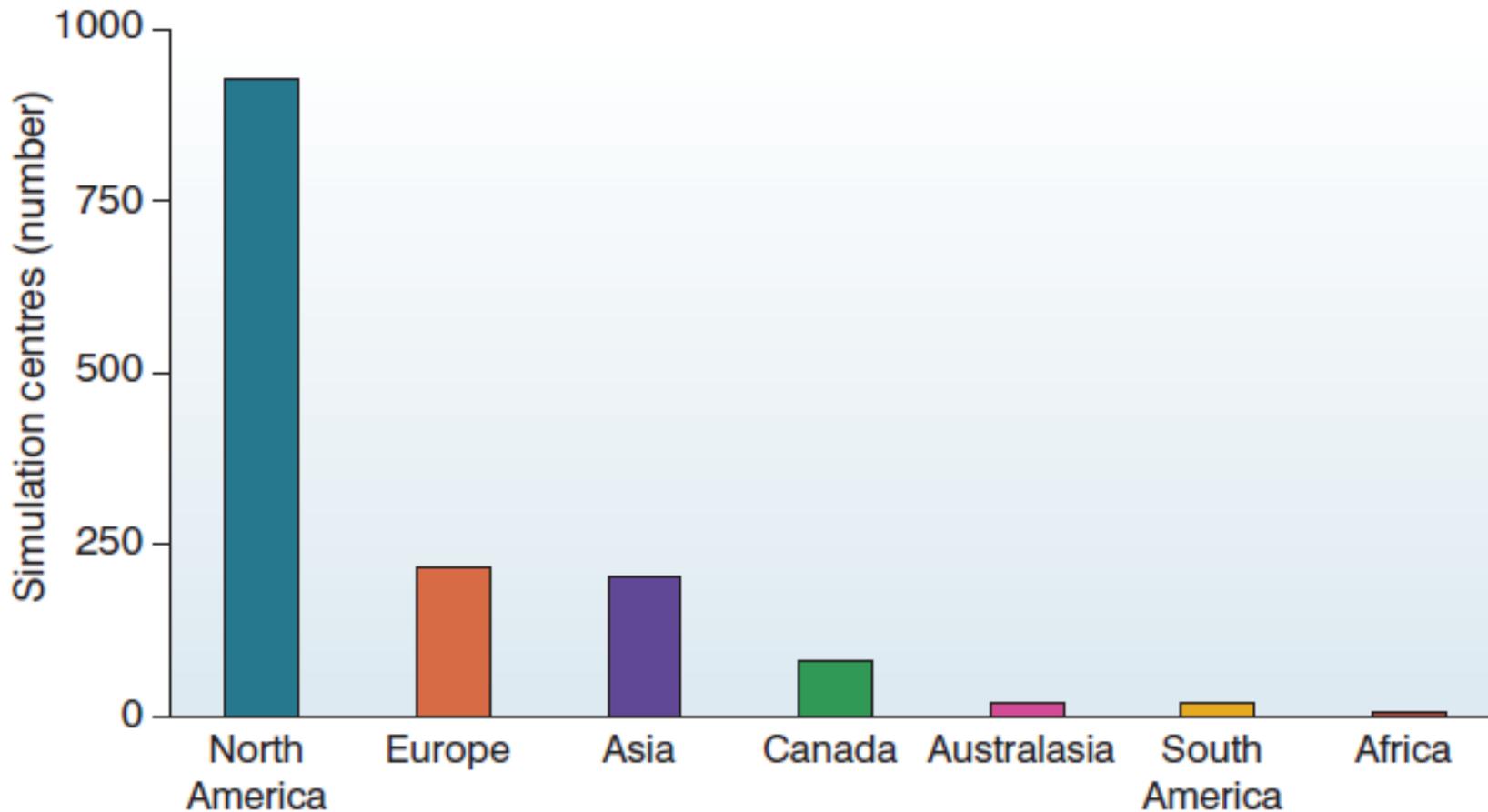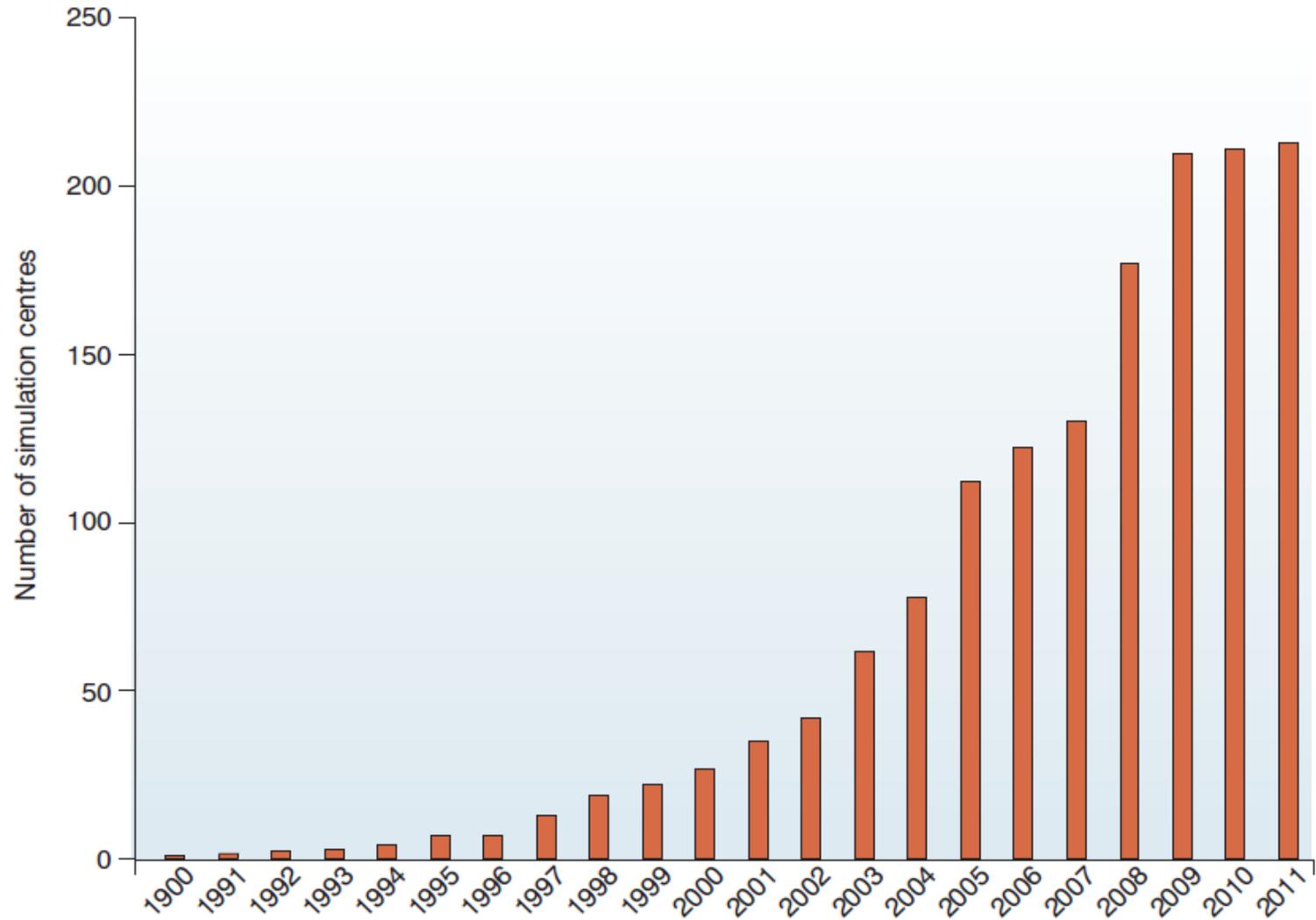# HOW TO ORGANIZE AND CONDUCT SIMULATION SESSIONS

