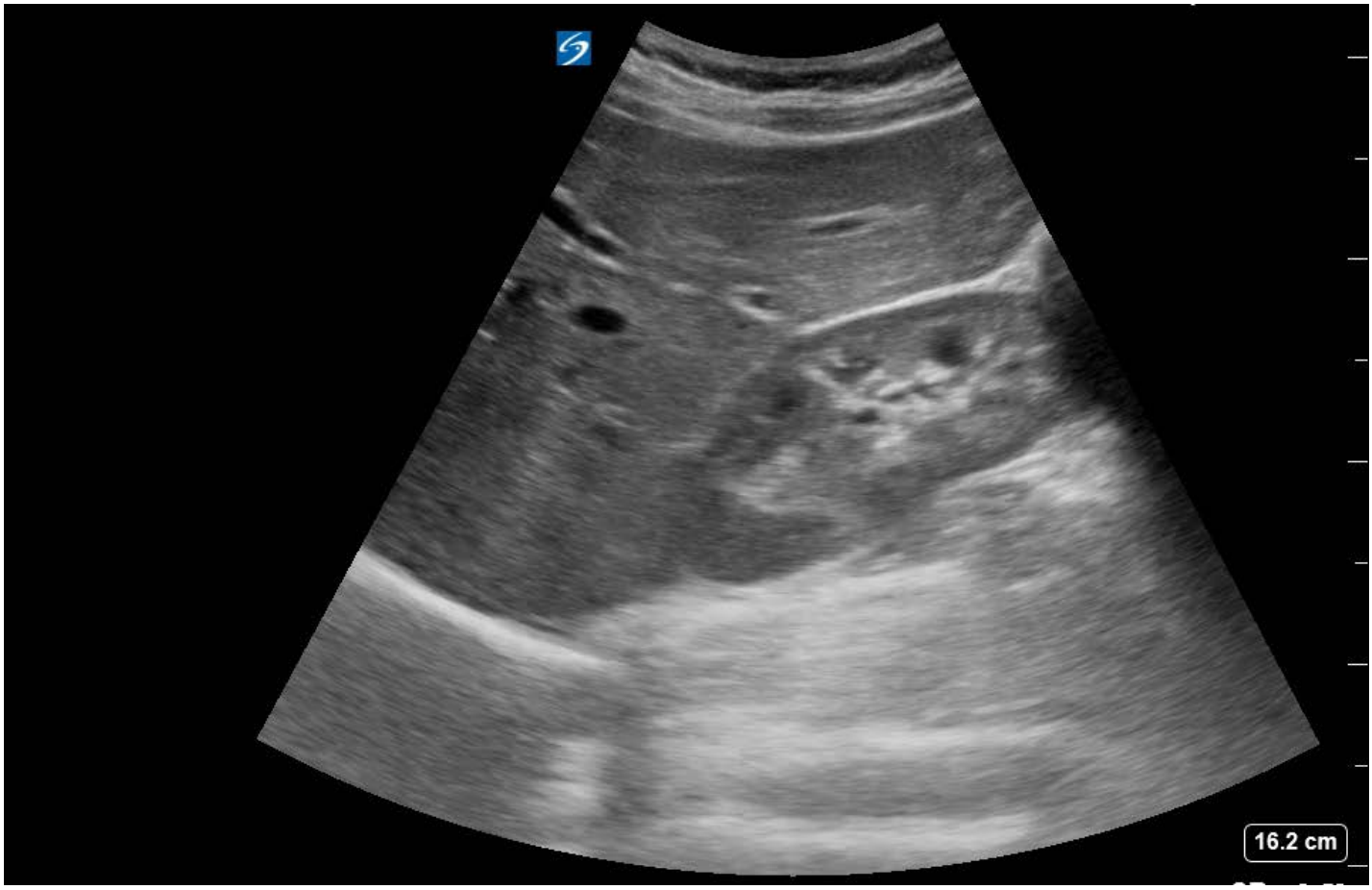
You have been allocated to run a teaching session on eFAST, in your department's weekly trainee education program.

