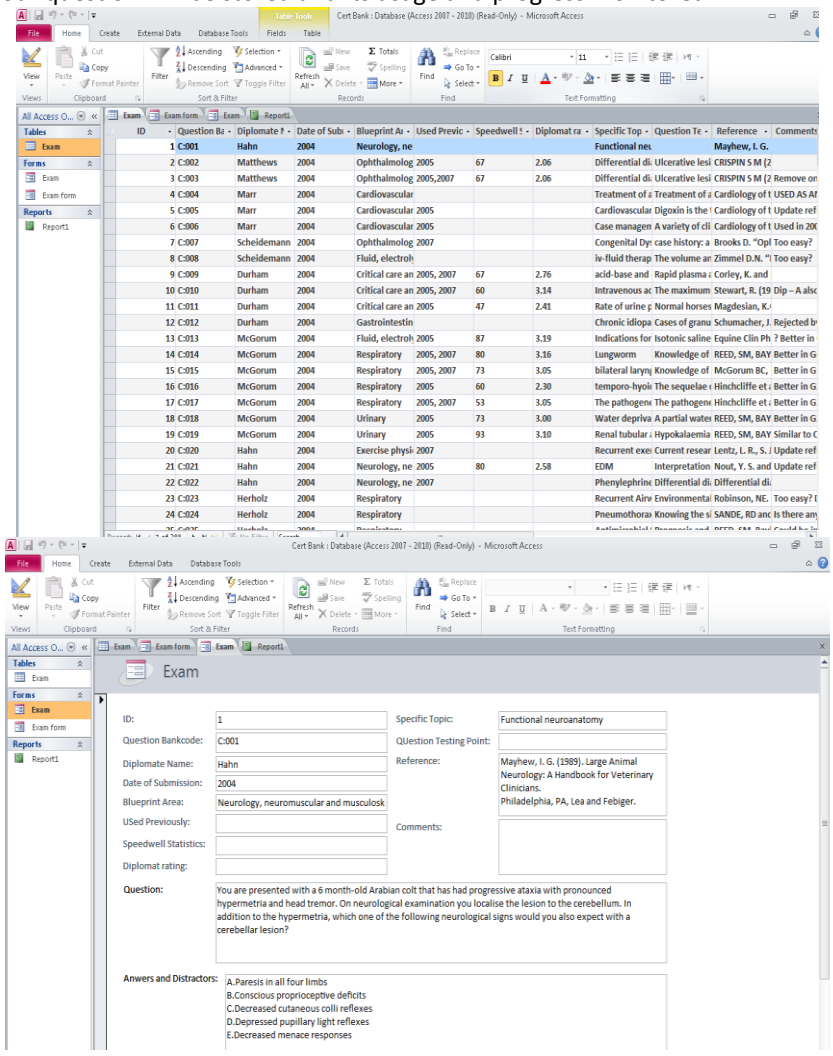
WRITING MCQS: INFORMATION FOR DIPLOMATES

THANK YOU FOR CONTRIBUTING TO THE ECEIM EXAMINATION PROCESS. WHEN SUBMITTING QUESTIONS, PLEASE:

- READ ALL THE GUIDELINES (Including 'Insights on Writing Exam Questions' at the end of the document)
- USE THE MICROSOFT ACCESS OR EXCEL TEMPLATE and label the document with your name e.g 'keen2013-1.adb OR keen2013-1.xls'. Replace the 'Joe Bloggs' example with your question and details . DO NOT ALTER THE HEADINGS. USE A NEW FILE FOR EACH QUESTION.
- If you choose to include a table in your question, please use the MICROSOFT EXCEL TEMPLATE for tables and submit it as a separate file. Label the file with your name and then the suffix 'table' e.g. keen2013-1-table
- If you choose to include an image in your question, please submit it as a jpeg in the highest resolution possible (e.g. 200-300dpi) and label the file with your name and then the suffix 'figure' e.g. keen2013-1-figure
- E-MAIL TO: john.keen@ed.ac.uk
- We may alter your question slightly for a variety of important reasons. Please do not be offended; we value your testing points enormously and our aim is to make each question as useful as possible. See principle #5 below: 'producing good questions is a collaborative effort, and the result is a better exam than could be achieved by the sum of each individual's efforts'.

