Evolución del National Board of Medical Examiners en E.U.A.: Retos y Logros

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National Board of Medical Examiners

Philadelphia

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Overview of Presentation

- Background on the National Board of Medical Examiners (NBME)
- Evolution of the NBME Certifying Examinations into the current USMLE
- Other NBME programs and services
 - Subject Examinations
 - Self-Assessment Examinations
 - International Activities
- Question-and-Answer Session

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National Board of Medical Examiners (NBME)

- Independent, not-for-profit organization
- Founded in 1915
 to meet the need
 for a national
 standard for medical licensing
- licensing
- Staff of 350 located in Philadelphia
- Mission: "To protect the health of the public through state of the art assessment"



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Services for Health Professions Organizations

- Certification Exams
- Recertification Exams
- In-training Exams
- Self-assessments

- Item and Test Development
- Test Administration
- Test Analysis
- Scoring and Score Reporting
- Consultation
- Research



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Services for Health Professions Organizations

American Board of Medical Specialties



- Dermatology
- Medical Genetics
- Neurosurgery
- Ophthalmology
- Orthopaedic Surgery
- Plastic Surgery

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Services for Health Professions Organizations

Other Health Professions

- American Board of Physical Therapy Specialties
- American Association of Medical Assistants
- National Board of Public Health Examiners
- National Commission on Certification of Physician Assistants
- National Board of Veterinary Medical Examiners

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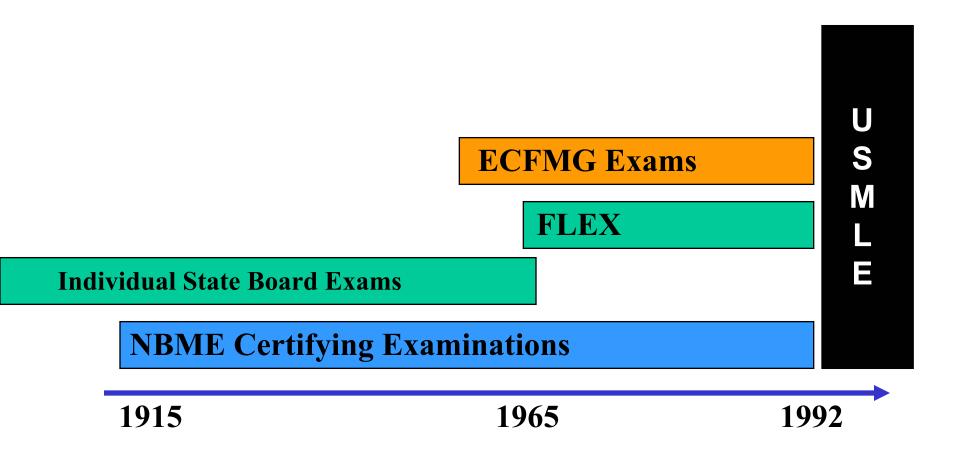
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Evolution of the NBME Certifying Examinations into the Current USMLE

1915	Five-day integrated examination including essay, oral, bedside and laboratory components
1922	Three-part NBME Certification introduced Part I - Basic sciences (essay examination) Part II - Clinical sciences (essay examination) Part III - Bedside oral examination
1953	Parts I and II converted to MCQ format Part III remains an oral examination
1964	Part III converted to an objective exam, using film clips (briefly), visual materials, PMPs
1989	IMGs allowed to sit for Part Examinations
1992	USMLE begins – Steps 1, 2 and 3
1999	Computer-based testing begins
2004	Step 2 Clinical Skills examination introduced

Licensing Examinations in the US



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USMLE Mission Statement

USMLE assesses a physician's ability to apply knowledge, concepts, and principles, and to demonstrate fundamental patient-centered skills that are important in health and disease and that constitute the basis of safe and effective patient care.