Complete the table below describing at least 2 landmarks and 2 features of a positive scan for each. (20 marks)

View	Landmarks	Positive Findings
RUQ	in mid-axillary line, marker end level with xiphi-sternum, probe marker at 11 o'clock pointing towards bed	Fluid in hepato-renal angle/ Morison's pouch, tip of liver (or between lateral margin of liver and diaphragm) Absence of: spine sign, lung curtain, comet tails, mirror image of liver
LUQ	Mid to posterior axillary line Middle of transducer level with xiphi-sternum, Probe marker at 1 o'clock pointing towards bed	Fluid in spleno-renal angle, tip of spleen or between lateral margin of spleen and diaphragm Absence of: spine sign, lung curtain, comet tails, mirror image of spleen
Pelvis	Do long and trans view In midline Nonmarker end over pubic symphysis for long, rotate 90^0 anticlockwise with marker to 9 o'clock for trans Beam pointing straight to bed	Fluid in rectovesical or rectovaginal pouch (pouch of Douglas) Fluid above bladder/surrounding bowel
Subcostal	Transducer transverse, Probe marker to 9 o'clock In midline Just below xiphisternum Push down to bed, angle upwards to heart	Fluid in pericardial space between pericardium and heart R ventricle/atrial collapse in tamponade
Right/Left Lung/pleura	Transducer long In mid-clavicular line Over anterior chest At level of clavicle, sliding down to lower lung margin Probe pointing into bed	Absence of: Twinkle artefact/'ants crawling'/comet tails Bar code sign on M-mode, or absence of 'sea shore' sign

The registrar working with you has performed an eFAST scan of a trauma patient and reports it as a negative scan. Review of his eFAST images reveals the image below.



a. How could this image be improved? (2 marks)

Reduce gain

Reduce depth

b. What would the registrar have to visualise in performing this view to confidently call it negative? (2 marks)

Visualise tip of liver/spleen

Fan through hepato-renal pouch

Upon clarifying this with the registrar, it appears that he has not done this and repetition of the scan reveals that it is positive.

How would you address this situation? (7 marks)

Ensure patient is safe and receives required management eg reassess, surg referral, further imaging etc

Open disclosure to patient/family, acknowledge, apologise, explain

Explain error to registrar,

Explore reasons for error, identify whether individual or general risk

Review processes in place to prevent such errors in future eg teaching, guidelines, supervision, dr in distress

Address deficits identified eg support dr in distress with GP, counselling, time off
Or implement guideline

Review success of strategies implemented to address issues identified eg review of USS images/use

SAQ 23

References

- https://www.acem.org.au/getattachment/d19d5ad3-e1f4-4e4f-bf83-7e09cae27d76/G24-Implementation-of-the-Australasian-Triage-Scal.aspx Accessed 28th Jan 2015
- https://www.acem.org.au/getattachment/693998d7-94be-4ca7-a0e7-3d74cc9b733f/Policy-on-the-Australasian-Triage-Scale.aspx Accessed 28th Jan 2015
- Cameron p. 861 - 864

1. Complete the following table on the Australasian Triage Scale (ATS):

One mark for each cell below. 20 marks total. Borderline mark is 15. Bits in red (or similar concept) needed to score borderline mark. Significant leeway granted in last column, given subjective nature of triage, EXCEPT the arrested patient has to be a Cat 1 descriptor!