This is how your question will be stored and its usage and progress monitored:



EXTRACTS FROM PROCEDURES AND GUIDELINES FOR ORGANISATION, PREPARATION AND MAINTENANCE OF STANDARDS AND INTEGRITY OF DIPLOMATE EXAMINATIONS FOR ECEIM

EXAMINATION FORMAT

The examination will consist of General and Certifying Examinations as described in our Constitution. Candidates may sit either the General examination only, or both together (see Training Brochure for details of entry requirements).

GENERAL EXAMINATION

This will consist of entirely of multiple choice questions (MCQ), 50 of which are aimed at testing the candidates' knowledge and understanding of concepts relating to the medical and biological sciences that underpin clinical practice of equine internal medicine (for example pharmacology, microbiology, physiology, pathology, epidemiology, diagnostic imaging). A further 50 MCQ will be aimed at testing the candidates' clinical knowledge and their ability to synthesise this to address clinical problems. A blueprint will be published to the candidates documenting how many MCQ will be assigned to specific body systems and spheres of knowledge within the examination (see below). The General MCQ will be answered in two 2.5 hour sessions thus the candidates will have 3 minutes per question.

CERTIFYING EXAMINATION

This will consist of 3 sections:

1. MCQ aimed at testing the candidates' ability to address clinical problems. Particular emphasis will be given to the candidates' ability to demonstrate clinical judgement when presented with a case scenario. A blueprint will be published to the candidates documenting how many MCQ will be assigned to specific body systems and spheres of knowledge within the examination (see below). 50 MCQ will be answered in 3.5 hours thus the candidates will have 3.6 minutes per question.
2. Essay Section: Candidates previously have been required to answer 2 of 3 essay questions over a period of 3 hours but from 2014 this will change to 2/2 questions.
3. Objective case management section: Candidates will be given clinical information on 2 cases and given 60 minutes to review this information. They will then discuss the cases during two 30 minute sessions with two panels of 2 examiners, one of whom will act as discussant or chairman with a series of pre-determined questions relating to the management of the case. The other will observe. During the presentation, the candidate will be expected to request further diagnostic information and details of response to suggested therapy and this will be provided as appropriate. All candidates will receive the same case material thus provision must be made to prevent contact between candidates who have completed the section and those that are not. Candidates will be given the option of having this section recorded on videotape.

PREPARATION OF EXAMINATION QUESTIONS

Reading these guidelines carefully will significantly reduce the Exam Team's workload in editing the questions to make them suitable for inclusion in the examination

GENERAL GUIDLINES FOR MULTIPLE CHOICE QUESTIONS:

- The questions will be of single best answer format with between 3 distractors (i.e. incorrect options).
- Simple English language and grammar should be employed.
- Use Times New Roman, 10 point
- **Use SI units** and refer to the attached list of normal reference intervals that the candidates will be given access to during the examination. Where the variable you wish to include in your question is not listed on this sheet, please provide a normal range in your question.
- If you wish to include large amounts of lab data, please present this in a table (using the template provided). In order to reduce the number of words in each question, do not provide an interpretation as well as an actual number i.e. use EITHER "there is neutrophilia" OR "the neutrophil count was 12 $x10^9$/l" NOT BOTH.
- Clearly the realities of practice dictate that the selection of diagnostic tests and treatments is often constrained by financial considerations however, for the purposes of this examination, candidates will be told to select their answer on the basis of best medical practice and to assume that there are no specific financial constraints unless they are mentioned within individual questions.
- Regulations on drug use vary across Europe, and this is variable currently as various countries are introducing new legislation. Please take care to avoid questions that are specifically centred on the use of drugs that are not generally available or are considered inappropriate for animals destined to enter the human food chain. In selecting questions, the examination board will attempt to ensure that there is no geographic bias and questions on drugs which are not widely available within some areas of Europe will not be given undue prominence within the examination, although they may be included in a small number of questions.
- It is appropriate to include questions on exotic diseases or important diseases that occur only in certain parts of Europe. In selecting questions, the examination board will ensure that there is no geographic bias and thus, diseases, which do not occur within some areas of Europe, will not be given undue prominence within the examination, although they may be included in a small number of questions

