessment blueprints
- WBA
- Assessment of professionalism

Schools are identified as A – P (n = 21) in this section.

6.9.1 Sound Practice: Clinical assessment

Robust clinical assessment involves multiple modalities used to test multiple attributes set in a clinical context, with real or simulated patients and observed by an appropriate supervisor. All assessments should include effective feedback on performance to enable the student to learn and develop as they progress through the program. All clinical assessment formats should be provided with clear instructions to supervisors with criterion referenced marking schemes.

A number of schools have formative options for all of their summative clinical assessments. This is sound practice for clinical assessments because it provides students with the opportunity to undertake assessment in a formative framework, receive structured feedback and practise clinical skills under supervision without impact on their overall grade. With targeted feedback, students can undertake self-directed learning to improve their performance before the summative exam is taken. Supervisors can also identify those students that may need additional support as a result of formative assessments.

Medical school A is an example of sound practice as it has close links with their clinical supervisors. This school communicates regularly with their supervisors about the expected standards for each cohort and each clinical assessment undertaken in their attachments. This is primarily done through faculty academic staff such as the deputy head of school, director of medical education and the head of clinical skills. This medical school stated that they know all of their supervisors and acknowledged that this was possible due to their small cohorts and the fact that they were the only medical school in the region. This close communication between the medical school and clinical assessors is a desirable approach to clinical assessment as there is a clear understanding between the faculty and examiners regarding the standards of students and the expectations for each clinical exam.

Five medical schools were identified as having a programmatic approach to assessment. This is viewed as sound practice for clinical assessment as it provides the student with the opportunity for continuous improvement by undertaking multiple modalities of assessment with targeted feedback. A programmatic approach to clinical assessment provides the faculty/school with multiple snapshots of a student's performance aggregated over time and allows for longitudinal tracking of student results. This ensures that a student is passing all aspects of assessment and reduces compensation between assessment types.

6.9.2 Sound practice: OSCEs
There are a variety of ways of optimising the quality of OSCEs depending on local resources and other constraints. A variety of approaches are described below including:
- blueprinting of the OSCE exam before construction to ensure curriculum coverage, construct validity and sampling
- a regular analysis of the results reviewing the reliability and validity of results
- each station should cover a single topic, not include multidimensional topics or linked topic stations
- examiners should be a calibrated/briefed prior to the exam
- marking sheets should be criterion referenced with definitions that clinicians can relate to in practice
- cut scores should be determined via borderline groups or borderline regression methods

Medical school B runs formative OSCEs halfway through their clinical years and uses these exercises as learning opportunities to assist students in preparation for their final barrier OSCEs. These formative OSCEs also help to identify the struggling student. This school did have challenges running formative OSCEs at every training site but stated that those sites which had the capacity to undertake formative OSCEs, the exercise was found to be beneficial for students and supervisors.

Schools are using a variety of approaches to calibrate examiners before OSCE exams. Medical school C has a designated person available on the day of the OSCE to rotate between examiners and assist with calibration of each station. Other medical schools upload videos of the borderline, clear pass and clear fail student for assessors to review in their own time before the exams. This form of calibration assists with minimising variation between sites.

Medical schools D, E & F try to mitigate examiner bias by rotating their students between clinical training sites for their high stakes exams. This reduces bias by ensuring that the students are not examined by someone who was their supervisor. The rotating of students or examiners around sites for high stakes exams is also a form of calibration and ensuring that the standards of clinical assessment are the same across sites. The schools that undertake this measure stated that the results of their OSCEs do not vary across sites.

6.9.3 Sound practice: Assessment blueprints
Examples of sound practice regarding of the use of assessment blueprints in medical schools are difficult to define due to the varied use of blueprints. There were a number of blueprints being used in medical schools but as mentioned previously these were all interchangeable with the terms assessment matrix, summary, sampling framework and blueprint. The following examples highlight some of the better examples of the use of blueprints in medical schools.

Medical school G has extensively blueprinted their entire curriculum and had developed a number of different levels of blueprinting documents. These included:
- High level blueprint of their graduate profile

- Second level blueprint of intermediate objectives against assessment tools
- Blueprint for each phase of the program
- Individual exam blueprints for OSCEs and written exams
- Professionalism blueprints for the whole of program

Medical school H uses the three levels of blueprinting recommended previously in this report but also includes three dimensional overlays and information from the Australian Bureau of Statistics regarding the incidence and prevalence of disease in populations. This information is then used to include a proportion of exam questions regarding certain conditions into assessments based on the likelihood that a student will encounter this condition in practice.

6.9.4 Sound practice: WBA
The literature provides the following guidelines regarding the use of WBA:
- WBA should include formative and summative formats
- WBA should be repeated multiple times to ensure sampling of cases and reliability
- A sufficiently expert and experienced assessor should be used to mark the student, one who has directly supervised the student
- When not sufficiently expert and experienced assessors exist, the school has a dedicated staff development programme.
- Assessment should be based on routine encounters occurring in the clinical environment to ensure validity
- The tool should be criterion referenced using language that clinicians can relate to in everyday practice

There were a number of examples of sound practice identified in medical schools regarding the use of WBA. Medical school I reviews ITA results every six weeks. A component of the ITA incorporates feedback and a score from clinicians and nurses who have observed the student. If there is a significant discrepancy, the results are discussed with the assessors and the student may be required to undertake another ITA. This process also allows for an early flagging system for any student who is scoring poorly.

Medical school J brings together all of their clinical teachers and leaders every six weeks to review ITA results. There are approximately eighty to ninety forms reviewed and if a problem is identified with a particular student, the next attachment is notified so that appropriate learning and support structures can be mobilised. This is sound practice regarding WBA as the meeting of clinical teachers to discuss results is a form of calibration and standard setting and also identifies those students who may be struggling.

Medical school K has developed online modules for their assessors regarding the use of WBA, particularly for the use of mini CEX. This calibrates examiners before they undertake the exam therefore increasing the reliability of the WBA.

Medical schools L & M have WBA as required formative assessments and use the opportunity as a learning activity for their students. Students are still required to complete the assessments to a satisfactory standard but they do not count towards their overall grade. This particular school also has a programmatic approach to assessment and regards the opportunity for students to have formative assessments as an important aspect of their program.