Sanja Kupesic Plavsic, MD, PhD
Professor of OB GYN
Associate Dean of Faculty Development
Paul L Foster School of Medicine
TTUHSC El Paso

Number of simulation centers by region

Number of simulation centers in EU

Clinical simulation:

- Provides a safe environment where trainees can learn without the risk of harming a patient
- Provides an environment that is fully attentive to the learner ' s needs
- Can be adjusted according to learners need
- Provides an opportunity for repetitive training
- Enables exposure to gradually more complex clinical challenges and rare emergency situations where time is an important factor
- Supports experiential learning
- Provides opportunities for training of the individual and team of health professions
- Gives an opportunity for:
  - ✓ Formative assessment, that includes debriefing and feedback
  - ✓ Self-reflection
  - ✓ Summative assessment

The starting point

- Define the required learning outcomes and learners' needs

- Define learning objectives (**S**pecific, **M**easurable, **A**chievable, **R**elevant & **R**ealistic, **T**ime-framed)

- Design the simulation session to include activities to help learners achieve the outcomes
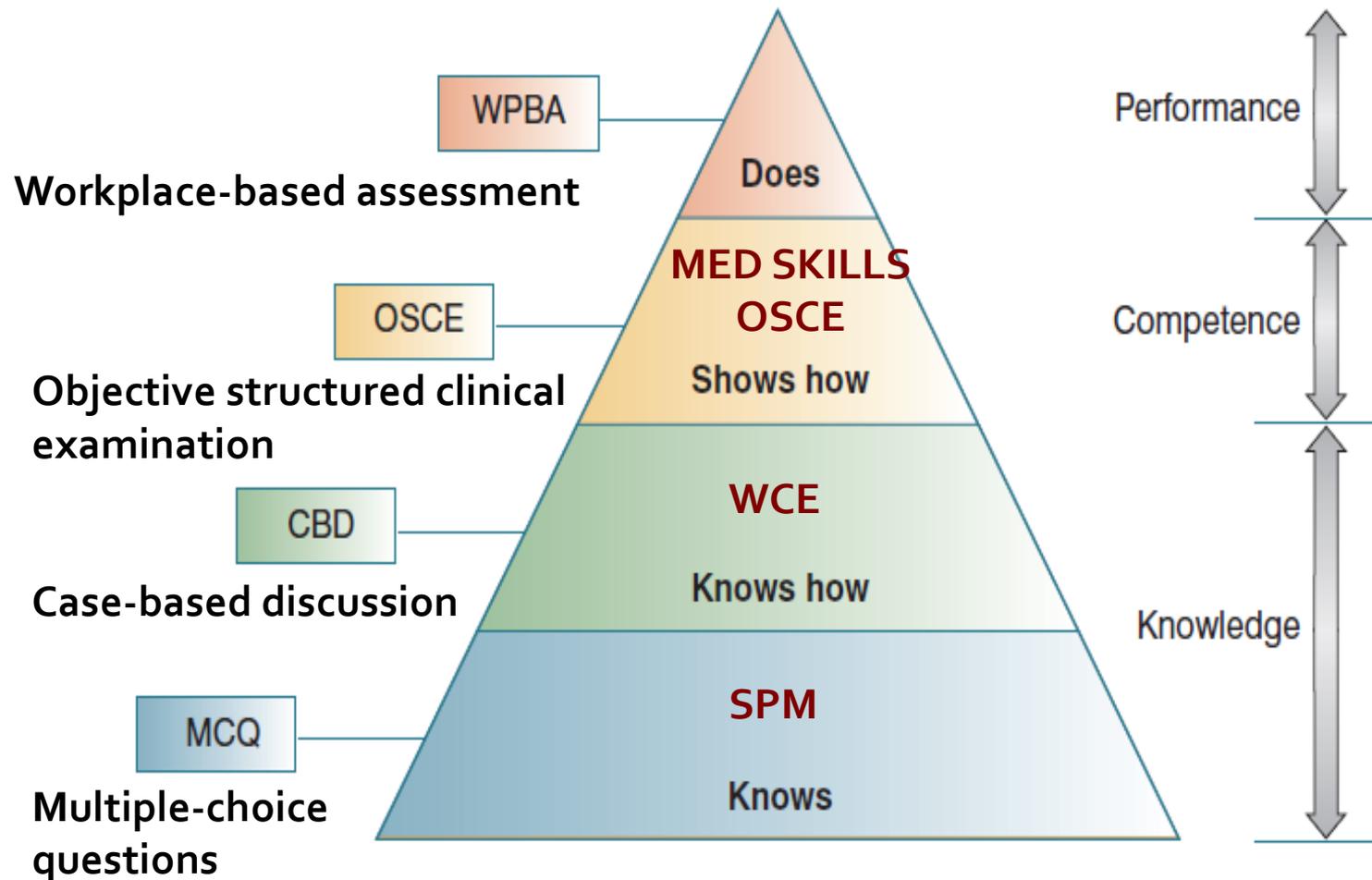
Best Practices in Clinical Simulation