DETAIL TO BE INCLUDED ON THE SUPPLIED MS ACCESS or EXCEL FILE:

DIPLOMATE NAME:
DATE OF SUBMISSION:

PAPER:	General 1/General 2/Certifying
BLUEPRINT AREA:	e.g. respiratory, perinatology etc (see blueprint topics below)
SPECIFIC TOPIC:	e.g. 'pathophysiology of EHV-1'
QUESTION TESTING POINT:	A statement of exactly what knowledge or ability the question is testing….e.g. 'DNApol (ORF30) variants carrying the D752 marker are associated with most outbreaks of herpes virus myeloencephalitis.' You can provide as much explanation as you wish.
REFERENCE	Must be a text or journal paper that is less than 7 years old (see information below); texts from recommended list that are more than 7 years old may be cited.

QUESTION

Basic tips (but see more detailed guidelines below):

- Avoid unnecessary or misleading information.
- For General papers 1 and 2, these should have simple constructions (see examples).
- In the Certifying paper, longer clinical scenarios should be used (see examples).
- Describe clinical scenarios briefly and concentrate on the abnormal findings and use statements such as "no other abnormalities were detected on general physical examination

including rectal palpation" rather than listing all normal findings. Use a similar approach for describing results of diagnostic investigations where possible.

- Use standard international units. The candidates will be given the reference ranges below. Do not provide interpretation of haematology or biochemistry as well as data i.e. do not say "neutrophilia - state the neutrophil count. Use the templates below if you wish to include large amounts of lab data.
- Images can be included provided that they are essential to the question and illustrate something that cannot be easily described in words.
- Do not use negative formats e.g., which of the following is false/least likely to be effective etc.
- Use generic names for all drugs and do not expect candidates to recall specific doses.
- Format clinical problems as:

  (a) Stem – the clinical scenario composed of:
  First paragraph: signalment and presenting complaint
  Second paragraph: physical findings
  Subsequent paragraphs: results of diagnostic investigations.
  (b) Lead line – the specific question to be addressed for example – "**which one of the following is the most appropriate treatmen**t etc."

OPTIONS
Basic tips (but see more detailed document below)

- Avoid unintentional clues e.g. correct answer longer than the others, absolute statements
- Avoid double negatives or complex language
- Provide at least 3 distractors

CORRECT ANSWER Very important to indicate which the correct answer is!!

REFERENCE RANGES FOR ADULT HORSES

(Candidates will be given a copy of these data during the exam together with a calculator should they wish to convert the data to other units that they are more familiar with)

	SI Units	Reference Range	Multiplication Factor to convert SI to other units
HAEMATOLOGY			
White blood cells	x 10^9/l	5.5–12.1	1, x 10^3/μl
Segmented neutrophils	x 10^9/l	2.9–8.5	1, x 10^3/μl
Band neutrophils	x 10^9/l	0–0.1	1, x 10^3/μl
Lymphocytes	x 10^9/l	1.16- 5.1	1, x 10^3/μl
Monocytes	x 10^9/l	0 – 0.7	1, x 10^3/μl
Eosinophils	x 10^9/l	0–0.8	1, x 10^3/μl
Basophils	x 10^9/l	0–0.3	1, x 10^3/μl
Red blood cells	x 10^{12}/l	6– 10.4	1, x 10^6/μl
Packed cell volume	L/L	0.30–0.45	100, %
Haemoglobin	g/L	101–161	0.1, g/dl
Mean corpuscular volume	fl	37-49	Same
Mean corpuscular haemoglobin concentration	g/L	353-393	0.1, g/dl
Mean corpuscular haemoglobin	pg	13.7-18.2	same
Platelets	x 10^9/l	117-256	1, x 10^3/μl
CLOTTING PROFILE			
Prothrombin time	sec	8.2-11	
Activated partial thromboplastin time	sec	30-50	