Other schools are using multiple WBA tools, assessors and contexts both formative and summative. This is sound practice as different assessment tools examine different aspects of clinical competence. The use of multiple tools allows for sampling of skills and scenarios and multiple observers improves the reliability of results.

6.9.5 Sound practice: Professionalism
The assessment of professionalism is challenging as professionalism itself is a broad term. A systematic review of consensus statements on the meanings of professionalism placed all aspects under one of the following five headings: [13]

- Adherence to ethical practice principles

- Effective interactions with patients and with people who are important to those patients
- Effective interactions with other people working within the health system
- Reliability
- Commitment to maintenance, and continuous improvement, of competence in one's self, others and systems.

A best practice approach to the assessment of professionalism should include a multifaceted approach to the tools, observers, location and timing of the assessment.[14]

Medical school J is including professionalism criteria in every clinical assessment tool. This school gathers a large amount of information about the student's professionalism over the entire program, from both multiple observers and multiple tools. This is a desirable approach as it will allow for multiple snapshots of a student's professionalism overtime which can then be used to form a defensible decision – this is the same rationale behind a programmatic approach to assessment.

Medical schools C & F are using OSCE patients, real or standardised, to mark the student based on their ability to be a doctor in the future. This incorporates aspects of professionalism and utilises patient and assessors comments to make a judgement on a student's professionalism.

6.10 Novel approaches in medical school assessment programs
A number of context dependant novel approaches were identified during the data collection. The examples fall into the following categories:

- Clinical assessment
- OSCEs
- Assessment of professionalism

6.10.1 Clinical assessment
Medical school C has introduced an End of Program Assessment of Clinical Competence (EPACC) at the end of their final year to ensure that the content from the last attachments are assessed before a student graduates. This school has their major high stakes barrier OSCE and written exams halfway through the final year but there are still a number of attachments students rotate through before the end of the program. The EPACC ensures students are assessed on the content of their final attachments and still engaged for the last six months of the program.

Medical schools I & N have introduced an online end-of-program MCQ format exam as a final hurdle to ensure students are ready to practise as an intern. Students must complete and pass the required formative exam and reach a threshold standard. Both schools stated that it was a final 'check' that their students were ready to graduate. The exam tests a number of scenarios that a student will encounter as a new intern.

Medical school I has undertaken a novel approach to ensuring that students are progressing through their clinical attachments and assessments by allocating students to academic supervisors in their clinical years. Students have an academic supervisor for the entire year and are required to meet with their supervisor at least three times to review their progress. It allows the student to discuss their clinical experiences with the academic supervisor (who is not their clinical supervisor) and to review any problems with their assessment portfolio. This approach provides additional support for the student and ensures that the student is undertaking all clinical assessments as appropriate.

6.10.2 OSCE
Medical schools use OSCEs in a variety of formats with novel approaches undertaken with iPads, station content and the timing of OSCEs within the medical school program.

Medical school D has adopted a novel approach to collating OSCE results by using iPads for marking. The marking sheets prompt examiners if there are missing data fields and this eliminates problems associated with incomplete marking sheets. The use of iPads also reduced the amount of paper used for results and made collation of student results easier and faster.

Schools are approaching the content of OSCE stations in a number of interesting ways. This study has revealed a number of unique topics assessed through the use of OSCEs as listed below:

- MOSCE: Maori OSCE used to examine Hauora Māori (Maori Health)
- Shared decision making OSCEs examining patient safety aspects and informed consent
- Stations examining what students should do when they are confronted with something beyond their scope of practice

Medical school J is pushing back their major high stakes OSCE exam into the second last year of their program and modifying their curriculum accordingly. This school is undertaking a programmatic approach to assessment and using WBA over the final two years and monitoring student results longitudinally. If there are any concerns about a student's performance in those final two years, then the student will be required to undertake an OSCE exam. The OSCE exam will only be run for those students for whom there is some concern. In this way the school is not running OSCE exams for those students for whom there is no concern.

6.10.3 Professionalism
Medical school C has developed a professionalism blueprint as part of its extensive course blueprinting. The professionalism blueprint defines the five core elements of professionalism, based on a systematic review of findings and with assessment tools mapped to the blueprint. This ensures that professionalism is assessed and integrated into the program.

In summary, there were a number of examples of sound practice identified in medical schools' assessment programs which is creating constructive diversity in curriculum delivery and assessment.

7. Conclusion

This project has identified a range of common assessment practices by the end of basic medical education programs in Australia and New Zealand, resulting in a unique trans – Tasman snapshot of clinical assessment occurring in 2012/13. A number of recommendations have also been put forward in the interest of further improving assessment processes in medical schools.

The clinical assessment blueprints developed in collaboration with all Australian and New Zealand medical schools has provided templates for schools to consider as part of their assessment processes to enable sampling across a curriculum. It is anticipated that the collaboration between medical schools has helped to identify the core clinical requirements of medical graduates and suggestions for assessment of these skills.

The inclusion of sound practice examples of clinical assessment occurring in medical schools will provide examples of how schools could improve their clinical assessment programs based on current practices occurring in Australia and New Zealand.

This project was possible due support from the Clinical Supervision and Support Program of Health Workforce Australia. Medical Deans appreciates the support provided by HWA and looks forward to working with HWA on projects which will capitalise on the Competencies Project outputs such as the Medical Deans Assessment Benchmarking Project.