- Ensure opportunities for:
  - **Deliberate practice** involving focused repetitive practice and evaluation
  - **Feedback** (both formative and summative)
  - **Curriculum integration** so that simulation is incorporated into the wider curriculum to complement clinical education

- Define **outcome measurements** from educational interventions to establish reliability and validity of those interventions
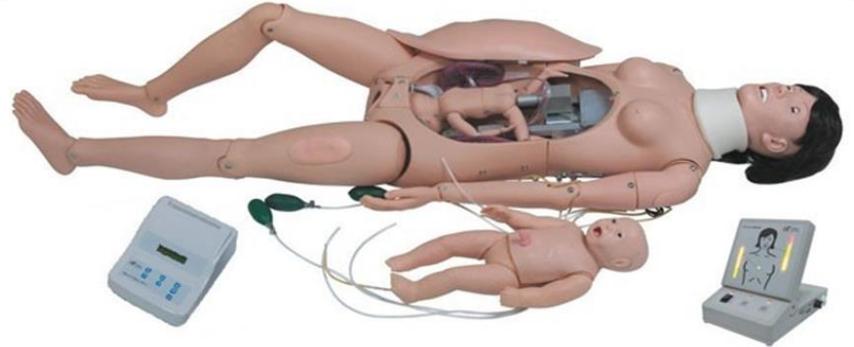
Best Practices in Clinical Simulation

- Provide opportunities for **mastery learning** (deliberate practice with clearly defined learning objectives and set of minimal standards required before progression to further stages)

- Establish use for **high-stakes testing** procedures

- Ensure simulation training is used in the correct **educational and professional context**

Miller's Pyramid with examples of assessment modalities for each level

Classification of Simulators

Classification of Simulators

	Appearance	Interaction with the learner	Educational context
Part task trainer	Realistic, but of a single body part	Feels realistic but limited or no response	Repetitive practice of isolated skill
Full body simulator	Realistic body, often with associated physiological modelling	Allows examination (for example, pulses) and realistic interactions	Realistic practice of whole scenarios
Screen simulator	2D image of patient, equipment or staff	Realistic response to input via keyboard or mouse	Cognitive exploration of a variety of situations
Virtual reality	3D image of patient, equipment or staff	Realistic response to input via a variety of methods	Realistic practice, often of a defined task
Real people as simulators	Real people	Verbal and non-verbal communication	Practice of a variety of clinical skills
Hybrid simulation	Any combination of the above	Verbal and non-verbal communication and interaction	Realistic practice
Simulated environments	An entire clinical environment	Full interaction with patient and team	Realistic practice and team training

Partial task trainer

- Realistic, single body part
- Realistic, but limited or no response
- Allows repetitive practice of isolated skill