Fibrinogen degradation products	μg/ml	0-16	
Antithrombin III	%	75- 26	
SERUM PROTEINS			
Total Protein	g/L	53-73	0.1, g/dl
Albumin	g/L	29-41	0.1, g/dl
Globulin	g/L	18-38	0.1, g/dl
Alpha 1 globulin	g/L	0.4-2.0	0.1, g/dl
Alpha 2 globulin	g/L	3.2-8.4	0.1, g/dl
Beta 1 globulin	g/L	4.0-10.8	0.1, g/dl
Beta 2 globulin	g/L	1.7-8.9	0.1, g/dl
Gamma globulin	g/L	4.6-13.4	0.1, g/dl
Plasma fibrinogen	g/L	0.3-3.9	100, mg/dl
Serum amyloid A	mg/L	0-20	
SERUM ENZYME ACTIVITIES			
Aspartate amino transferase	iu/L	102-350	same
Creatinine kinase	iu/L	110-250	same
Lactate dehydrogenase	iu/L	225-700	same
Gamma-glutamyl transferase	iu/L	1-40	same
Glutamate dehydrogenase	iu/L	1-10	same
Serum alkaline phosphatase	iu/L	147-261	same

Intestinal alkaline. phosphatase	iu/L	13-87	same
Sorbitol dehydrogenase	iu/L	3 - 14	same
OTHER BIOCHEMICAL PARAMETERS			
Urea nitrogen	mmol/L	2.5-10.0	2.8, mg/dl
Creatinine	μmol/L	85-165	0.0113, mg/dl
Glucose	mmol/L	4.3-5.5	18, mg/dl
Total bilirubin	μmol/L	1.7-42.8	0.0585, mg/dl
Direct (conjugated) bilirubin	μmol/L	1.7-5.1	0.0585, mg/dl
Indirect (unconjugated) bilirubin	μmol/L	0 – 37.6	0.0585, mg/dl
Bile acids	μmol/L	1-8.5	same
Triglycerides	mmol/L	0.2-1.2	
Cortisol	mmol/L	71-165	0.0362, μg/dl
Fasting Insulin	μiu/ml	8.0-47.5	
Tri-iodothyronine (T_3)	nmol/L	0.48-1.46	65.1, ng/dl
Thyroxine (T_4)	nmol/L	7.7-42.8	0.0777, μg/dl
Cardiac Troponin	ng/ml	0.05-0.2	
Selenium	μmol/L	0.7-8.4	
Serum iron	μmol/L	13 - 25	5.58, μg/dl
Total iron-binding capacity	μmol/L	48-72	5.58, μg/dl
Serum Calcium	mmol/L	2.9-3.3	4.01, mg/dl
Fractional urinary clearance calcium	%	2.6-15.5	
Serum Phosphate	mmol/L	0.9-1.9	3.1, mg/dl
Fractional urinary clearance phosphate	%	0.02-0.53	
Serum Magnesium	mmol/L	0.6-1.0	2.43, mEq/L
Fractional urinary clearance	%	3.8-21.9	
Serum Sodium	mmol/L	134-142	1, mEq/L
Fractional urinary clearance	%	0.02-1.0	
Serum Potassium	mmol/L	3.0-5.0	1, mEq/L
Fractional urinary clearance	%	15-65	
Serum Chloride	mmol/L	95-103	1, mEq/L
Fractional urinary clearance	%	0.04-1.6	
Serum osmolality	mOsmol/kg	270-300	same
BLOOD GAS ANALYSIS			
Arterial pH		7.347-7.475	
Venous pH		8.345-7.433	
Arterial partial pressure of oxygen	mm Hg	80-112	1, torr
Venous partial pressure of oxygen	mm Hg	37-56	1, torr
Arterial partial pressure of carbon dioxide	mm Hg	36-46	1, torr
Venous partial pressure of carbon dioxide	mm Hg	38-48	1, torr
Bicarbonate	mmol/L	22-29	1, mEq/l
Anion gap	mmol/L	7-15	
Lactate (resting)	mmol/L	< 2	