8. References

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9. Appendices

A. Reference and Writing Group Membership

B. Ethics approval 1

C. Ethics approval 2

D. Medical School Participants

E. Semi – structured interview questions 1

F. Semi – structured interview questions 2

G. Extract AMEE Guide 31 – Workplace Based Assessments

H. Glossary

Reference Group and Writing Group Membership   Appendix A

Reference Group

Member	Representing
Professor Richard Hays (Chair)	Medical Deans
Professor Nicholas Glasgow (Deputy Chair)	Medical Deans and Australian Medical Council
Dr Andrew Singer	Department of Health and Ageing
Ms Deborah Paltridge	Confederation of Post Graduate Medical Education Councils
Dr Gregory Keogh	Confederation of Post Graduate Medical Education Councils and Clinical Supervisors
Professor David Prideaux	Medical Educators/Flinders medical school
Dr Michael O'Sullivan	Australian Medical Association Council Doctors in Training (proxy)
Dr Vanessa Grayson	Australian Medical Association Council Doctors in Training
Mr Steve Hurwitz	Australian Medical Students' Association (2012/13)
Mr Kunal Luthra	Australian Medical Students' Association (2013/14)
Dr Morton Rawlin	Committee of Presidents of Medical Colleges
Professor Andrew Hill	Clinical Supervisors/Auckland medical school
Professor Tarun Sen Gupta	Medical Educator/Clinical Supervisors/James Cook medical school
Professor Lambert Schuwirth	Medical Educator/Flinders medical school
Ms Sharon Cody	Health Workforce Australia (observer)
Ms Monique Hourn	Medical Deans

Writing Group

Member	Representing
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Professor Nicholas Glasgow (Deputy Chair)	Medical Deans and Australian Medical Council
Professor David Prideaux	Medical Educators/Flinders medical school
Ms Deborah Paltridge	Confederation of Postgraduate Medical Education Councils
Dr Vanessa Grayson	Australian Medical Association Council Doctors in Training
Professor Tarun Sen Gupta	Medical Educators/Clinical Supervisors/James Cook medical school
Professor Lambert Schuwirth	Medical Educators/Flinders medical school
Mr Steve Hurwitz	Australian Medical Students' Association (2012/13)
Mr Kunal Luthra	Australian Medical Students' Association (2013/14)
Ms Monique Hourn	Medical Deans

THE UNIVERSITY OF SYDNEY

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Ref: [MF/KFG]

19 November 2012

Ms Monique Hourn
Medical Deans Australia & NZ
Email: mhourn@medicaldeans.org.au

Dear Ms Hourn

Thank you for your correspondence dated 15 November 2012 addressing comments made to you by the Human Research Ethics Committee (HREC) Low Risk Executive Committee.

I am pleased to inform you that with the matters now addressed your protocol entitled **"Medical Deans 'Competencies Project Stage 3: Developing a National assessment blueprint for clinical competencies for the medical graduate"** has been approved.

Details of the approval are as follows:

Protocol No.:   **15411**

Approval Date: **16 November 2012**

First Annual Report Due: **30 November 2013**

Authorised Personnel: **Ms Monique Hourn**

Documents Approved:

Document	Version Number	Date
Introductory Letter	Version 1	October 2012
Participant Information Statement	Version 2	November 2012
Participant Consent Form	Version 1	October 2012
Semi structured interview themes and questions	Version 1	October 2012

HREC approval is valid for four (4) years from the approval date stated in this letter and is granted pending the following conditions being met:

Condition/s of Approval

- Continuing compliance with the National Statement on Ethical Conduct in Research Involving Humans.

- Provision of an annual report on this research to the Human Research Ethics Committee from the approval date and at the completion of the study. Failure to submit reports will result in withdrawal of ethics approval for the project.

- All serious and unexpected adverse events should be reported to the HREC within 72 hours.

Manager Human Ethics
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ABN 15 211 513 464
CRICOS 00026A

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- All unforeseen events that might affect continued ethical acceptability of the project should be reported to the HREC as soon as possible.

- Any changes to the protocol including changes to research personnel must be approved by the HREC by submitting a Modification Form before the research project can proceed.

Chief Investigator / Supervisor's responsibilities:

1. You must retain copies of all signed Consent Forms (if applicable) and provide these to the HREC on request.

2. It is your responsibility to provide a copy of this letter to any internal/external granting agencies if requested.

Please do not hesitate to contact Research Integrity (Human Ethics) should you require further information or clarification.

Yours sincerely

Dr Margaret Faedo
Manager, Human Ethics
On behalf of the HREC

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007) and the CPMP/ICH Note for Guidance on Good Clinical Practice.

THE UNIVERSITY OF
SYDNEY

Research Integrity
Human Research Ethics Committee

Monday, 25 March 2013

Ms Monique Hourn
Medicine Faculty Office; Sydney Medical School
Email: mhourn@medicaldeans.org.au

Dear Monique

Your request to modify the above project submitted on 05 march 2013 was considered by the Executive of the Human Research Ethics Committee at its meeting on 20 March 2013.

The Committee had no ethical objections to the modification/s and has approved the project to proceed.

Details of the approval are as follows:

Project No.:   **2012/2582**

Project Title: **Medical Deans' Competencies Project Stage 3: Developing a National assessment blueprint for clinical competencies for the medical graduate**

Please note the following special condition to your approval:
- The appendix needs a little formatting in the top paragraph of page 2.

Date Uploaded	Type	Document Name
05/03/2013	Other Type	Additional information WPBA Appendix 1
05/03/2013	Advertisements/Flyer	Semi structured interview questions clean version
05/03/2013	Interview Questions	Semi structured interview questions tracked changes

Please do not hesitate to contact Research Integrity (Human Ethics) should you require further information or clarification.

Yours sincerely

Dr Stephen Assinder
Chair
Human Research Ethics Committee

Medical School	Representative
Adelaide	Professor Randall Faull
Auckland	A/Prof Warwick Bagg
	Ms Barbara O'Conner
	Dr Steven Lillis
Australian National University	A/Prof Kirsty Douglas
Bond	A/Prof Victoria Brazil
	A/Prof Charles Le Duc
Deakin	Dr Karen D'Souza
Flinders	Professor Paul Worley
	Dr Julie Ash
Griffith	A/Prof Gary Rogers
JCU	Professor Tarun Sen Gupta
	Dr Peta-Ann Teague
Monash	A/Prof Jenepher Martin
	Dr Ian Presnell
Melbourne	Professor Geoff Mccoll
NSW	Professor Philip Jones
	Dr Tony O'Sullivan
	Dr Silas Taylor
Newcastle	Dr Graham Horton
	Professor Brian Jolly
	Dr Andra Dabson
Notre Dame - Sydney	A/Prof Michael Wan
	A/Prof Lynne Madden
Notre Dame - Fremantle	Professor Gavin Frost
	A/Prof Carole Steketee
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	Ms Maureen Nichols
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Queensland (UQ)	Dr Jenny Schafer
	Dr David Hewett
	Dr Nancy Sturman
Sydney (USYD)	A/Prof Leo Davies
UTAS	Professor Craig Zimitat
	Professor Richard Turner
UWA	Professor Tony Celenza
	Professor Sandra Carr
UWS	Professor Wendy Hu
	A/Prof James Kwan
Wollongong	Professor Ian Wilson

Developing the National Assessment Blueprint for Clinical Competencies for the medical graduate.