Full body simulator
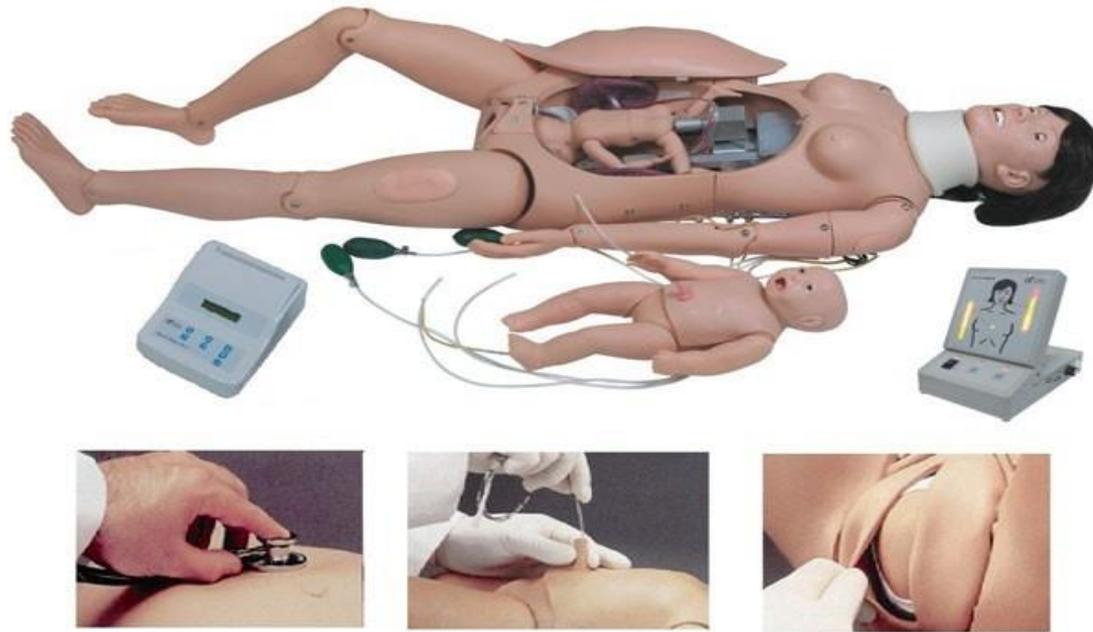
- Realistic body with physiologic modeling
- Allows examination, realistic interactions, and practice of realistic scenarios

Screen simulator
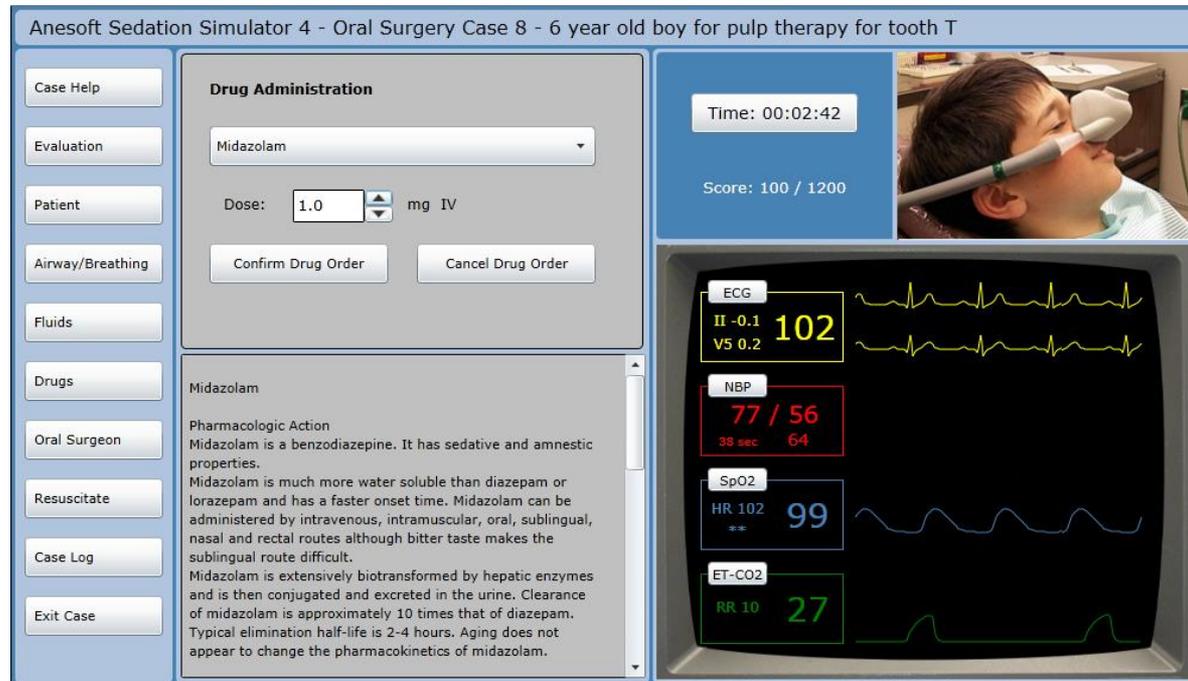
- 2D images of a patient, equipment and staff
- Realistic response to input via keyboard or mouse
- Cognitive exploration of variety of situations