BLUEPRINT FOR MCQ SECTIONS

SYSTEM/SPHERE OF KNOWLEDGE (BLUEPRINT AREA)	GENERAL 1 BIOLOGICAL & MEDICAL SCIENCES	GENERAL 2 CLINICAL SCIENCES	CERTIFYING CLINICAL PROBLEMS
Behaviour	2	-	-
Cardiovascular	2	3	3
Clinical Pathology*	3	-	-
Critical Care & emergency medicine	-	3	3
Dermatology	2	3	3
Diagnostic Imaging*	2	-	-
Epidemiology and medical statistics*	4	-	-
Endocrinology, metabolic & hepatic	3	4	4
Exercise Physiology & sports medicine	2	-	3
Fluid, electrolyte and acid-base balance	-	3	3
Gastrointestinal	3	7	7
Genetics & molecular biology*	4	-	-
Haemolymphatic		4	3
Immunology*	3	-	-
Infectious disease & microbiology*	5	3	1
Neurology, neuromuscular, & musculoskeletal	1	4	3
Nutrition*	3	-	-
Ophthalmology		3	3
Parasitology*	3		1
Perinatology*		3	3
Pharmacology & toxicology*	4	-	-
Respiratory	3	7	7
Urinary	1	3	3
Total	50	50	50

* Elements of these disciplines will be incorporated into the clinical questions and problems relating to the various body systems.

SOME EXAMPLES OF MCQS

Example1: test of knowledge of pathophysiology suitable for General Section 1

DIPLOMATE NAME:	
DATE OF SUBMISSION:	June 2004
PAPER:	General 1
BLUEPRINT AREA:	Neurology
SPECIFIC TOPIC:	Pathogenesis of botulism & tetanus
QUESTION TESTING POINT:	The main toxins of botulism and tetanus are similar although they exert effects that appear to be opposites due to differences in binding sites.
REFERENCE	REED, SM, BAYLY, WM, SELLON, DC, 2004 Equine Internal Medicine, 2nd Edition, WB Saunders, p 64.

QUESTION
Which one of the following statements most accurately describes the action of botulinum and tetanus neurotoxins?

OPTIONS

A. Botulinum and tetanus neurotoxins block the action of acetylcholinesterase at the synapse.
B. Botulinum neurotoxin augments the action of acetylcholinesterase at the synapse, while tetanus neurotoxin blocks the activity of acetylcholinesterase at the synapse.
C. Botulinum and tetanus neurotoxins inhibit exocytosis of neurotransmitters from presynaptic nerve terminals.
D. Botulinum and tetanus neurotoxins stimulate exocytosis of neurotransmitters from presynaptic nerve terminals

CORRECT ANSWER D

Example 2: synthesis of knowledge of diagnosis of disease suitable for General Paper 2

DIPLOMATE NAME:
DATE OF SUBMISSION: June 2004
PAPER: General 2
BLUEPRINT AREA: Endocrinology/metabolic/hepatic
SPECIFIC TOPIC: Diagnosis of biliary disease

QUESTION TESTING POINT: Complete choleostasis is typified by increases in total and direct bilirubin, urine bilirubin but negative urine urobilinogen; extra-hepatic biliary obstructions usually have conjugated bilirubin of less than 50% of serum total bilirubin; none of these changes individually is specific to choleostasis.