Semi structured interview themes and questions

The semi structured interviews for this research project will involve open ended questions that aim to address relevant themes and topics surrounding the clinical assessment of medical graduates and the development of a National Assessment Blueprint for Clinical Competencies for the medical graduate. Interview participants will be University medical school staff who are involved in the assessment program of a professional entry medical degree.

Theme 1: Exploring clinical assessment in medical schools
1. Please tell us how your medical school assesses students against the new Australian Medical Council's (AMC) Graduate Outcomes Statements? At what point in a professional entry medical program do you do this? Second to latter half of a program or only in the final year?

2. What kinds of clinical assessment formats do you use for students in their second to latter half of a professional entry medical program?

3. Where do you get your Observed Structured Clinical Assessment Examination (OSCE) stations from? Do you develop your OSCEs internally? Are you a member of an assessment collaboration which shares OSCE stations? If so, which one/s?

Theme 2: Assessment blueprints in medical schools
4. Does your medical school have an assessment blueprint developed against the new AMC Graduate Outcome Statements?

5. If your school uses an assessment blueprint, what kind do you use?

6. What does your assessment blueprint look like?

7. What information is contained in the headings and columns of your assessment blueprint?

Theme 3: Workplace Based Assessments in medical schools
8. Does your medical school utilise Workplace Based Assessments (WPBAs) in your clinical assessment program? If so, which Graduate Outcome Statement are you assessing by using WPBAs? How does this fit in with your assessment blueprint?

9. How do we ensure that all students have WPBAs that measure the same outcomes against the AMC's Graduate Outcomes Statements?

10. How do you include professionalism in clinical assessment?

11. What does your medical school do if students don't meet the standards for WPBAs and how do you remediate this and reassess?

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Theme 4: Standard setting
12. How do you standard set for WPBAs and OSCEs, particularly WPBAs?

13. How confident are you that the expected standards are calibrated against the expected performance of a medical graduate?

Theme 5: Developing a National Assessment Blueprint for Clinical Competencies for the medical graduate
14. Would you be willing to share a copy of your school's assessment blueprint (no individual assessment items) on the understanding that this information is being sought from all 20 Australian and New Zealand medical schools and that it is being shared in the spirit of creating an assessment blueprint resource for all medical schools to utilise?

15. If a National Assessment Blueprint is developed for Clinical Competencies for the medical graduate would your school use such as resource? If so, how?

Thank you for your participation.

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Developing the National Assessment Blueprint for Clinical Competencies for the medical graduate.

Semi structured interview themes and questions

The semi structured interviews for this research project will involve open ended questions that aim to address relevant themes and topics surrounding the clinical assessment of medical graduates and the development of a National Assessment Blueprint for Clinical Competencies for the medical graduate.

Theme 1: Exploring clinical assessment in medical schools
1. Please tell us how your medical school assesses students against the new Australian Medical Council's (AMC) Graduate Outcomes Statements? At what point in a professional entry medical program do you do this? Second to latter half of a program or only in the final year?

2. What kinds of clinical assessment formats do you use for students in their second to latter half of a professional entry medical program? How does your medical school link the type of clinical assessment to outcomes?

3. Where do you get your Observed Structured Clinical Assessment Examination (OSCE) stations from? Do you develop your OSCEs internally? Are you a member of an assessment collaboration which shares OSCE stations? If so, which one/s?

Theme 2: Assessment blueprints in medical schools
4. How do you determine what to put into your exams? What types of questions? What areas to cover? How does the new AMC GOS factor into this process?

5. If your school uses an assessment blueprint, what kind do you use?

6. What does your assessment blueprint look like?

7. What information is contained in the headings and columns of your assessment blueprint?

Theme 3: Workplace Based Assessments in medical schools
8. Does your medical school utilise Workplace Based Assessments (WPBAs) in your clinical assessment program? If so, which Graduate Outcome Statement are you assessing by using WPBAs? How does this fit in with your assessment blueprint?
Examples of WPBA include: Mini-Clinical Evaluation Exercises (mini-CEX), Direct Observed Procedural Skills (DOPS), In-Training Assessments (ITAs), Case Based Discussions (CBD), Long Cases, Short Cases, Case presentation. See Appendix 1 for further explanation

9. How do WPBA contribute to the assessment of medical students at the end point of your program? Do you assess against the same outcomes?

10. How does your medical school combine assessment scores from within clinical placements with results from OSCEs?

11. How do you include professionalism in clinical assessment?

12. What does your medical school do if students don't meet the standards for WPBAs and how do you remediate this and reassess?

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Theme 4: Standard setting

13. How do you standard set for WPBAs and OSCEs, particularly WPBAs?

14. Please tell us what standard you assess students by the end of your program? Are you aware of the new GOS and how are you going to incorporate this?

15. How can we know that the outcomes of clinical assessment are the same across different clinical training sites within an institution?

Theme 5: Developing a National Assessment Blueprint for Clinical Competencies for the medical graduate

16. Would you be willing to share a copy of your school's assessment blueprint (no individual assessment items) on the understanding that this information is being sought from all 20 Australian and New Zealand medical schools and that it is being shared in the spirit of creating an assessment blueprint resource for all medical schools to utilise?

17. If a National Assessment Blueprint is developed for Clinical Competencies for the medical graduate would your school use such as resource? If so, how?

Thank you for your participation.