Category	Treatment Acuity*	Description of Category	Clinical Descriptors (indicative only)
1	Immediate	**Immediately Life-Threatening Conditions**	Cardiac arrest Respiratory arrest Immediate risk to airway – impending arrest Undifferentiated Major Trauma
2	Within 10 minutes	**Imminently Life-Threatening** The potential for time-critical treatment (e.g. thrombolysis, antidote) to make a significant effect on clinical outcome Very severe pain	Airway risk – severe stridor or drooling with distress Undifferentiated chest pain Severe respiratory distress Circulatory compromise Very severe pain - any cause BSL < 3 mmol/l Drowsy, decreased responsiveness any cause (GCS< 13) Acute hemiparesis/dysphasia Behavioural/Psychiatric: - violent or aggressive - immediate threat to self or others
3	Within 30 minutes	**Potentially Life-Threatening** The patient's condition may progress to life or limb threatening, or may lead to significant morbidity, if assessment and treatment are not commenced within thirty minutes of arrival Situational Urgency	Severe hypertension Moderately severe blood loss – any cause Moderate shortness of breath Seizure (now alert) Head injury with short LOC- now alert Trauma - high-risk history with no other high-risk features
4	Within 60 minutes	**Potentially Serious** Significant complexity or severity Likely to require complex work-up and consultation and/or inpatient management	Vomiting or diarrhoea without dehydration Eye inflammation or foreign body – normal vision Minor limb trauma – sprained ankle, possible fracture, uncomplicated laceration
5	Within 120 minutes	**Less Urgent** Clinico-administrative problems Results review, medical certificates, prescriptions only	Minimal pain with no high risk features Low-risk history and now asymptomatic Minor symptoms of existing stable illness Minor wounds - small abrasions, minor lacerations (not requiring sutures) Scheduled revisit e.g. wound review, complex dressings

*Maximum waiting time for medical assessment and Rx

2. List two administrative functions of the ATS. For each, provide one example of how it's used for that purpose.

a. Measure of Access and Activity *Something about ability to meet waiting times needed.*

Performance indicator thresholds specified by ACEM (see reference), stipulating proportions of cases within categories that should meet waiting time target. These are: ATS 1 – 100%; ATS 2 – 80%; ATS 3 – 75%; ATS 4 and 5 – 70%. Failure to meet thresholds may indicate resource deficits. Average waiting time in each category also an indicator.

b. Quality Assurance *Any one of the following will score 2.5:*

Benchmarking against like hospitals, determining admission rate per category, accuracy or validation of triage allocation, utility for staff training / credentialing, workforce management.

2.5 marks each. 5 marks in total. Borderline mark is 2.5. Bits in red (or similar concepts) needed for borderline mark. Significant leeway granted in descriptors.

Overall borderline mark is 17.5 / 25.

A 38 year woman presents with right upper quadrant abdominal pain associated with nausea and vomiting.

The trainee performs a biliary ultrasound and takes the image below.

a. How would you improve the image below? (1 mark)

Too deep

b. What list five (5) findings on the ultrasound would indicate the presence of cholecystitis? (5 marks)

sonographic Murphy's sign

GB wall thickening >3mm

pericholic fluid

GB distension

GB sludge

c. The registrar thinks that she may have detected a gall stone. What ultrasound finding confirms the presence of a gall stone? (1 mark)

acoustic shadow

d. In a gall bladder scan, list six (3) images or structures are important to visualise in the presence of a gall stone. For each factor explain why this is important. (6 marks)

GB neck ?occult impacted stone

Mobility of stone ? impacted

CBD dilatation/stone – effect of obstruction

Liver – hepatic duct dilatation – 'train tracks'– effect of obstruction

e. What landmarks and techniques are used to confirm imaging of the common bile duct? (3 marks)

portal vein in long

hepatic artery in trans sitting under CBD

absence of flow in CBD compared to pulsation of hepatic artery and venous flow in portal vein

f. This patient later writes to the director of your department complaining that she was misdiagnosed with cholecystitis based on the ultrasound by the ED registrar. How would you address this complaint on behalf of the ED director? (10 marks)

respond to pt in timely manner committing to review

Apologise for any inconvenience/errors,

Check if pt needs further tx that can be facilitated

investigate the case, review notes, images, discuss with staff involved

decide whether processes adhered to correctly or not

speak to dr involved, clarify what happened

if error in process, then actions to correct eg education, supervision, guideline, review

if dr in distress ie process robust but dr underperforming, then actions to correct eg learning plans, increased supervision, supports for health/personal issues, time off if needed etc

Meet/discuss outcome of investigation and plan for rectifying with complainant

Follow up on actions implemented and review plan as needed

SAQ

You have been invited to join your Emergency Departments Quality Improvement Workgroup

a. List the key steps in the Quality Improvement Cycle ? (4 Marks)