USMLE is a joint program of the Federation of State Medical Boards and the National Board of Medical Examiners

Purpose of Step 1

Step 1 assesses whether you understand and can apply important concepts of the sciences basic to the practice of medicine, with special emphasis on principles and mechanisms underlying health, disease, and modes of therapy.

Step 1 ensures mastery of not only the sciences that provide a **foundation for the safe and competent practice** of medicine in the present, but also the **scientific principles required for maintenance of competence** through lifelong learning.

Step 1: Content and Structure

- Item-writing committees organized by discipline (eg, gross anatomy & embryology, physiology, microbiology), but interdisciplinary membership
- Test forms assembled according to an integrated (non-disciplinary) content outline; emphasis on integrative items
- Amount of coverage varies across disciplines; more coverage of Year 2 topics
- Emphasis on testing application of knowledge; 60% of items framed as patient vignettes

Guidelines for Writing Step 1 Items

- Test application of knowledge using experimental and clinical vignettes
- Focus items on key concepts and principles that are essential information (without access to references) for all examinees to understand
- Test material relevant to learning in clinical clerkships, graduate medical education, and beyond
- Avoid items that only require recall of isolated facts
- Avoid esoteric or just interesting topics that are not essential

Recall of Basic Science Facts vs Application of Basic Science Knowledge

Basic Science Recall Item:

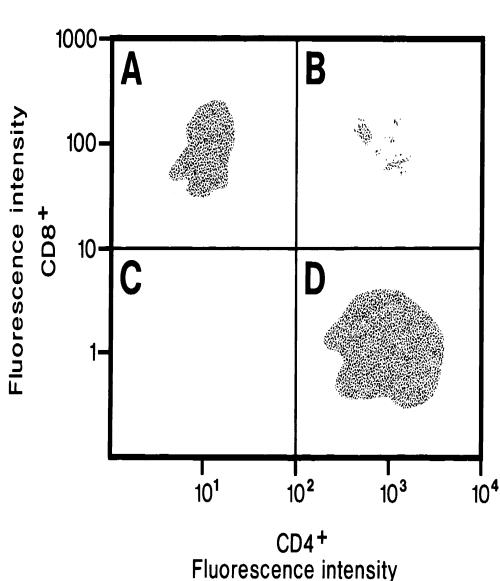
Which of the following areas is supplied with blood by the posterior inferior cerebellar artery?

Basic Science Application Item:

A 62-year-old man develops left-sided limb ataxia, Horner's syndrome, nystagmus, and loss of appreciation of facial pain and temperature sensation. Which of the following arteries is most likely to be occluded?

Sample Step 1 Item: Experimental Vignette

Flow cytometric data of T lymphocytes stained with fluorescent antibody to CD4+ and CD8+ antigens from a healthy person are shown. Lymphocytes from which quadrant will respond the most vigorously to immunization with the hepatitis A virus vaccine?



Purpose of Step 2

Step 2 assesses whether the examinee can apply medical knowledge, skills, and understanding of clinical science essential for the **provision of patient care under supervision** and includes emphasis on health promotion and disease prevention.

Step 2 ensures that due attention is devoted to **principles of clinical sciences and basic patient-centered skills** that provide the foundation for the safe and competent practice of medicine.

Guidelines for Writing Items for Step 2 Clinical Knowledge (CK)

- Test application of knowledge using clinical vignettes, rather than just recall of isolated facts
- Focus on clinical situations that either occur frequently or are critically important
- Pose clinical decisions that would be expected of an examinee at next level of training (new intern), regardless of specialty (eg, good consumer of surgeons; psychiatric problems that present in primary care)
- Focus on relevant tasks: for some topics, this may be synthesizing patient information to arrive at a diagnosis; for other topics, it may be deciding on the next step in patient care, etc

Step 2 CK Content and Structure

- Item-writing committees organized by specialty (internal medicine, ambulatory medicine, surgery, obstetrics & gynecology, pediatrics, psychiatry)
- Test forms assembled according to integrated content outline that organizes clinical science material by organ system and physician task
- Virtually all items are framed in a patient context and require examinees to perform some clinical task (eg, reach a diagnosis, indicate next step in workup or management)

