VALIDATION OF TWO E-LEARNING EXERCISES: FACS AND VP IN MEDICAL TEACHING

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TEACHING UNDERGRADUATE ANAESTHESIA

- Final-Year Students attend a 2-week module
  - 40 weeks of Medical & Surgical clinical attachments

- Difficult to cover syllabus &
  Essential topics missed
  - Suitable clinical cases not always available

TEACHING UNDERGRADUATE ANAESTHESIA

- E-learning used to supplement clinical teaching

- Introduced two types of Virtual Patient on course

- Summer 2006:

  Formative Assessment Case Studies (FACS)

- Summer 2008:

  Story-line Virtual Patient (VP)

WHAT IS A VP?
VIRTUAL PATIENT

- "specific type of computer program that simulates real-life clinical scenarios; learners emulate the roles of health care providers to obtain a history, conduct a physical exam, and make diagnostic and therapeutic decisions"

Association of American Medical Colleges

WHAT IS A VP?
VIRTUAL PATIENT

- Many formats described:
  - Interactive clinical cases (FACS)
  - Anatomical Virtual Patients
  - Longitudinal Virtual Patients (Storyline VPs)

WHAT IS FACS?
FORMATIVE ASSESSMENT CASE STUDIES

- Short interactive cases
  - 20-30 min to compete
- Usually focus on a single topics
  - e.g. Peri-operative management of Diabetes

WHAT IS FACS?
FORMATIVE ASSESSMENT CASE STUDIES

- Network of interlinking web-pages
  - A series of decision steps (n= 9-13)
- Student progresses by answering questions correctly
  - Mostly MCQ about the case scenario
- Feedback for wrong selections (i.e. Formative)

FACS Administration

Student Management
Case Management
Admin Management
Results
Admin Log

Change Password

Help

Logout

Welcome Lester!
System Administrator

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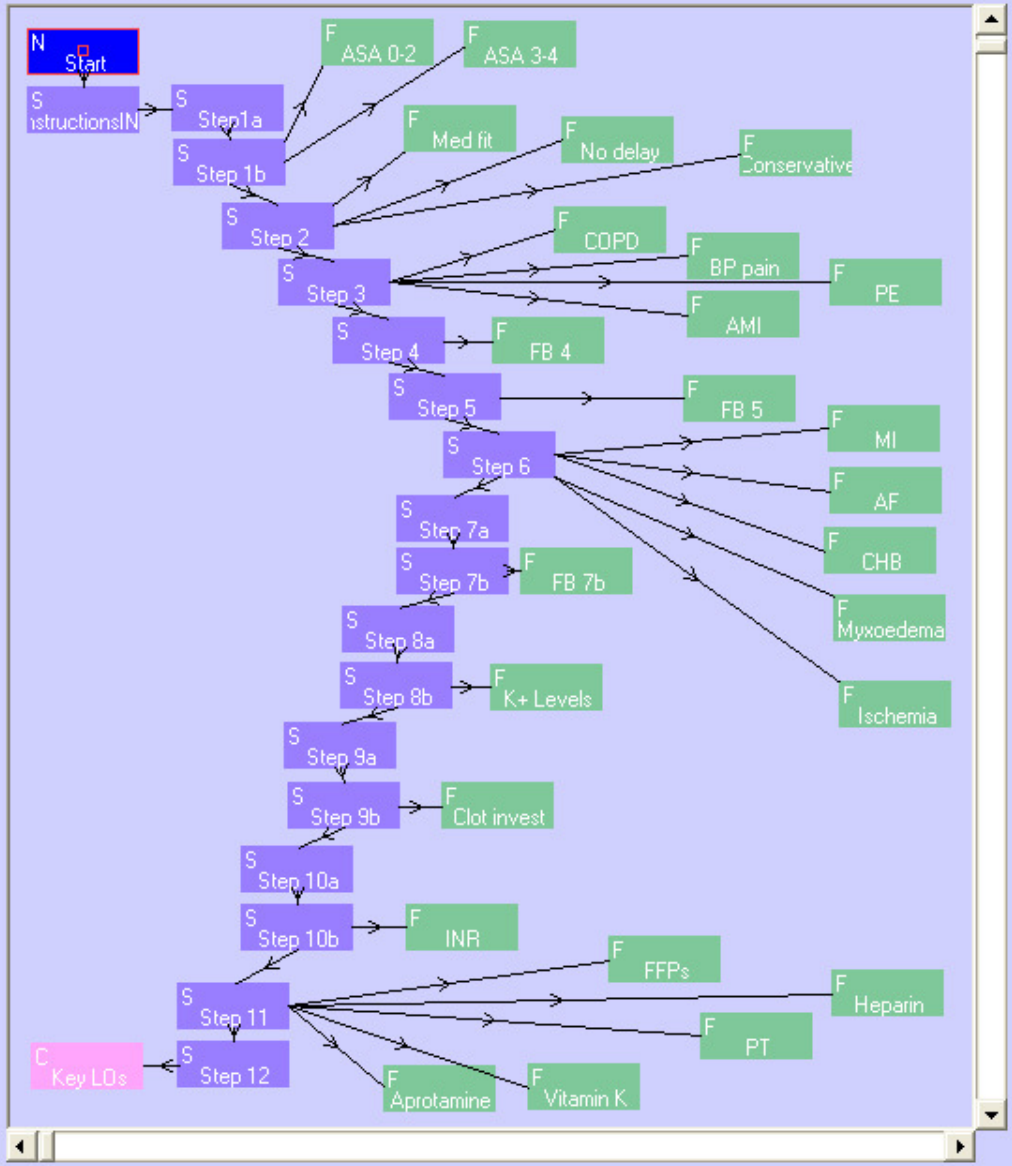
FACS v1.0.47