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Additional information for semi – structured interview participants

Workplace Based Assessments (WPBA) definition
The assessment of day-to-day practices undertaken in the working environment.[1]
An assessment of what doctors actually do in practice.[2]

Extracts from the Workplace-based assessment as an educational tool: AMEE Guide No. 31
JOHN NORCINI[3] & VANESSA BURCH[4]
Pages 858 – 862

Formative WPBA assessment methods
A number of assessment methods, suitable for providing feedback based on observation of trainee performance in the workplace, have been developed or regained prominence over the past decade. This section provides a brief description of the essential features of some of them including:

- Mini-Clinical Evaluation Exercise (mini-CEX);
- Clinical Encounter Cards (CEC);
- Clinical Work Sampling (CWS);
- Blinded Patient Encounters (BPE);
- Direct Observation of Procedural Skills (DOPS);
- Case-based Discussion (CbD);
- MultiSource Feedback (MSF).

Mini-clinical evaluation exercise (mini-CEX)
The mini-CEX is an assessment method developed in the United States (US) that is now in use in a number of institutions around the world. It requires trainees to engage in authentic workplace-based patient encounters while being observed by faculty members (Norcini et al. 1995). Trainees perform clinical tasks, such as taking a focused history or performing relevant aspects of the physical examination, after which they provide a summary of the patient encounter along with next steps (e.g., a clinical diagnosis and a management plan). These encounters can take place in a variety of workplace settings including inpatient, outpatient, and emergency departments. Patients presenting for the first time as well as those returning for follow up visits are suitable encounters for the mini-CEX. Not surprisingly, the method lends itself to a wide range of clinical problems including: (1) presenting complaints such as chest pain, shortness of breath, abdominal pain, cough, dizziness, low back pain; or (2) clinical problems such as arthritis, chronic obstructive airways disease, angina, hypertension and diabetes mellitus (Norcini et al. 2003). In the original work, each aspect of the clinical encounter is scored by a faculty member using a 9–point rating scale where 1–3 is unsatisfactory, 4–6 is satisfactory and 7–9 is superior. The parameters evaluated include: interviewing skill, physical examination, professionalism, clinical judgement, counselling, organisation and efficiency, and overall competence. Different scales and different parameters have been used successfully in other settings (e.g., National Health Service). The core purpose of the assessment method is to provide structured feedback based on observed performance. Each patient encounter takes roughly 15 minutes followed by 5–10 minutes of feedback. Trainees are expected to be evaluated several times with different patients and by different faculty members during their training period. This assessment tool has been shown to be a reliable way of assessing postgraduate trainee performance provided there is sufficient sampling. Roughly 4 encounters are sufficient to achieve a 95% confidence interval of less than 1 (on the 9-point scale) and approximately 12–14 are required for a reliability coefficient of 0.8 (Norcini et al. 1995, 2003; Holmboe et al. 2003). In addition to the postgraduate setting, the mini-CEX has been successfully implemented in undergraduate medical training programmes (Hauer 2000; Kogan et al. 2003; Kogan & Hauer 2006). In this context,

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[1] Postgraduate Medical Education and Training Board Workplace Based Assessment Subcommittee. Workplace based assessment. Postgraduate Medical Education and Training Board, 2005.
[2] Swanwick T, Chana N. Workplace-based assessment. Br J Hosp Med (Lond) 2009;70:290-3.
[3] Foundation for Advancement of International Medical Education and Research, Philadelphia, USA,
[4] University of Cape Town, South Africa

the period of observation and feedback is often longer, ranging from 30–45 minutes (Hauer 2000; Kogan et al. 2002). There is a growing body of evidence supporting the validity of the mini-CEX. Kogan et al. (2002, 2003) found that mini-CEX performance was correlated with other assessments collected as part of undergraduate training. Faculty ratings of videotapes of student-standardised patient encounters, using the mini- CEX forms, were correlated with the checklist scores and standardised patient ratings of communication skills (Boulet et al. 2002). In postgraduate training, mini-CEX performance was correlated with a written in-training examination and routine faculty ratings (Durning et al. 2002). Holmboe et al. (2004) found that, using the mini-CEX form, they could differentiate amongst videos, scripted to represent different levels of ability. Finally, et al. (2006) found that mini-CEX scores were correlated with the results of a Royal College oral examination.

Clinical encounter cards (CEC)
The CEC system, developed at McMaster University in Canada (Hatala & Norman 1999) and subsequently implemented in other centres (Paukert et al. 2002), is similar to the mini-CEX. The basic purpose of this assessment strategy is also to score trainee performance based on direct observation of a patient encounter. The encounter card system scores the following dimensions of observed clinical practice: history-taking, physical examination, professional behaviour, technical skill, case presentation, problem formulation (diagnosis) and problem solving (therapy). Each dimension is scored using a 6-point rating scale describing performance as 1: unsatisfactory, 2: below the expected level of student performance, 3: at the expected level of student performance, 4: above the expected level of student performance, 5: outstanding student performance, and 6: performance at the level of a medical graduate. In addition to capturing the quality of the performance, the 4-6 inch score cards also provide space for assessors to record the feedback given to the trainee at the end of the encounter. This system has been shown to be a feasible, valid, and reliable measure of clinical competence, provided that a sufficient number of encounters (approximately 8 encounters for a reliability coefficient of 0.8 or more) are collected (Hatala & Norman 1999). Moreover, introduction of the system was found to increase student satisfaction with the feedback process (Paukert et al. 2002) and to have modest correlations with other forms of assessment (Richards et al. 2007).