Plan - the change - 1 Mark
Do - implement the change - 1 Mark
Check - monitor and review the change - audit - 1 Mark
Act - revise / review the plan and repeat the cycle - 1 Mark

Exact wording not required statements consistent with concept will be given marks
Taken from Dunn Emergency Medicine Manual 5th Edition Volume 1 Chp 22 Pg 351

b. List six clinical indicators used in Emergency Medicine to measure clinical care and outcomes. (6 Marks)

1 Mark to maximum of 6 for any of:

- *ATS Compliance*
- *% Access block*
- *STEMI - time to angio / thrombolysis*
- *Admission rates*
- *DNW Rates*
- *Number of deaths in ED*
- *Time to antibiotics*
- *Time to analgesia*
- *NEAT Compliance*
- *Trauma audits*
- *Satisfaction surveys - patients or staff*
- *Staff retention / sick leave*
- *Patient complaints audit*
- *Notes audits*
- *Occupational health and safety audits - staff injuries or needle sticks etc.*
- *Missed results audit*

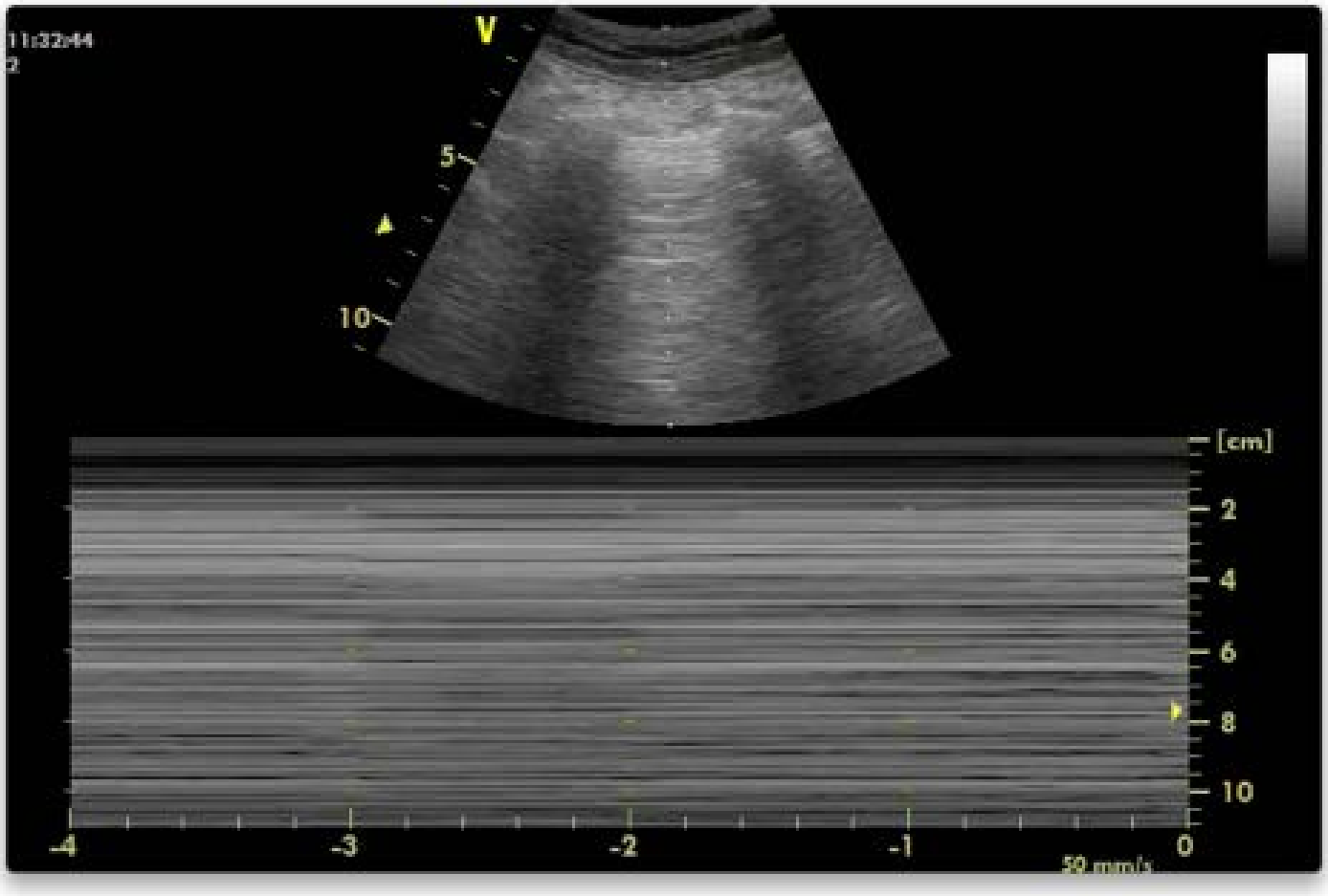
List not exhaustive - taken from Taken from Dunn Emergency Medicine Manual 5th Edition Volume 1 Chp 22 Pg 352 and Cameron Textbook of Adult Emergency Medicine 3rd Edition Section 27.3 Pg 822