Case Management

Cases - Add Case - Delete Case

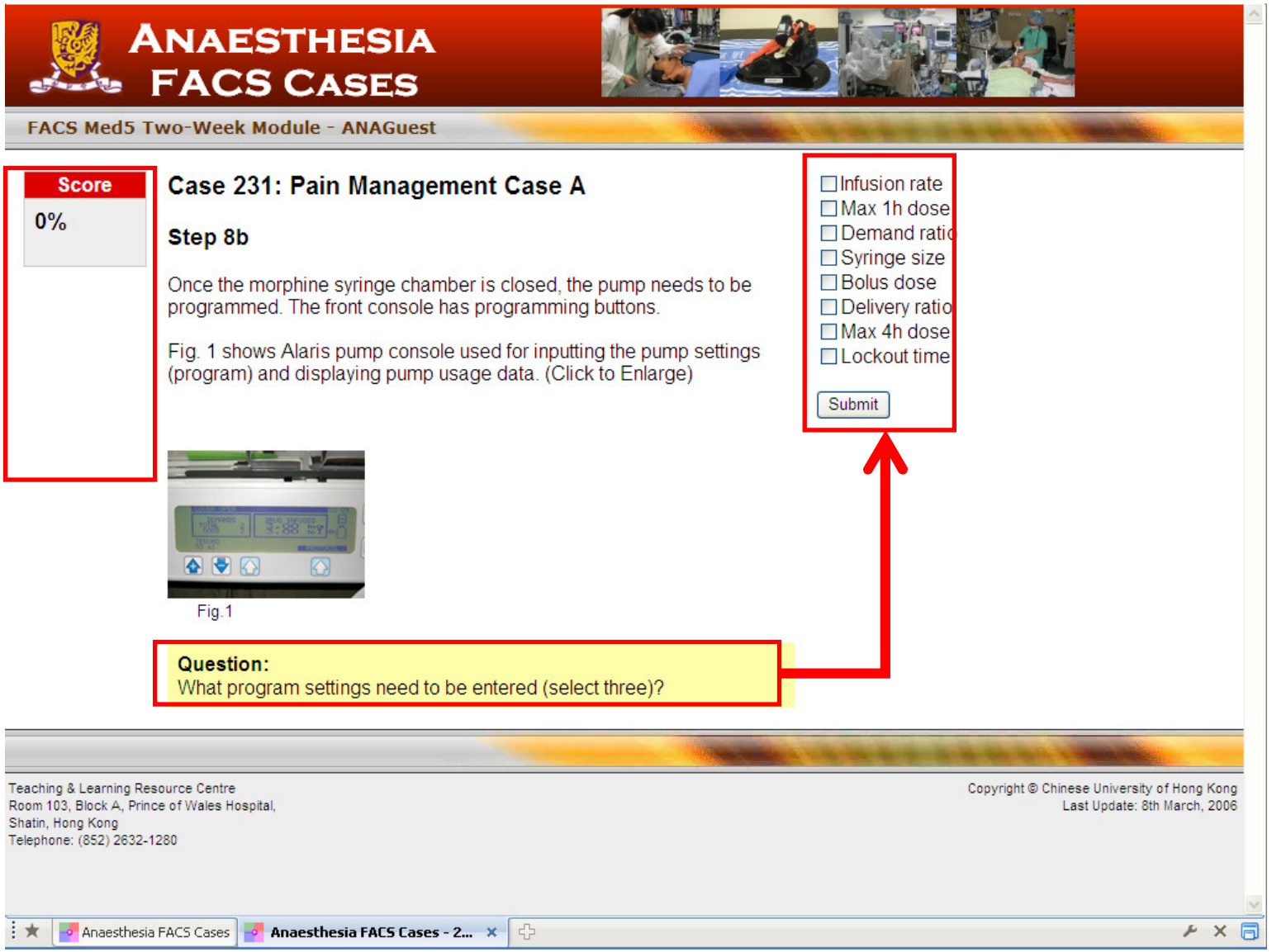
Check | Duplicate | FACS Graph v1.0.61



Start	
Case ID	157
Case Name	Laboratory data
Category	Anaesthesia
Description	An elderly woman has a traumatic hip fracture. <font color=blue>To be done in week 1
Activated	☑

- ☐ Workshop Group
- ☐ Surgery C - Group 4
- ☐ Group 8
- ☐ Surgery B - 8AB
- ☐ Surgery B - 8CD
- ☐ Guests
- ☐ Test
- ☐ Med5210WBSA
- ☐ DemoGroup
- ☐ Virtual AE
- ☐ Workshop Virtual AE
- ☐ ENT - Med 5
- ☐ Public
- ☐ Traditional Chinese Medicine
- ☐ FACS Tour
- ☐ Student Result Logging
- ☐ ORT

EXAMPLE OF FACS WEB-PAGE: *TYPICAL DECISION STEP*



STORYLINE VPS

- An illness takes place over days / months / years
  - Condenses important clinical events into a story
  - Viewed independent of time
  - Provide an overview of the case from beginning to end

- 2005-2008 Teaching Development Grant

EXAMPLE OF STORYLINE VP WEB-PAGE:

QUESTIONS ABOUT VIRTUAL PATIENTS

Does their introduction into a course improve student learning?

- **New & exciting teaching innovations**
- **Overcome logistic problems:**
  - **Finding suitable patients / cases**
  - **Lack of Student - Teacher contact time**
- **Surveys of Student Opinion support their use**

But little scientific evidence that student performance improved following exposure

WHAT DID WE DO?

- Introduced a new topic (Acute Pain Management):
  - into our existing FACS and VP E-learning syllabus.
- Studied VPs effect on examination performance
  - in three separate exams over one academic year.
- Students were not informed of changes.

OUTLINE OF STUDY DESIGN

- July 2009 to April 2010
  - N=132
  - Split into 16 groups of 7-10 students

- Introduced into Anaesthesia module curriculum:
  - THREE new Pain Management FACSs
  - ONE new section in the storyline VP (post op pain mx)

OUTLINE OF STUDY DESIGN-CON'T

- Exposed half to Pain FACS and half to the new section on pain management in the VP (2 x 2 split)

- Given 1-hour introductory session on using FACS and VP

- Previously students had only:
  - (a) 1-morning acute pain service ward round and
  - (b) 1-hour tutorial on pain.