REFERENCE Duncan, Prasse, Mahaffey, Veterinary Laboratory Medicine, Iowa State University Press, 1994, p130.

QUESTION
Which one of the following sets of laboratory data would you expect to find in a horse that has a mass causing obstruction of the common bile duct?

OPTIONS

	Packed Cell Volume (l/l)	Serum Haemoglobin (g/dl)	Serum total bilirubin (µmol/l)	Serum direct bilirubin (µmol/l)	Urine Bilirubin	Urine urobilinogen
A	0.27	9	100	80	+	-
B	0.32	10.6	40	4	-	-
C	0.12	5.2	160	80	+	+
D	0.32	10.6	100	4	-	+

CORRECT ANSWER A

Example 3: test of clinical judgement suitable for Certifying Exam

DIPLOMATE NAME:	
DATE OF SUBMISSION:	June 2004
PAPER:	Certifying
BLUEPRINT AREA:	Cardiology
SPECIFIC TOPIC:	Complication of quinidine sulphate therapy
QUESTION TESTING POINT:	Horses that have atrial fibrillation of prolonged duration complicated by AV valve insufficiency are at increased risk of developing extra-cardiac signs of quinidine toxicity, notably diarrhoea whereas in horses with short duration AF, idiosyncratic reactions, notably arrhythmias are more common particularly in horses with hypomagnesaemia
REFERENCE	Cardiology of the Horse, Marr, WB Saunders, 1999, p 186-197

QUESTION

You are presented with a 4 year old Thoroughbred colt used for racing. He performed disappointingly during a race 3 days ago while his performance he had raced successfully two weeks prior to that.

The horse is in good condition with a normal demeanour. The heart rate is within normal limits but there is an arrhythmia. No other abnormalities are detected on general physical examination.

Electrocardiography confirms atrial fibrillation with a ventricular rate of 40/min. Echocardiography demonstrates no valvular insufficiency and the cardiac dimensions are normal. A complete blood count demonstrated no significant abnormalities except that the horse had a total serum magnesium concentration of 0.38 mmol/l.

Which one of the following potential side effects of quinidine sulphate, administered via a nasogastric tube, is this horse is most likely to develop?

OPTIONS

A. Urticaria
B. Laminitis
C. Ventricular arrhythmias
D. Diarrhoea

CORRECT ANSWER C

Below is the READING information that has previously been given to examination candidates which includes a list of textbooks and journals from which Diplomates are encouraged to use as references for their questions. These have subsequently been expanded and will likely be expanded further for future examinations.

GENERAL COMMENTS ON EXAM PREPARATION.

The entire examination will emphasize information taken from the current veterinary literature. Selected information will also be taken from the current human and general biomedical literature. With respect to the veterinary literature, current veterinary textbooks and papers published in refereed journals should be the primary study area. Candidates are advised to prepare for the examination by a systematic review of recent textbooks and periodicals. Your mentors can help you select appropriate study material. WE CANNOT DEFINE CONCLUSIVELY THE BODY OF KNOWLEDGE NECESSARY TO PASS THIS EXAMINATION – the following list is ONLY A GUIDELINE.

Textbooks:

Equine Internal Medicine 2nd Edition (Reed, Bayly, Sellon)
Equine Medicine and Surgery (Merritt, Moore, Mayhew et al)
Current Therapy in Equine Medicine I – 6 (Robinson)
Large Animal Internal Medicine (Smith)
Equine Sports Medicine and Surgery (Hinchcliff et al)
Clinical Biochemistry of Domestic Animals (Kaneko)
A current textbook in physiology (e.g. Guyton and Hall or Ganong)
Clinical Physiology of Acid-base and electrolyte disorders
A current textbook in immunology (e.g. Roitt or Tizard)
Large Animal Neurology (Mayhew)
Veterinary neuroanatomy and clinical neurology (DeLahunta)
The Pharmacological basis of Therapeutics (Goodman and Gilman)
Veterinary Drug Handbook (Plumb)
Respiratory Physiology (West)
Veterinary Laboratory Medicine (Duncan, Prasse, Mahaffey)
Veterinary Clinical Epidemiology (Smith), or Veterinary Epidemiology (Thrusfield)
Equine Diagnostic Ultrasound (Reef)
Manual of Equine Gastroenterology (Mair, Divers Ducharme)
Equine Respiratory Medicine and Surgery (McGorum, Dixon, Robinson, Schumacher)
Equine Emergencies (Orsini and Divers)
Equine Infectious Diseases (Sellon and Long)
Equine Neonatal Medicine (Paradis)
Equine Neurology (Reed and Furr)
Diagnostic Techniques in Equine Medicine (Taylor, Brazil and Hillyer)
The Equine Hospital Manual (Corley and Stephen)
Color Atlas of Diseases and Disorders of the Foal (McAuliffe and Slovis)

Journals

Journal of Veterinary Internal Medicine
Equine Veterinary Journal
Journal of the American Veterinary Medical Association
American Journal of Veterinary Research
Compendium of Continuing Education for the practising veterinarian
Veterinary Clinics of North America
Equine Veterinary Education
New England Journal of Medicine (major review articles)
Veterinary Record
Veterinary Journal
ACVIM and AAEP Proceedings (recent years)

Insights on Writing Examination Questions

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The American Board of Internal Medicine (ABIM) tests approximately 25,000 candidates a year for certification in internal medicine or its subspecialties. Since 1996, all ABIM exams have asked for the single best answer, in a format known as the "A-type" question.

In this session, we will discuss the principles of the good test question and the strategies for constructing one. Throughout, we will reference the "American Board of Internal Medicine Question-Writing Guidelines," which can be found in the section for Diplomates on the ACVIM website.

Principle #1: Follow a specific question-writing plan

• Choose a testing point.

Successful question writers start by surveying the general content domain for any given writing assignment and then listing specific content areas within that domain. The specific areas are then ranked in order of importance. For example, areas in which practice has recently changed can be highlighted for special attention, or areas seen with greatest frequency can be marked for needing more than one question.

After an area is selected, the writer needs to identify and write out the exact testing point. For example, in cardiology, under the general content domain of "Hypertension," the specific content area could be "Management of isolated systolic hypertension" with a testing point being "Thiazide diuretics should be the initial treatment for uncomplicated systolic hypertension."

• Choose the cognitive ability to be tested

In this writing plan, there are three types of cognitive ability. The first is knowledge, which tests a candidate's recall of facts. Knowledge questions are short and are easy to write, but they do not test clinical skills and fail to supply information about how an examinee uses the knowledge in practice. Few questions should be of this type.

The second cognitive ability, synthesis, tests not only recall but also interpretation of facts. This is most useful in diagnostic problems, although the examinee is not asked to assess severity of a condition or to act on its treatment. A minority of questions should be of this type.

The third cognitive ability is judgment, which tests recall, interpretation, and decision-making skills. These questions best simulate practice, and most questions should be of this type.

• Choose the cognitive task

The cognitive task is posed in the question line, called the "lead line.". For medical questions, here are some specific cognitive tasks:

> <u>Diagnostic inference / Differential diagnosis</u>:
> Which of the following is the most likely diagnosis?
> Which of the following best explains this patient's current symptoms?

Clinical features:
Which of the following clinical manifestations is most likely to occur in this patient's illness?

Diagnostic testing:
Which of the following will best document the source of this patient's symptoms?
Which of the following laboratory studies should you order next?

Natural history / Epidemiology:
This patient is at the greatest risk for the development of which of the following?
Which of the following best predicts the development of [disease named] in a patient who has [condition named]?