Virtual reality

- 3D images of a patient, equipment and staff
- Realistic response to input via variety of methods
- Realistic practice of a defined task

Real people as simulators
Standardized and simulated patients

- Training of verbal and non-verbal communication
- Practice of variety of clinical skills

Hybrid simulation

- **SP(s) + simulator**: training of verbal and non-verbal communication and interaction
- Realistic practice

Hybrid simulation
Attaching part-task trainers to simulated patients
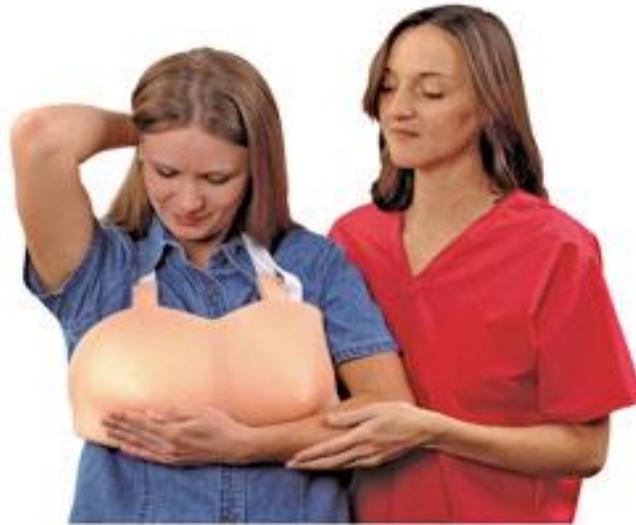
- **Hybrid simulation** - the process of attaching part-task trainers to standardized/simulated patients, assessment of clinical skills can include added complexity to measure aspects of the doctor–patient interaction

Simulated environments

- Simulation of the clinical and/or OR environment
- Enables full interaction with patient and team, allowing realistic practice and team training

Simulation *in situ*

- Simulation is no longer confined to the simulation center due to the advent of the **wireless manikin**

- ***In situ* simulation** provides the opportunity to identify latent threats which exist in the clinical environment by replicating challenging scenarios in the workplace

Assessment Steps

- Choose the **appropriate level of fidelity**

- The blind use of the highest fidelity available is a principle which should be avoided

- **Define the aims and significance of the assessment, typically to appraise the competence**

Define the domain of the assessment

- Technical skills
- Non-technical skills
- Medical knowledge
- Clinical reasoning
- Patient management skills
- Personal attributes
- Teamwork
- Confidence

Scoring Metrics

- **Use of established instruments** (checklist scores and rating scales)

- **Internal metrics** (digital timers, motions and pressure sensors, instrument trackers)

- Creation of **checklist scores**

- Creation of **global rating scales**

Checklist Scores

- Learner's final score is commonly just a <u>simple count of the number of actions</u> that were performed or a sum of the item scores if ordered completion categories are employed

- Where some actions are deemed more important than others the item scores can be weighted, although again determination of appropriate weights is a matter of subjective judgement

Checklist Scores

- List of observable actions and outcomes, appropriate to the presented scenario, which are important for the learner to complete in order to exhibit their proficiency in certain skill/clinical situation

- Usually scored on Yes/No basis (binary)
- Done/Not done

- Expert consensus should be used to determine which actions to include in a checklist