A 43 year old man presents with a crush injury to his chest and you perform an eFAST scan.

a. Complete the table below listing which five (5) eFAST views detect pathology within the chest.

b. For each view, describe a positive finding that indicates chest pathology, without repetition of findings. (10 marks)

View	Positive Finding
RUQ	Absence of mirror image, lung curtain, comet tails
LUQ	Spine sign,
Subcostal	Pericardial fluid Right ventricular/atrial collapse
Left Chest	Absence of pleural sliding, Barcode/Stratosphere Sign
Right Chest	Lung point



You record the image above in your scan.

a. What is the name given to this finding? (1 mark)

Barcode/Stratosphere Sign

_____

b. List three possible causes for this finding, commencing with the most likely cause. (3 marks)

Pneumothorax: most likely cause in setting of trauma

_____

Pleural Adhesion: Inflammatory adhesion eg ARDS, Chronic fibrosis

_____

Absence of pleural movement: Apnoea, Atelectasis, Oesophageal intubation, Cardiopulmonary arrest, Phrenic nerve palsy

_____

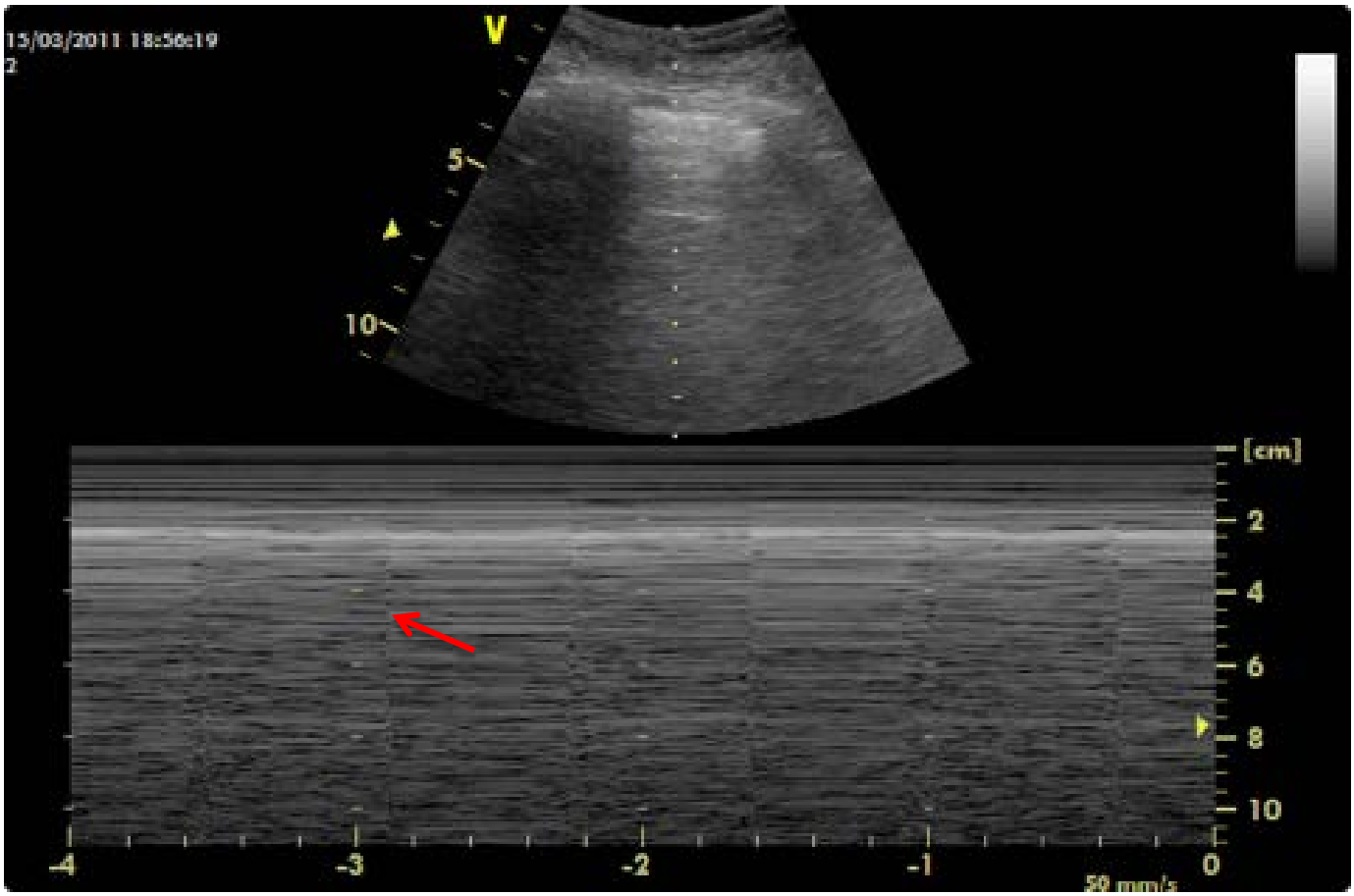
c. How could you use the ultrasound to confirm the most likely finding? (1 mark)

Locate the lung point

or Locate the 'heart point'- differs to lung point Stone MB, Chilstrom M, Chase K, Lichtenstein D. The heart point sign: description of a new ultrasound finding suggesting pneumothorax. Acad Emerg Med. 2010 Nov;17(11):e149-50. doi: 10.1111/j.1553-2712.2009.00660.x. PubMed PMID: 21175508. [Free Full Text]