Clinical work sampling (CWS)
This assessment method, developed in Canada, is also based on direct observation of clinical performance in the workplace (Turnbull et al. 2000). The method requires collection of data concerning specific patient encounters for a number of different domains either at the time of admission (admission rating form) or during the hospital stay (ward rating form). These forms are completed by faculty members directly observing trainee performance. The domains assessed by faculty include: communication skills, physical examination skills, diagnostic acumen, consultation skills, management skills, interpersonal behaviour, continued learning skills and health advocacy skills. Not all skills are evaluated on each occasion. Trainees are also assessed by ward nursing staff (using the multidisciplinary team rating form) and the patients (using the patient rating form) who are in the care of the trainees. These rating forms, also completed on the basis of directly observed behaviour, require a global assessment and ratings of the following domains: therapeutic strategies, communications skills, consultation with other health care professionals, management of resources, discharge planning, interpersonal relations, collaboration skills, and health advocacy skills and professionalism. All rating forms use a 5-point rating scale ranging from unsatisfactory to excellent performance. This assessment method has also been shown to be valid and reliable provided a sufficient number (approximately 7 encounters for a reliability coefficient of 0.7) of encounters are observed (Turnbull et al. 2000). A later study found that the CWS strategy could be adapted to radiology residency using a handheld computerised device (Finlay et al. 2006). Compliance with voluntary participation was not as great as expected but this evaluation format included the opportunity to discuss performance at the time of data entry, rather than at the end of rotation. The investigators found the method less useful for summative purposes although the sample size was small (N¼14).

Blinded patient encounters
This formative assessment method is based on the same principle as the three assessment methods already mentioned. It is unique, however, in that it forms part of undergraduate bedside teaching sessions. (Burch et al. 2006). Students, in groups of 4–5, participate in a bedside tutorial. It starts with

a period of direct observation in which one of the students in the group is observed performing a focused interview or physical examination as instructed by the clinician educator conducting the teaching session. Thereafter the student is expected to provide a diagnosis, including a differential diagnosis, based on the clinical findings. The patient is unknown to the student, hence the term 'blinded' patient encounter (McLeod & Meagher 2001). This type of patient encounter has the advantage of safely allowing the trainee to practice information gathering, hypothesis generation, and problem solving without access to the workup by more senior doctors. After the presentation, the session focuses on demonstrating the important clinical features of the case as well as discussing various issues, for example appropriate investigation and treatment relevant to the patient's presenting clinical problem. It concludes with a feedback session in which the student receives personal private advice about his/her performance. Feedback is provided using a 9-point rating scale for assessment of clinical interviewing and examination skills as well as clinical reasoning skills. The rating scale ranges from 1–3 for poor performance, 4–6 for adequate performance and 7–9 for good performance. Space is provided on the score sheet to add other written comments. Students keep the score sheets which are only used for feedback purposes.

Direct observation of procedural skills (DOPS)
This assessment method developed in the UK, focuses on evaluating the procedural skills of postgraduate trainees by observing them in the workplace setting (Wragg et al. 2003). Just as in CWS and the Encounter Card Assessment systems, trainees' performance is scored using a 6-point rating scale where 1–2 is below the expected level of competency, 3 reflects a borderline level of competency, 4 meets the expected level of competency and 5–6 are above the expected level of competency. The assessment procedure is generally expected to require 15 minutes of observation time and 5 minutes dedicated to feedback. Trainees are provided with a list of commonly performed procedures for which they are expected to demonstrate competence such as endotracheal intubation, nasogastric tube insertion, administration of intravenous medication, venepuncture, peripheral venous cannulation and arterial blood sampling. They are assessed by multiple clinicians on multiple occasions throughout the training period. This method of procedural skills assessment is not limited to postgraduate training programmes. Paukert and colleagues have included basic surgical skills to be mastered by undergraduate students in their clinical encounter card system (Paukert et al. 2002). Although DOPS is similar to procedural skills log books, the purpose and nature of these methods differ significantly. The recording of procedures is common to both of them, but log books are usually designed to ensure that trainees have simply performed the minimum number required to be considered competent. The provision of structured feedback based on observation of a performance is not necessarily part of the log book process. Moreover, the procedure is not necessarily performed under direct observation and little feedback, if any, is expected to be given. In contrast, DOPS ensures that trainees are given specific feedback based on direct observation so as to improve their procedural skills.

Case-based discussion (CbD)
This assessment method is an anglicised version of Chart-Stimulated Recall (CSR) developed for use by the American Board of Emergency Medicine (Maatsch et al. 1983). It is currently part of the Foundation Programme implemented for postgraduate training in the UK National Health Service. In CbD, the trainee selects two case records of patients in which they had made notes and presents them to an assessor. The assessor selects one of the two for discussion and explores one or more aspects of the case, including: clinical assessment, investigation and referral of the patient, treatment, follow-up and future planning, and professionalism. Since the case record is available at the time of assessment, medical record keeping can also be assessed by the examiner. This type of performance assessment focuses on evaluating the clinical reasoning of trainees so as to understand the rationale behind decisions made in authentic clinical practice. As with other assessment methods described, each encounter is expected to last no more than 20 minutes, including 5 minutes of feedback. Trainees are expected to engage in multiple encounters with multiple different examiners during the training period. There are several studies supporting the validity of this measure. Maatsch et al. 1983) collected several assessments for a group of practicing doctors eligible for recertification in Emergency Medicine. They found that CbD correlated with a number of the other measures, including chart audit. The score distribution and pass-fail results were consistent with scores on initial certification, ten years earlier. As importantly, CbD was considered the most valid of the measures by

the practicing doctors participating in the study. A study by Norman and colleagues compared a volunteer group of doctors to those referred for practice difficulties (Norman et al. 1989). CbD was highly correlated with a standardised patient examination and with an oral examination. More importantly, it was able to separate the volunteer group from the doctors who were referred. Likewise, Solomon et al. (1990) collected data from several different assessments on practicing doctors eligible for recertification. CbD was correlated with the oral examination as well as written and oral exams administered 10 years earlier.