PELVIC EXAM AND PAP SMEAR

STUDENT:_____

DATE: _____

General Technique / Exam Skills	Yes	No
Examines the external genitalia		
Gloves remain clean during the course of examination		
Holds speculum at 45 degree angle; inserts and opens speculum appropriately		
Inspects the cervix and vagina walls		
Collects the ectocervical cells for liquid based cytology (360 degress)		
Collects the endocervical cells for liquid based cytology (180 degrees)		
Uses correct technique to collect cells into the vial		
Labels the specimen appropriately		
Collects the cervical cells correctly using spatula and cytobrush		
Removes the speculum correctly		
TOTAL		

Global Rating Scales

- Comprises an ordered list of levels of performance to which numerical scores are attributed:
  - ✓ 1 = very poor
  - ✓ 2 = poor
  - ✓ 3 = satisfactory
  - ✓ 4 = good
  - ✓ 5 = very good

- May be specific by anchoring to observed behaviors

- Complex

Using the Objective Structured Assessment of Technical Skills (OSATS) global rating scale

GLOBAL RATING SCALE OF OPERATIVE PERFORMANCE

Please circle the number corresponding to the candidate's performance in each category, irrespective of training level

Respect for Tissue :

1	2	3	4	5
Frequently used unnecessary force on tissue or caused damage by inappropriate use of instruments		Careful handling of tissue but occasionally caused inadvertent damage		Consistently handled tissue appropriately with minimal damage

Time and Motion :

1	2	3	4	5
Many unnecessary moves		Efficient time/motion but some unneccessary moves		Clear economy of movement and maximum efficiency

Instrument Handling :

1	2	3	4	5
Repeatedly makes tentative or awkward moves with instruments by inappropriate use of instruments		Competent use of instruments but occasionally appeard stiff or awkward		Fluid moves with instruments and no awkwardness

Knowledge of Instruments :

1	2	3	4	5
Frequently asked for wrong instrument or used inappropriate instrument		Knew names of most instruments and used appropriate instrument		Obviously familiar with the instruments and their names

Flow of Operation :

1	2	3	4	5
Frequently stopped operating and seemed unsure of next move		Demonstrated some forward planning with reasonable progression of procedure		Obviously planned course of operation with effortless flow from one move to the next

Use of Assistants :

1	2	3	4	5
Consistently placed assistants poorly or failed to use assistants		Appropriate use of assistants most of time		Strategically used assistants to the best advantage at all time

Knowledge of Specific Procedure :

1	2	3	4	5
Deficient knowledge. Needed specific instruction at most steps		Knew all important steps of operation		Demonstrated familiarity with all aspects of operation

Checklists vs. global rating scales

Checklists	Global rating scales
Do not differentiate between different levels of performance	Differentiate between different levels of performance
Do not take into account the sequence and timing of actions performed	May take into account the sequence and timing of actions performed
Objective	Subjective
Assessment of performance skills	Generic aspects of performance

Assessors

- Experienced; with clinical expertise

- Non-expert raters (standardized patients, residents, medical students…)

- Peer rating

- Self-assessment

Quality Assurance: Piloting the assessment

- Timing and realism of the scenario
- The difficulty level of the tasks
- The adequacy of the participant instructions
- The appropriateness and feasibility of the scoring system
- Assessment of the instruments
- Identifying unanticipated problems

Challenges of the assessment method

- Checklist item construction

- Rater training

- Rater (assessor) experience

- Rater *calibration*

Quality Assurance

Six attributes of good assessment:

- Reliable
- Valid
- With educational impact
- Cost-efficient
- Acceptable
- Feasible

Reliability

- A reliable assessment must produce measurements of individual performance that are **reproducible in similar circumstances such as on other occasions** (test-retest reliability) or using other raters (inter-rater reliability)

Quality Assurance: Piloting the assessment

- Gather two or more raters to score the performance and establish the degree of inter-rater reliability

Reliability coefficient

- Variation in scores awarded by a single rater at two viewings of the same performance **(intra-rater reliability)**

- Variation between multiple raters scoring the same performance **(inter-rater reliability)**

Validity

- **Validation** is a process of gathering evidence, from multiple sources, to show that such interpretations are sound and sensible

  - Face validation
  - Content validation

Face and Content Validity

- **Face validity**: the assessment appears to be <u>realistically measuring the desired attributes</u> (e.g. ability to perform a Pap smear)