STUDENTS GROUP EXPOSURE

		FACS	
		Exposed to FACS	**Not exposed**
VP	**Exposed to VP**	B	C
	Not exposed	D	A

N = 132 students
16 groups in total

ANAESTHESIA STUDENT EXAMS (2009-2010)

- End of Module Exam
  1. Written MEQ
  2. MCQ

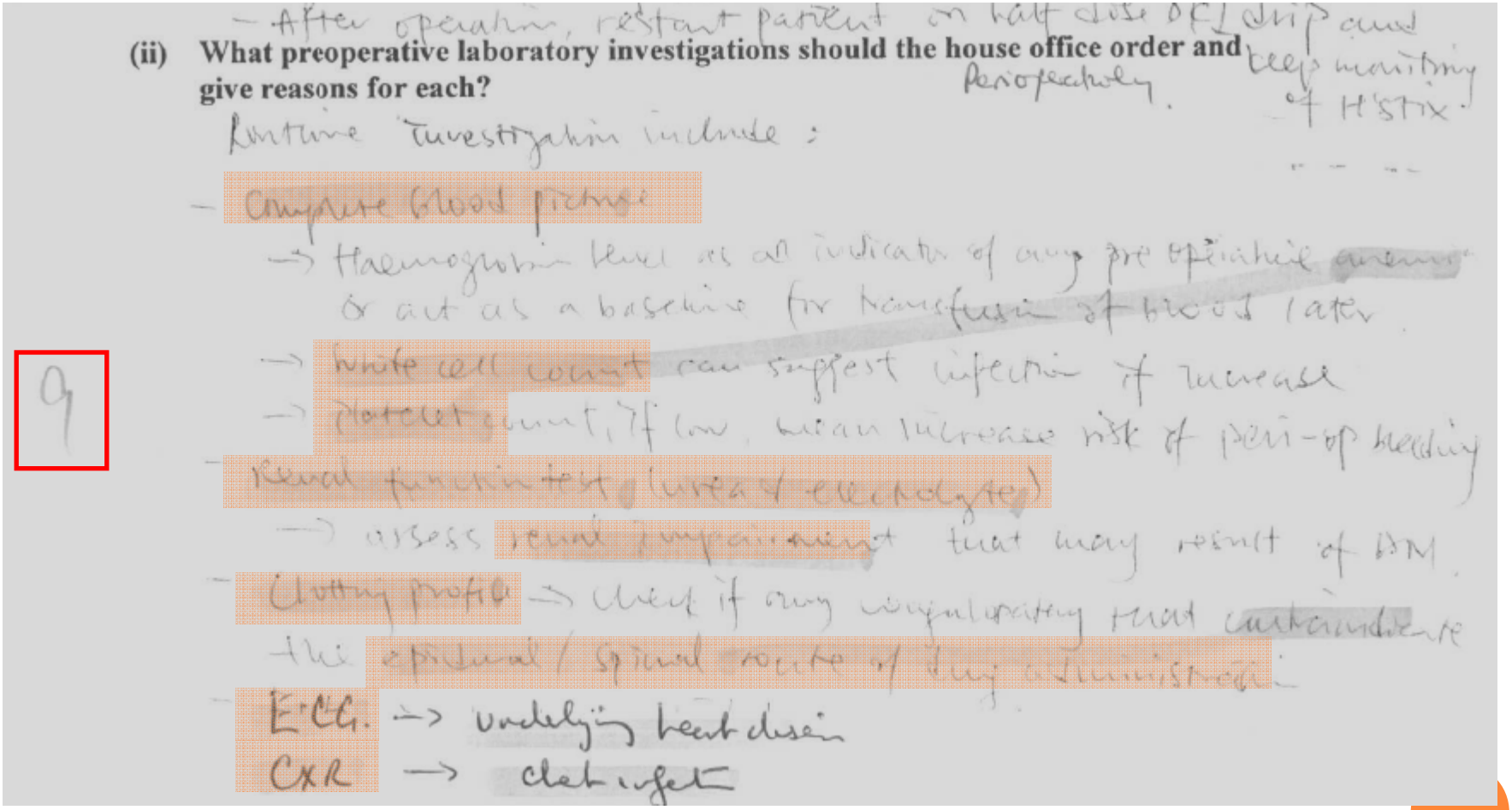
- Final-year surgery exam
  3. Written MEQ