MultiSource feedback (MSF)
More commonly referred to as 360-degree assessment, this method represents a systematic collection of performance data and feedback for an individual trainee, using structured questionnaires completed by a number of stakeholders. The assessments are all based on directly observed behaviour (Wragg et al. 2003) but they differ from the methods presented above in that they reflect routine performance, rather than performance during a specific patient encounter. Although there are a number of different ways of conducting this form of assessment, the mini-peer assessment tool (mini-PAT) that has been selected for use in the Foundation Programme in the UK is a good example. Trainees nominate 8 assessors including senior consultants, junior specialists, nurses and allied health service professionals. Each of the nominated assessors receives a structured questionnaire which is completed and returned to a central location for processing. Trainees also complete self-assessments, using the same questionnaires, and submit these for processing. The categories of assessment include: good clinical care, maintaining good clinical practice, teaching and training, relationships with patients, working with colleagues and an overall assessment. The questionnaires are collated and individual feedback is prepared for trainees. Data are provided in a graphic form which depicts the mean ratings of the assessors and the national mean rating. All comments are included verbatim, but they remain anonymous. Trainees review this feedback with their supervisor and together work on developing an action plan. This process is repeated twice yearly during the training period. This method is widely used in industry and business, but has also been found to be useful in medicine. Applied to practicing doctors, it was able to distinguish certified from non-certified internists and the results were associated with performance on a written examination (Ramsey et al. 1989; Wenrich et al. 1993). In a follow-up study, two subscales were identified—one focused on technical/cognitive skills and the other focused on professionalism (Ramsey et al. 1993). Written examination performance was correlated with the former but not the latter. Multisource feedback has been applied to postgraduate trainees as well as practicing doctors. The Sheffield Peer Review Assessment Tool, which is the full scale version of mini-PAT was studied with paediatricians and found to be feasible and reliable (Archer et al. 2005). It also separated doctors by grade and tended to be insensitive to potential biasing factors such as the length of the working relationship. Whitehouse et al. (2002) also applied multisource feedback to postgraduate trainees with reasonable results. Finally, this form of assessment has also been used successfully with medical students (Arnold et al. 1981, Small et al. 1993). Both positive and negative reports from peers have influenced academic actions. Overall, reasonably reliable results can be achieved with the assessments of 8 to 12 peers.

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Glossary of terms

Assessment	Process of measuring the professional knowledge, skills or behaviour of a learner. In the workplace this involves making a judgement about the learner's strengths and weaknesses in order to establish a learning plan or to measure improvement over time.	Wojtczak, A. (2002). Glossary of Medical Education Terms: Part 1. *Medical Teacher, 24*(2), 216-219.
Formative Assessment	Assessment which is part of the ongoing teaching and learning process and is designed to assist the learner to improve their performance. It should include feedback to the learner as part of this developmental process. This type of assessment is not used to determine progression to the next stage of learning but rather to assist in planning learning opportunities to enhance or improve performance.	Wojtczak, A. (2002). Glossary of Medical Terms: Part 1. *Medical Teacher, 24*(2), 216-219. Newble, D., & Cannon, R. (2001 A handbook for medical teachers (4th ed.). Netherlands: Kluwer Academic Publications.
Summative Assessment	Process of assessment which occurs at the end of a period of teaching/learning. In the context of the Prevocational doctor this would occur at the end of a specific rotation. Summative assessment usually involves the process of comparing the learner's performance against a standard. Assessment should be objective, reliable, valid and reproducible.	Wojtczak, A. (2002). Glossary of Medical Terms: Part 1. *Medical Teacher, 24*(2), 216-219. Newble, D., & Cannon, R. (2001) A handbook for medical teachers (4th ed.). Netherlands: Kluwer Academic Publications.
Self Assessment	Learner assesses his/her own performance against a set of criteria. This process of assessment requires the learner to reflect on his/her performance and make judgments against the criteria.	Newble, D., & Cannon, R. (2001 A handbook for medical teachers (4th ed.). Netherlands: Kluwer Academic Publications.
Peer Assessment	Use of the learner's peers (other PGY 1 or PGY2 doctors) to assess the performance of each other rather than a more experienced clinician/supervisor.	Wojtczak, A. (2002). Glossary of Medical Education Terms: Part 5. *Medical Teacher*, 24(6), 658-660.

Competence	Competence can be defined as the acquisition of a satisfactory level of relevant knowledge, skills, and/or attitudes as determined by an assessment at a particular point in time. A learner can be judged competent at the time of an assessment and yet fail to perform in real life.	Wojtczak, A. (2002). Glossary of Medical Education Terms: Part 1. Medical Teacher, *24*(2), 216-219.
Performance	Performance is what is done in real life under varying conditions and times. Performance can only be assessed by observation within the workplace over time.	Wojtczak, A. (2002). Glossary of Medical Education Terms: Part 5. *Medical Teacher*, *24*(6), 658-660.
Feedback	Feedback is information given to an individual in order to reinforce or to improve his/her performance. Feedback needs to be specific so that the learner knows what he/she has done well and what he/she needs to improve. Feedback also needs to be timely with research showing that feedback is most effective when given close to the time the performance occurs.	Stenglehofen, J. (1993). Feedback. In Teaching students in clinical settings. (pp. 153-159.). London: Chapman and Hill. Peyton, J. (1998). *Teaching and learning in medical practice.* Great Britain: Manticore Europe Ltd.

Assessment Tools

Case based discussion (CBD)	Structured discussion of clinical cases by the supervisor focusing on clinical reasoning and decision making. It should include discussion of real cases in which the trainee has been involved.	Southgate L, Cox J, David T, *et al.* The General Medical Council's performance procedures: peer review of performance in the workplace. *Med Educ* 2001;35:9–19.
Multi-source feedback (MSF)	Collated views from a range of co-workers either team members or a range of supervising staff.	Archer J, Norcini J, Davies H. Use of SPRAT for peer review of paediatricians in training. *British Medical Journal*. 2005;330(1251-1253). Violato C, Lockyer J, Fidler H. Multisource feedback: a method of assessing surgical practice. *British Medical Journal* 2003;326(7388):546-8.
In-Training Assessment	A credible view of a trainee's progress usually completed by the supervisor, based on personal knowledge or after consultation with colleagues.	Ringsted C, Pallisgaard J , Østergaard D, Scherpbier A The effect of in-training assessment on clinical confidence in postgraduate education *Medical Education 2004;* 38:1261-1269