_____

The following day, your registrar presents you with the image below that she has just taken on an eFAST scan.



d. What is the name and cause of the artefact indicated by the red arrow? (2 marks)

NAME___Lung Pulse / T lines_____

CAUSE_ These lines form a T with the pleural line on M-mode. They are caused by the transmission of cardiac activity through motionless or near motionless lung when sliding is reduced or absent. As transmission through lung is required they rule out a pneumothorax. This phenomenon can be seen on 2D by a tiny amount of pleural sliding in time with the heart beat (but it is much easier to appreciate on M-mode)._____

e. What does this finding indicate? (1 mark)

Absence of pneumothorax_____

SAQ

There have been a number of incidents in your emergency department Short Stay Unit where patients have unexpectedly deteriorated during their stay.

a. What is the role of a Short Stay Unit? (2 Marks)

To manage Emergency Medicine patients who would benefit from extended treatment and observation but have an expected length of stay of less than 24 hours.
Taken from Cameron Textbook of Adult Emergency Medicine 3rd Edition Section 27.2

1 Mark for providing extended care for Emergency Medicine patients
1 Mark for acknowledging an expected length of stay of 24 hour or less

b. How would you develop a solution to this problem ? (4 Marks)

Gather information - 1 Mark
Develop solution plan - 1 Mark
Implement plan - 1 Mark
Audit / Re-collect data - 1 Mark