An MEQ is Modified Essay Question where student provides short notes answers

MODULE MEQ

- 20 min
- 4-5 questions including 2-3 on pain related topics
- Used 4-different papers A, B, C & D – rotated 4 times

MODULE MEQ



- After operation, restart patient on half dose of drip and keep monitoring of H'STIX.

(ii) What preoperative laboratory investigations should the house office order and give reasons for each?

Preoperatively.

Routine Investigation include :

- Complete blood picture
  - → Haemoglobin level as an indicator of any pre operative anemia & act as a baseline for transfusion of blood later
  - → White cell count can suggest infection if increase
  - → Platelet count, if low, mean increase risk of peri-op bleeding
- Renal function test (urea & electrolyte)
  - → assess renal impairment that may result of DM.
- Clotting profile → check if any coagulopathy that contraindicate the epidural / spinal route of drug administration.
- E.C.G. → underlying heart disease
- CXR → chest infect

9

MODULE-MCQ

- Anaesthesia uses a bank of 300+ five items questions
  - Managed using IDEAL software (OES – C. Haslett)
  - Items reviewed and upgraded annually
    - Based on level of Difficulty & Discrimination
- 75 min
- 60 item with 6-9 items on pain
- Used 3 different exams –A, B, B, C rotated 4 times

MODULE-MCQ

- Analyzed MCQ data from only exam B
  - Two middle modules (n=69 students)

- Compared marks from 9 pain management items against 11 general items*

*(high quality IDEAL criteria).

MODULE-MCQ

Ques 20

A 32-year old secretary is dignosed with breast cancer. She is admitted for a simple mastectomy. Post operatively, the anaesthetist prescribes appropriate pain management.

What does he prescibe?

A. Intramuscular morphine
B. Intravenous PCA morphine
C. No pain relief is required
D. NSAIDS administered orally
E. Paravertebral LA infusion

FINAL-MEQ

- Final-year surgery exam
  - May 2010
- 10 items
  - 4 items on pain related topics
- 20 mins
- 1 set by anaesthesia