- **Content validity**: the assessment effectively assesses the <u>relevant or important domains at a level appropriate to the intended examinees</u>

Face and Content Validity

- Both are established on the basis of subjective judgements of the assessment tool made by stakeholders in the process

- Should be assessed before implementation of the assessment

Criterion Validation

- Correlate the results of an assessment with those of a second assessment (on the same group of individuals) that captures some of the same dimensions of performance

- Should be conducted close in time to the first assessment

Educational Impact

- **Formative feedback**
- **Summative feedback**

  - Informs learners about their current levels of performance

  - Highlights their individual strengths and weaknesses, and

  - Points the way towards future learning and development

Acceptability, Feasibility and Cost-Effectiveness

- **<u>Acceptability</u>**: Create surveys that gather stakeholder perceptions of whether the assessment is fair, is set at an appropriate level of difficulty and afford adequate opportunity for learners to display their abilities

- **<u>Feasibility and cost-effectiveness</u>**: time and resource intensive

Standard Setting for Summative Assessments

- **Fixed percentage method** is a relative method whereby the proportion of examinees who will pass is predetermined for each cohort

- **Hofstee method:** Experts set minimum and maximum pass scores and minimum and maximum acceptable failure rates. A graphical method is then used to identify a cut-point that falls between these extremes

- **Contrasting groups method** judges are asked to examine the overall performance of a sample of candidates and award each one a pass or fail, regardless of the actual scores awarded

Faculty Roles in Simulation

- Lead simulation educator
- Instructor
- Coach
- Mentor
- Facilitator
- Assessor
- Quality improvement lead
- Clinical service lead

How to prepare for simulation

- Acquire the technical skill
- Make the context real
- Identify non-technical skills associated with practical procedures (situation awareness, team working, etc.)
- Create scenario learning objectives
- Design scenario to develop technical and non-technical skills
- Ensure safe learning environment
- Debrief / Assess

Competencies of the simulation based educator

- Orientation and familiarization with different simulation modalities
- Developing and sustaining a safe learning environment
- Designing effective simulation-based learning
- Facilitation skills
- Effective feedback and debriefing skills
- Know how to use video-enhanced debriefing

Create a skeleton outline of simulation session I

- Timetable encompassing the availability of suitable facilities, equipment, paperwork, assessors, standardized patients, participants, technical and administrative support personnel

- Compile contact details/eRaiders for all participants

- Consider contingency plans for the 'failure' of any of the components: what to do if an assessor fails to turn up on the simulation day

Create a skeleton outline of simulation session II

- Prepare and print paperwork, including score sheets, information and guidance for all those involved

- Give clear directions for where to go, when to arrive, what to expect, how long the assessment will take and when the results will be available

One or two business days before session

- Double check that facilities are functioning, paperwork is organized and equipment is available

- If possible set up and test all equipment before the day of the assessment

On the Day

- Conduct short verbal briefings for assessors, technicians and administrative assistants

- Conduct briefing for learners so they know what to expect and how they will be evaluated

- Communicate any last minute information that may not be included in the advance information

- Learning activity: Take time to debrief after the session

Post-Assessment

- Transfer checklist scores and ratings from paper sheets to a computer database, by hand or electronic scanning if possible, as promptly as possible after the assessment in order to facilitate timely feedback to the learners

- Deliver results and feedback to the learners regarding their performance in the assessment

- Organize debriefing and define areas for improvement

Establish a team motivated to use simulation	**Determine location**	**Identify and gather equipment**	**Determine current standards of best practice**
Create learning objectives	**Develop scenarios to meet pre-identified learning objectives**	**Plan simulation sessions into the timetable / Create score sheets and guidelines**	**Run pilot scenarios**
Ensure written consent from participants if recording will be used	**Run simulation session and debriefing**	**Ask participants to provide feedback**	**Run survey (with learners and trainers, assesses and assessors)**
Keep a record of all simulation sessions for audit / quality assurance	**Review feedback and surveys**	**Make the appropriate changes to the learning objectives, equipment & session structure**	**Review to ensure sessions remain contemporary**