Sample Step 2 CK Item: Diagnosis

A previously healthy 67-year-old woman comes to the physician because of fever, moderate left-sided abdominal and pelvic discomfort, and loose stools containing mucus over the past two days. Her Ttemperature is 38.5 C (101.3 F). Examination of the abdomen shows moderate tenderness that is most pronounced in the left lower quadrant and pelvis. There is no guarding or rebound. Bowel sounds are hypoactive. A 3-cm, tender abdominal mass is palpated in the left lower quadrant. Rectal examination shows no abnormalities. Test of the stool for occult blood is positive. Her leukocyte count is 13,000/mm³ (45% segmented neutrophils, 5% bands, and 50% lymphocytes). An x-ray film of the abdomen shows distended loops of bowel.

Sample Step 2 CK Item: Diagnosis

Which of the following is the most likely diagnosis?

- A. Appendicitis
- B. Colorectal carcinoma
- C. Diverticulitis
- D. Inflammatory bowel disease
- E. Pancreatitis
- F. Tubo-ovarian abscess

Testing Recall vs Application of Knowledge MCQs as Low-Fidelity Clinical Simulations

Recall Version

What is arterial blood gas analysis most likely to show in patients with cardiogenic shock?

- A. Hypoxemia with normal pH
- B. Metabolic acidosis
- C. Metabolic alkalosis
- D. Respiratory acidosis
- E. Respiratory alkalosis

Application Version → (same option list)

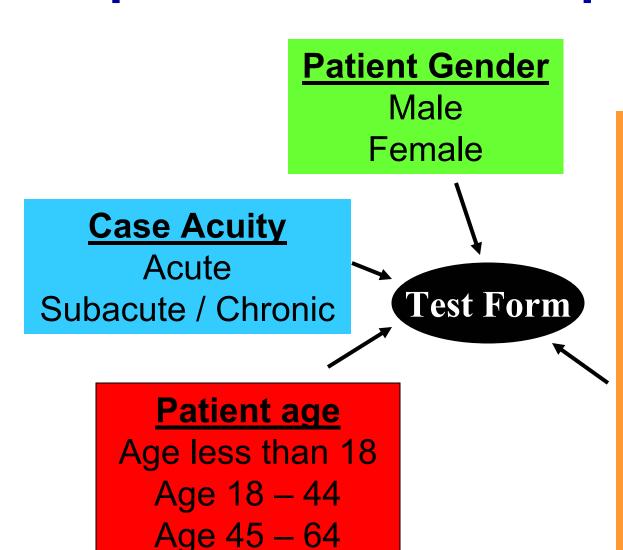
A 74-year-old woman is brought to the emergency department because of crushing chest pain. She is restless, confused, and diaphoretic. On admission, temperature is 36.7 C, blood pressure is 148/78 mm Hg, pulse is 90/min, and respirations are 24/min. During the next hour, she becomes increasingly stuporous, blood pressure decreases to 80/40 mm Hg, pulse increases to 120/min, and respirations increase to 40/min. Her skin is cool and clammy. An ECG shows sinus rhythm and 4 mm of ST segment elevation in leads V₂ through V₆. Arterial blood gas analysis is most likely to show which of the following?