FINAL-MEQ

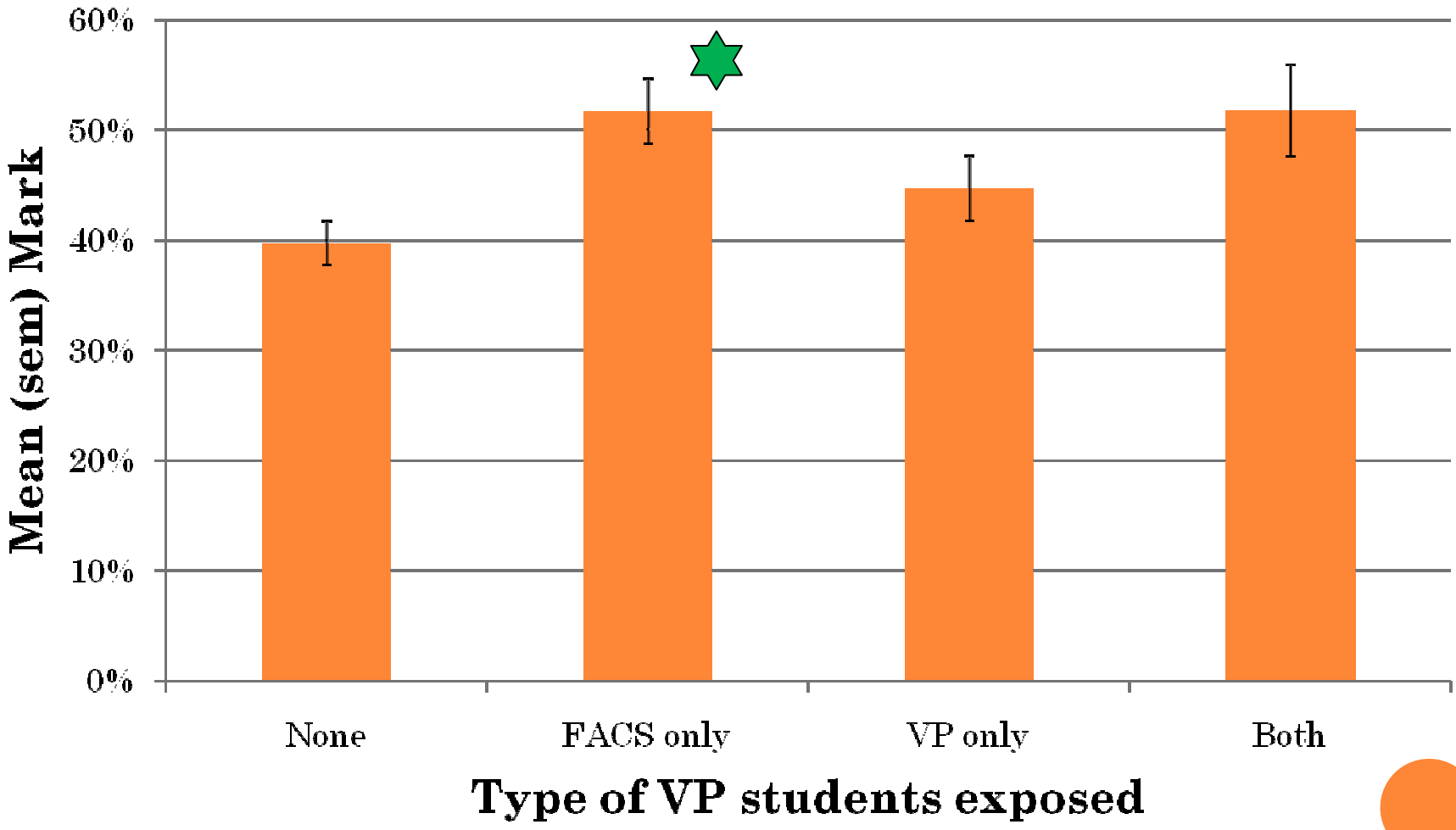
c. What additional laboratory tests are indicated in this case?

[3 marks]

(i) Arterial blood gas analysis (0.5 mark)
(ii) Lung function tests / Spirometry (0.5 mark)
(iii) Send sputum for culture and sensitivity (0.5 mark)
(iv) Coagulation screen (0.5 mark)
(v) Group & Save / Cross match (1.0 mark)