Direct Observation of Procedural Skills (DOPS)	Assessment of a real life technical procedure by a supervisor using a global rating or skills checklist in a standardised form.	Wilkinson JR, Crossley JGM, Wragg A et al Implementing workplace-based assessment across the medical specialties in the United Kingdom *Medical Education 2008; 42*: Pages 364 - 373
Mini CEX	A real life episode of care or interaction between a trainee and a patient, observed for a short period, typically 10-25 minutes, and rated on a number of technical and professional dimensions on a standard rating form.	Norcini J. The Mini Clinical Evaluation exercise (mini-CEX). *The Clinical Teacher.* 2005;2(1):25-30. Norcini J, Blank L, Duffy F, Fortna G. The mini-CEX: a method for assessing clinical skills. *Annals of Internal Medicine.* 2003;138(6):476-81.
Portfolio	Collection of work which provides evidence of the achievement of knowledge, skills, attitudes, understanding and professional growth through a process of self-reflection over a period of time.	Dent J and Harden R. (2005). . A practical guide for medical teachers. 2nd edition. (p 346). Elsevier
Logbook	A training logbook constitutes the record of all training postings, work experiences, training activities with clinical supervisors, structured educational programmes attended, certified checklists of knowledge and skills and other educational activities	Dent J and Harden R. (2005). A practical guide for medical teachers. 2nd edition. Elsevier
Multiple Choice Question (MCQ)	A test consisting of a short statement with multiple further statements of which one (In a one-best answer format) or more than one (in a multiple true-false format) can be correct. The trainee indicates which are correct/incorrect.	National Board of Medical Examiners. Constructing written test questions for the basic and clinical sciences. NBME, USA (Authors: Case SM, Swanson DB). (Source of the manual on writing items) http://www.nbme.org/PDF/ItemWriting_2003/2003IWGwhole.pdf
Extended Matching Question (EMQ)	A test consisting of a large set of options (i.e. usually >10) followed by one or more short statements or patient vignettes. The trainee is asked for the best answer to a question that may involve diagnosis, choice of investigation, treatment or management for which one of the options provides the best answer.	National Board of Medical Examiners. Constructing written test questions for the basic and clinical sciences. NBME, USA (Authors: Case SM, Swanson DB). (Source of the manual on writing items) http://www.nbme.org/PDF/ItemWriting_2003/2003IWGwhole.pdf

Short Answer Question (SAQ)	Usually a statement of a topic or a patient vignette about which a trainee would be required to answer a few brief questions.	Page, G. and Bordage, G. "Developing Key Features Problems and Examinations to Assess Clinical Decision-Making Skills", Academic Medicine 1995; 70: 194-201. Farmer E, Page G. A practical guide to assessing clinical decision-making skills using the key features approach *Medical Education* 2005;39: 1188 - 1194
Objective Structured Clinical Examination (OSCE)	A structured round-robin test typically involving 5-10 minute 'stations' in which students carry out clinical tasks with real or simulated patients and are rated by an examiner at each station. Typically OSCEs have 10-15 stations and all students are rated by the same cohort of examiners.	Newble DI. Techniques for measuring clinical competence: objective structured clinical examinations. *Medical Education*, 2004:35; 199–203. Roberts C, Newble DI, Jolly B, Reed M, Hampton KK Assuring the quality of high stakes undergraduate assessments of clinical competence. Medical Teacher 2006; 28: 535-543
Long Case	A student is given unobserved time with a real patient in a clinical setting. During that time the student conducts an interview and performs a physical examination as appropriate. The student then presents his or her findings and plans to the examiners, who ask about the patient and related topics enabling them to judge the quality of the student's performance.	Norcini J. The death of the long case? BMJ 2002;324:408
VIVA	Interview between a trainee and one or more senior doctors. The interview may be focussed around a written piece or work or part of a free standing assessment.	Jolly B, Grant J – editors. The Good Assessment Guide: A Practical Guide to Assessment and Appraisal for Higher Specialist Training. 1997 Joint Centre for Education in Medicine. London

Progress Testing	Written knowledge exam (MCQs) that is usually administered to all students in the program at the same time and at regular intervals (usually twice to four times yearly) throughout the entire academic program. The test samples the complete knowledge domain expected of new graduates on completion of their course, regardless of the year level of the student. The differences between students' knowledge levels show in the test scores; the further a student has progressed in the curriculum the higher the scores. As a result, these resultant scores provide longitudinal, repeated measures, curriculum-independent assessment of the objectives (in knowledge) of the entire programme.	van der Vleuten CPM, Verwijnen GM, Wijnen WHFW. 1996. Fifteen years of experience with progress testing in a problem-based learning curriculum. Medical Teacher 18(2):103–110.
Script concordance test	Typically a case vignette followed by an additional sign or symptom and a question that asks whether a specific diagnosis would be more or less likely if such an attribute were present in the case.	Swanwick, T.- editor. Understanding Medical Education. Evidence, Theory 2010 (1st ed) p 213
Short case	Focuses on a particular of limited aspect of clinical practice, usually observation and examination of an individual body system, lesion or anatomical part. Usually occurs in the presence of an examiner who directs the student to a particular system and observers the encounter.	Jolly B, Grant J – editors. The Good Assessment Guide: A Practical Guide to Assessment and Appraisal for Higher Specialist Training. 1997 Joint Centre for Education in Medicine. London
PICO project	System for organising thoughts/questions **P**atient **I**ntervention **C**ontrol **O**utcome	http://library.med.nyu.edu/library/instruction/handouts/pdf/picohandout.pdf http://learntech.physiol.ox.ac.uk/cochrane_tutorial/cochlibd0e84.php

Clinical audit	A quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery.	Principles for Best Practice in Clinical Audit. (2002)National Institute for Clinical excellence (NICE). Radcliff Medical Press. Oxon. UK. http://www.nice.org.uk/media/796/23/BestPracticeClinicalAudit.pdf
Critically appraised topic	A CAT is a standardized, one-page summary of research evidence organized around a clinical question.	Fetters, L et al. Critically Appraised Topics. Paediatric Physical Therapy. (2004) Vol 16 (1) p19-21
Key Feature Problem	Usually a short case vignette followed by between one and three questions that investigate the candidate ' s knowledge of the main aspects of the case. Answers may be constructed or selected, usually requiring words or short phrases	Swanwick, T.- editor. Understanding Medical Education. Evidence, Theory 2010 (1st ed) p 213