Purpose of Step 2 and the Step 2 Clinical Skills (CS) Exam

Step 2 CS focuses on the mastery of basic patient-centered clinical and communication skills that provide the foundation for the safe and effective practice of medicine

Step 2 CS is jointly developed by the National Board of Medical Examiners and Educational Commission for Foreign Medical Graduates (ECFMG); it is administered throughout the year at five regional centers managed by ECFMG

Step 2 CS: Exam Blueprint



Age 65 +

Case Content Cardiovascular Respiratory Gastrointestinal Musculoskeletal Constitutional Neurological **Psychiatric** Genitourinary Women's health Other / multisystem

Step 2 CS: Exam Structure

- Introduced in June 2004 (successor to ECFMG Clinical Skills Assessment)
- Required for US and international medical students graduating in 2005 or later
- 30,000+ tested annually at five regional centers operated jointly with ECFMG
- Six-hour, OSCE-style test administration with 12 (25-minute) stations, each involving an SP
- Assesses examinees' proficiency in data gathering, recording patient information in a chart, interpersonal skills, and spoken English

 -25

Step 2 CS Station Structure: The SP Encounter

Fifteen minutes to:

- Read doorway information
- Interact with SP, taking relevant history and performing focused physical examination
 - no rectal, pelvic, genital, female breast exams
- Discuss diagnostic impression and diagnostic plan with the patient
- Address patient's questions, concerns
- Five-minute and final signals
- May leave before 15 minutes, but may not return

Step 2 CS Station Structure: The Patient (SOAP) Note

Ten minutes to:

- Record pertinent positives and negatives from history and physical examination
- Record a differential diagnosis (up to five diagnoses)
- Record a diagnostic workup plan (up to five studies)
- Notes can be handwritten or entered into a computer

While the examinee completes a SOAP note, the SP documents history and physical findings obtained and rates Communication & Interpersonal Skills and Spoken English Proficiency_____

Step 2 CS Scoring and Score Reporting Score Components

- Integrated Clinical Encounter (ICE)
 - Data gathering: History and physical examination
 - Patient Note
- Communication / Interpersonal Skills (CIS)
 - Interviewing skills
 - Information-sharing skills
 - Professional manner and rapport
- Spoken English Proficiency (SEP)
 - Listener effort, examinee pronunciation, word choice

All scores except the Patient Note are based on documents completed by the SP; Notes are graded by physicians

Step 2 CS Scoring and Score Reporting Pass/Fail Standards (Multiple Hurdles)

- In order to pass Step 2 CS, examinees must pass all three components on the same attempt:
 - Integrated Clinical Encounter (ICE)
 - Communication / Interpersonal Skills (CIS)
 - Spoken English Proficiency (SEP)
- Examinees that fail and then retake:
 - Reassessed in all three components
 - Must pass all three

Purpose of Step 3

Step 3 assesses whether you can apply medical knowledge and understanding of biomedical and clinical science essential for the **unsupervised practice of medicine**, with emphasis on patient management in ambulatory settings.

Step 3 provides a final assessment of physicians assuming independent responsibility for delivering general medical care.

General Undifferentiated Medical Practice ("GUMP")

Step 3 Content and Structure

- Item-writing committees are interdisciplinary
- Step 3 blueprint organized along two principal dimensions: clinical encounter frames (Initial Workups, Continued Care, Urgent Care) and physician tasks
- Test forms presented in blocks organized by setting (Office, Hospital, ED)
- Emphasis on management of known patients
- Emphasis on ambulatory settings
- Inclusion of 9 computer-based clinical simulations (CCS) to measure decision-making skills -31

Guidelines for Step 3 Items

- Test application of knowledge using patientcentered vignettes
- Focus on relevant clinical situations that either occur frequently or are critically important
- Pose clinical decisions that would be expected of general undifferentiated medical practitioners ("GUMP")
- Focus on relevant tasks: for some topics, this may be synthesizing patient information to arrive at a diagnosis; for other topics, it may be deciding on the next step in patient care, etc -32

Sample Step 3 Item: Management

A 1-month-old infant is brought to the office for her first wellcare visit. She was delivered at term and weighed 3500 g. Apgars were 8 and 9. She was discharged from the nursery at 36 hrs of age and has been nursing every 2 to 3 hrs. Exam shows a happy and content infant with good muscle tone and color. She is at the 25th percentile for length, 50th percentile for weight, and 75th percentile for head circumference. T is 37.0 C. The anterior fontanel is soft and open; tympanic membranes are normal. Lungs are clear. Heart rate and rhythm are regular with no murmur. The abdomen is soft and nondistended. The spine appears to curve to the left at the midthoracic region. There is a 1 x 1.5-cm, hyperpigmented, hairy patch of skin over the mid-thoracic spine. Genitalia are normal. X-rays of the chest and back show a unilateral unsegmented bar at T5 and T6, with a 7-degree curvature?