Note exact wording not essential but plan must include aspects of each of these domains to score maximum marks

c. You have been asked to develop a set of exclusion criteria for your Short Stay Unit. Please list your exclusion criteria ? (4 Marks)

1/2 Mark for each exclusion criteria to maximum of 4 marks.
- *Patients who should be admitted to in-patient wards - complex medical or surgical problems*
- *Multiple problems*
- *Elderly patient*
- *Paediatric patients*
- *Patients without clear management plan / diagnosis*
- *Patients with intensive nursing requirements*
- *Risk to staff patients - psychotic, violent, forensic history*

Taken from Cameron Textbook of Adult Emergency Medicine 3rd Edition Section 26.6

SAQ

You have been asked by the Head of your Emergency Department to give a presentation on Access Block and the National Emergency Access Target (NEAT).

a. What is the definition of Access Block ? (2 Marks)

This refers to the percentage of patients who were admitted or planned for admission but discharged from the emergency department (ED) without reaching an inpatient bed, transferred to another hospital for admission, or died in the ED whose total ED time exceeded 8 hours, during the 6 month time period. Taken from ACEM Policy on Standard Terminology P02v5Dec'14

1 Mark for recognising proportion / percentage of patients who do not reaching in-patient bed
1 Mark for accurate time frame of exceeding 8 hours

b. What is the National Emergency Access Target ? (2 Marks)

The NEAT, introduced in 2012, is an objective of the National Partnership Agreement on Improving Public Hospital Services, and has been set at "90 per cent of all patients presenting to a public hospital ED will either physically leave the ED for admission to hospital, be referred to another hospital for treatment, or be discharged within four hours". Taken from ACEM Policy on Standard Terminology P02v5Dec'14

1 Mark for correct percentage of patients to be admitted.
1 Mark for correct time frame of within 4 hours.

b. Outline potential solutions to improving Access Block & Overcrowding (6 Marks)

2 Solutions to access block and overcrowding

Reducing demand

In the community

- Improved funding of complex care for general practitioners and community providers
- Improved planning for end-of-life care
  - ➢ Mandate for residential care
  - ➢ Improved education of community and providers
- Coordination of community services
  - ➢ Reduce duplication between state, federal and community services
- Integrated and coordinated care of "frequent attenders"
- Hospital outreach — hospital-in-the-home, hospital-in-the-nursing-home, and medical assessment teams

In the emergency department

- Senior decision making (24/7)
- Short-stay units
- Accelerated evidence-based protocols
- Access to consultations and investigations

Balancing demand between elective and emergency programs

Increasing capacity

Emergency department processes

- Fast-tracking
- Laboratory and x-ray turnaround times
- Senior staffing 24/7
- Full capacity protocol (send patients to ward when emergency department is full)

Emergency department beds

- Only to the levels recommended by the Australasian College for Emergency Medicine.

Ward processes

- Whole-of-health-service bed coordination 24/7
  - ➢ Designated bed coordinator
  - ➢ Daily coordination rounds
  - ➢ Improved information technology for bed tracking and demand prediction
  - ➢ Long-stay monitoring
- Clinical inpatient rounds at least daily
- Improved speed of investigations and consultations

Ward beds

- Increase to > 3 acute hospital beds per 1000 population

Improving exit

Ward processes

- Morning discharge
- Weekend discharge
- Improved allied health and pharmacy access
- Better use of transit lounge

Community capacity

- Increased residential aged care beds
- Post-acute care services

Monitoring of acute health sector

- Emergency department processes
- Hospital processes
- Community processes

Non-solutions (unproven to reduce overcrowding)

- Nurse on call
- Ambulatory care clinics
- Ambulance bypass ◆

1 Mark per entry to maximum of 6 marks- a maximum of 3 marks can be given for Emergency Department specific strategies i.e. for full marks must include minimum of 3 hospital or community based strategies. Table taken from Cameron PA, Joseph AP, McCarthy SM. Access block can be managed. MJA 190;7:364-368. April 2009.