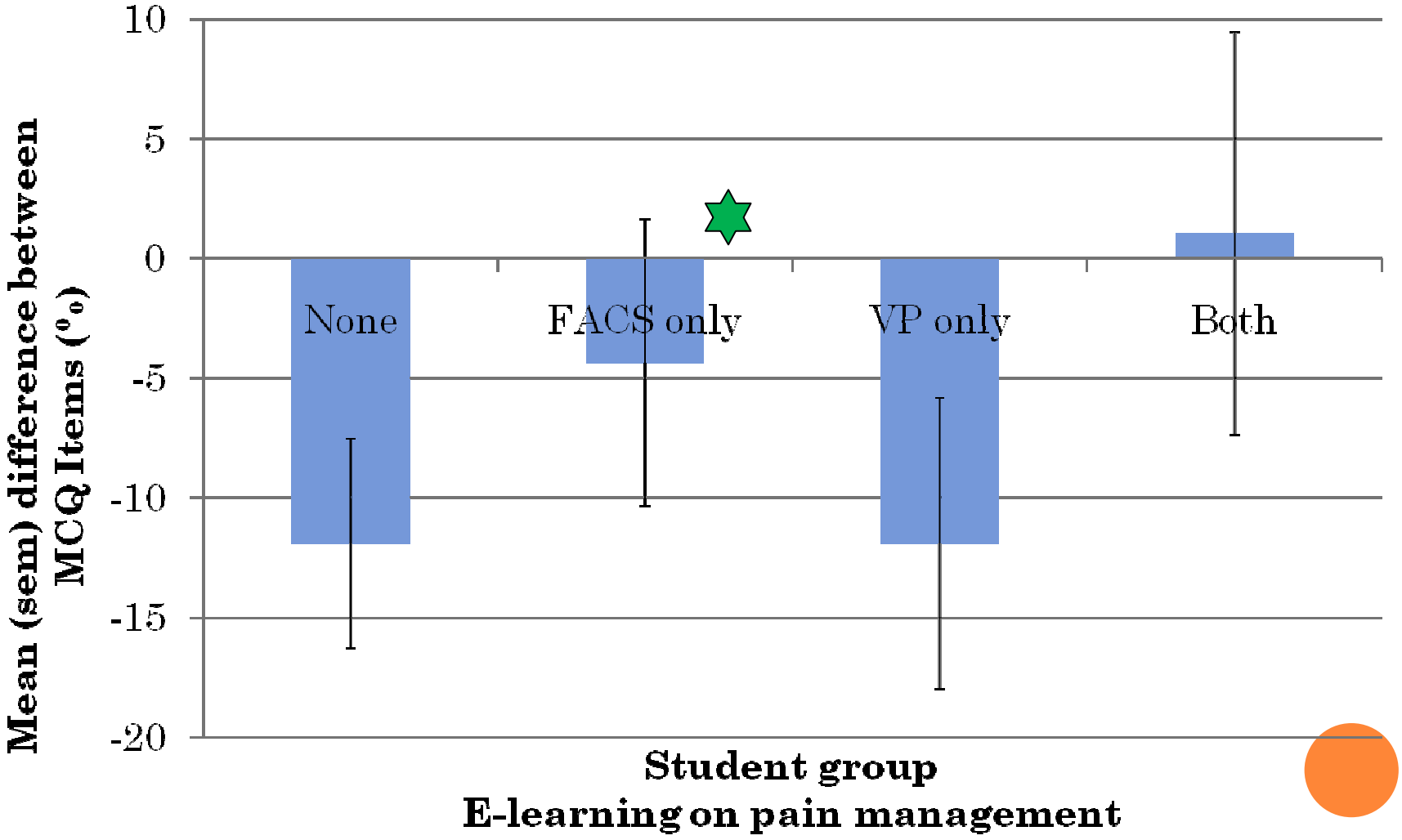
RESULTS

END OF MODULE MEQ MARKS FOR SECTION ON PAIN MANAGEMENT



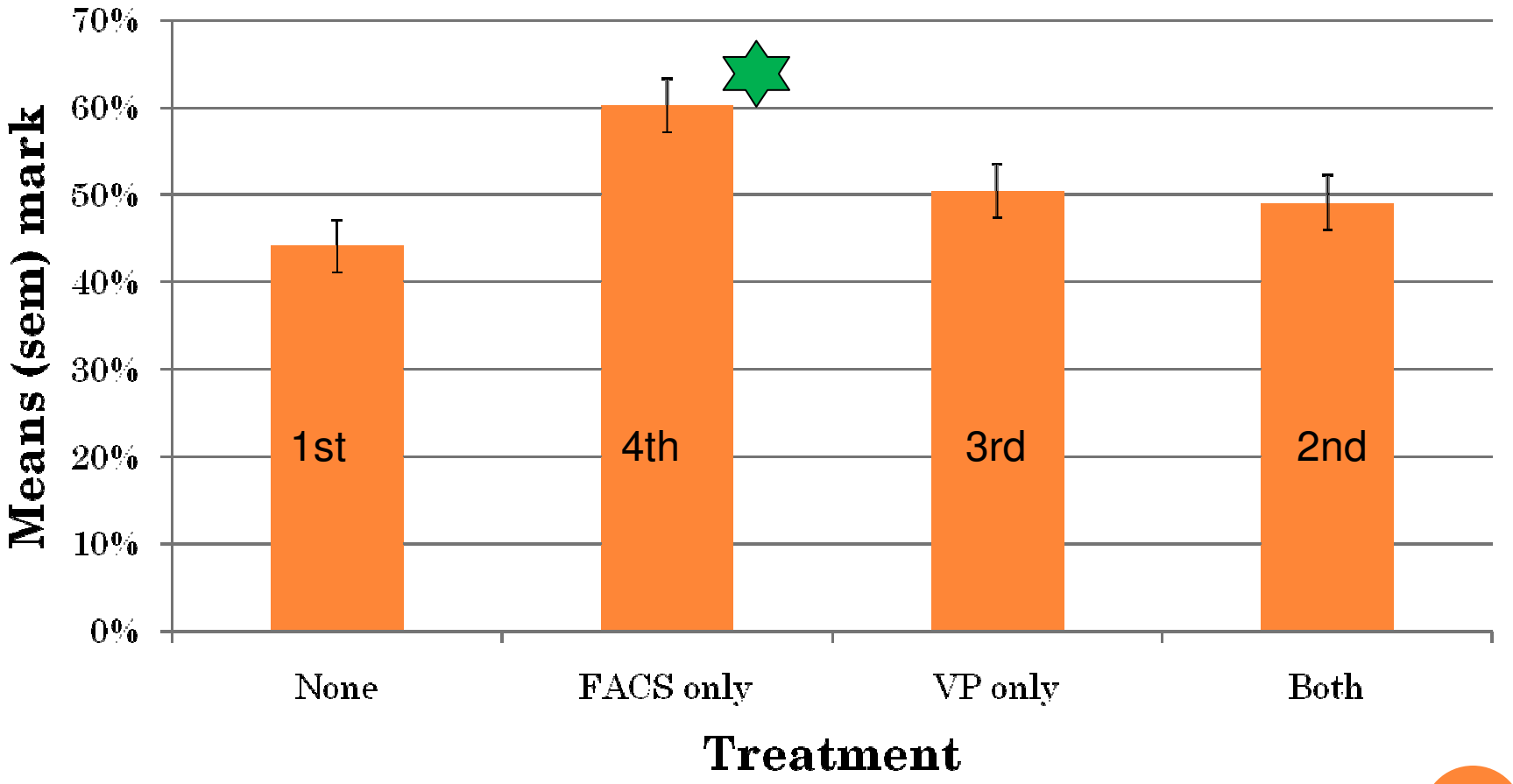
•Significant difference between groups for FACS only [univariate model] *P=0.001*

END OF MODULE MCQ PERCENTAGE DIFFERENCE BETWEEN PAIN AND GENERAL ITEMS: ADJUSTED EFFECT



* Significant difference between groups *P=0.02*

FINAL SURGERY – ANAESTHESIA MEQ MARKS FOR SECTION ON PAIN MANAGEMENT



•Significant difference between groups for FACS only *P=0.02*

IN SUMMARY …

Method	Result
1. End of Module – MEQ (written paper)	FACS ↑ Pain (*P=0.001*)
2. End of Module MCQ (Pain vs. Gen)	FACS ↑Pain (*P<0.02*)
3. Final Surgery MEQ (Anae writtten)	FACS ↑Pain (*P<0.02*)

IN CONCLUSION …

- Clear evidence that the introduction of Pain FACS exercises improved students' performance in both End of Module and End of Year Exams

- However, time may have an effect on the End of Year Exams' result

- Storyline VP did not significantly effect students' performance.

THANK YOU

Questions?