Treatment:
Which of the following is most likely to correct this patient's problem?
Which of the following drugs [or therapeutic interventions] should you order?

Management decision:
Which of the following should you do next [or now]?
Which of the following is the best management plan?

Pathophysiology / Basic science:
Gram stain of the causative organism is most likely to reveal which of the following?
Which of the following is the best explanation for this patient's poor response to therapy?

Interpretation of literature / Statistical methods:
Which of the following is the best interpretation of these data?

• Write the specific "lead line," the correct answer, and three or four distractors

Choosing the distractors is probably the most difficult part of writing a test question. Distractors may be partially correct, but they are not the best answer of the choices given. Distractors should be realistic choices that might be considered for the question posed but may reflect a common misconception, an outdated belief, or an idea that is commonly confused with the real answer. A question without adequate distractors is a question that will not work, regardless of its realistic scenario or its important content.

• Add a rationale for the question, with references

A short paragraph explaining the testing point and a list of references helps the committee reviewing the question.

• Finally, write the clinical stem

When the lead line, answer, and distractors are in place, they give an outline to the structure of the patient-based clinical scenario.

Principle #2: Avoid the common pitfalls

• Presenting a real case

Clinical stems are convenient fictions, not reflections of real-world ambiguity. The test is an evaluative instrument, not a pedagogical one, so a good test writer abstracts a principle from an interesting case and writes a question to test that principle.

- **Writing the stem before determining the testing point**

This pitfall often happens if a real case is presented. After the scenario is written, there may be no question to ask about it. Regardless, unnecessary information is sure to be part of the stem if it is written without a clear testing point and reasonable distractors.

- **Adding unnecessary or misleading information**

The purpose of the exam is to determine the excellent candidates, not to trick them, and all information in a stem should serve the purpose of the question.

- **Testing more than one point**

Two-part answers may be partly right and partly wrong, which can lead to confusion and error. When a question tests more than one point, measurement information is confounded.

- **Embedding irrelevant clues to the correct answer**

In some poorly written questions, the correct answer is too attractive to resist because it is blatantly obvious or it goes into excessive detail. The test-savvy candidate learns that the longest option is often the right one! Conversely, the distractors can be too implausible to select because they are obviously wrong or are too similar to each other. If the distractors include two drugs of the same class, chances are that both are wrong answers.

- **Using flawed question formats**

Negative questions (e.g., Which of the following is LEAST likely to occur? All EXCEPT which of the following is true?) create confusion by making the examinee switch from thinking about the correct choice to choosing the worst choice. These questions are easy to write, but they are sometimes answered incorrectly simply because they are confusing.

True/False questions (e.g., Which of the following statements is correct?) test multiple points in one question and provide no clear task for the examinee, who has to switch thinking from option to option to figure out which one is correct.

A "none of the above" question is imprecise, because this answer can be chosen for the wrong reason. The test writer cannot be certain just what the examinee is thinking when "none of the above" is chosen as a correct answer.

An "all of the above" question increases the probability of guessing the right answer, because when one distractor is obviously wrong, the "none of the above" is wrong, too.

Principle # 3: Review, reflect, and rewrite

After a question is written, it should be set aside for a bit and then re-read from the examinee's perspective. Does the stem set up the question in the lead? Is the answer correct and evidence-based? Are the distractors plausible? The question should be edited to remove unnecessary words, and it should be shared with a writing partner for a new perspective.

Principle #4: Let go of ego and ownership

A good question writer knows that her questions are not her children, they belong to the test committee. If sound, the testing point should be protected, not the vehicle for testing it. A question writer is open to challenges of the content of questions and lets the literature arbitrate. Finally, committee members should collaborate to make everyone's questions better.

Principle #5: The goal is a good examination

Producing good questions is a collaborative effort, and the result is a better exam than could be achieved by the sum of each individual's efforts. The reward for the question writer is having participated in setting a fair and valid standard for certification.