Sample Step 3 Item: Management

Which of the following is the most appropriate next step in management?

- A. ^{99m}Technetium bone scan
- B. Chromosomal studies
- C. Referral to pediatric orthopaedist
- D. Repeat x-ray films in 6 months
- E. Application of spica cast

Step 3: Computer-based Clinical Simulations (CCS)

- Simulation of the passage of time
- Free text entry of orders
 - Recognition of 1000s of diagnostic and therapeutic orders (and synonyms for those orders)
 - No cueing of examinees
- Realistic responses to examinees' patient management strategies
 - Dynamic model of patient's disease process
 - Simulated clinical facilities (complete with "nurses")
- Scoring based on statistical models of expert judgments of examinee performance

Comparison of USMLE Components

			Step 2			
		Step 1	CK	CS	Step 3	
Eligibility requirements		Medical student/graduate			Graduate* Pass 1&2	
Test admin		Offered year-round; 3 attempts/year				
Test length (days)		1	1	1	2	
	MCQ items	350	368		480	
Format	SP stations			12		
	CCS cases				9	

^{*}GME requirements vary by jurisdiction

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Performance on USMLE in 2005

			Step 2		
	Group	Step 1	CK	CS	Step 3
	US/Can	19600	18200	17000	17000
# tested	IMGs	19400	14900	15100	12000
	Total	39000	33000	32100	29000
% passing	US/Can	93	94	98	96
(1st takers*)	IMGs	68	77	85	75

^{*}Ultimately, 99+% of examinees from LCME-accredited schools in the US pass each Step component

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NBME Subject Exam Program: Mission

Serve the assessment needs of medical schools by providing high-quality assessment tools, information and assistance to medical educators

NBME Subject Exam Program:

- High-quality, USMLE-like items that have been carefully reviewed and pretested
- Items written by a "national faculty" (USMLE Test Committees)
- Draft test forms reviewed and revised by faculty members at multiple schools
- National norms and comparative information are available for students at the same stage of training
- Used by many medical schools as end-of-course and end-of-clerkship exams

NBME Subject Exam Program: Basic Science Examinations

- Gross Anatomy (+/-Embryology, Developmental Biology)
- Histology & Cell Biology
- Biochemistry
- Physiology (+/- Neurophysiology)
- Neuroscience (+/- Neuropath, Neuropharm)
- Behavioral Sciences
- Microbiology (+/- Immunology)
- Pharmacology
- Pathology
- Introduction to Clinical Diagnosis

NBME Subject Exam Program: Clinical Science Examinations

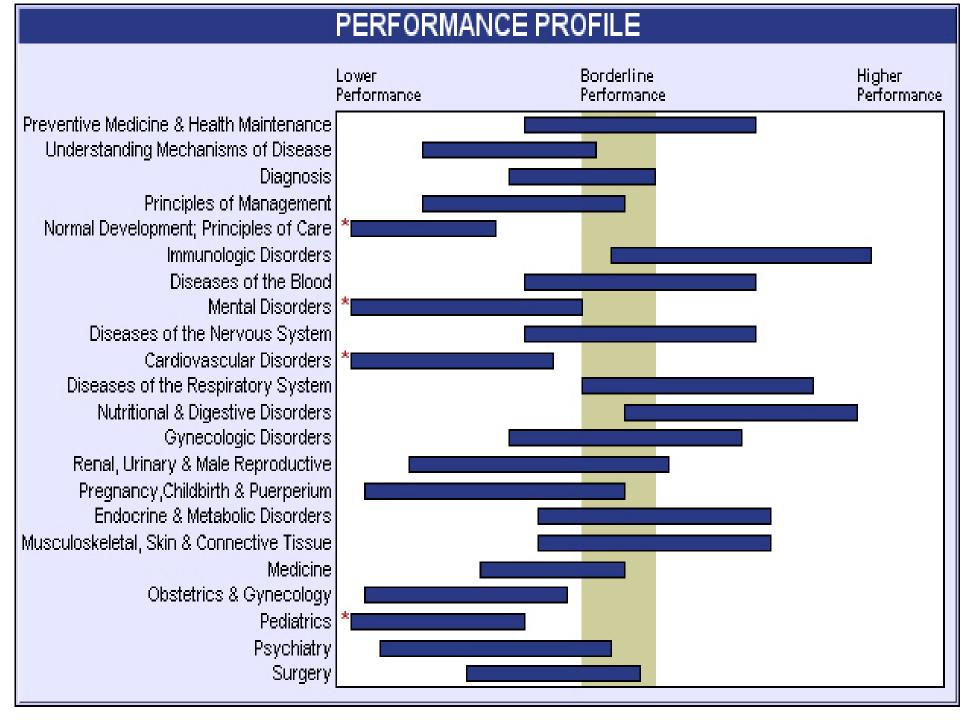
- Medicine
- Surgery
- Obstetrics & Gynecology
- Pediatrics
- Psychiatry
- Family Medicine
- Neurology
- Comprehensive Clinical Science Examination

- Goal of the program is to provide examinees with a tool that aids in identifying strengths and weaknesses and judging readiness to sit for USMLE
- Levels the playing field for examinees at international schools that do not have access to NBME subject examinations
- Self-assessment services provided directly to examinees
 - Comprehensive Basic Science (Step 1)
 - Comprehensive Clinical Science (Step 2 CK)
 - Comprehensive Clinical Medicine (Step 3 MCQ)

- Designed to reflect the format and content coverage of USMLE
- Unproctored, computer-based test administration over the web
- Can be taken at any time and from any location that the examinee chooses

- Recently retired USMLE items
- Multiple forms available
- 4 sections
 - Timing Conditions
 - Standard-Paced (1 hour/section)
 - Self-Paced (up to 4 hours/section)
- Web-based test administration
- Immediate score reporting





- New Spanish versions of selected test forms to be released in the near future
 - Comprehensive Basic Science Self-Assessment
 - Comprehensive Clinical Science Self-Assessment
- Looking for schools and examinees to participate in pilot tests (<u>free</u> of charge)
- See me or my NBME colleagues at the conclusion of the session if interested

- 20. Un hombre hospitalizado de 57 años de edad es sometido a un cateterismo de la vena subclavia derecha para la hiperalimentación. Actualmente, recibe tratamiento para una fístula de intestino delgado. Mientras se esperan los resultados de una placa radiográfica del tórax para verificar la posición del catéter, el paciente siente agitación repentinamente. La presión arterial es de 70/50 mm Hg y el pulso es de 110/min. El examen revela distensión venosa yugular. Durante la auscultación, los pulmones están despejados. Los sonidos respiratorios son iguales bilateralmente. La tráquea se encuentra en la línea media. Una placa radiográfica del tórax revela un catéter en la vena cava superior que atraviesa el ventrículo derecho hacia la izquierda hasta la línea media. ¿Cuál de las siguientes opciones sería la causa más probable de la hipotensión de este paciente?
- A) Embolia aérea
- B) Taponamiento pericárdico
- CC) Perforación de la arteria pulmonar
- OD) Bacteriemia estafilocócica
- © E) Neumotórax a tensión













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- 33. Una mujer de 57 años de ejad asiste al médico para realizarse un examen de seguimiento. Tiene antecedentes de 5 años de hipercalcemia que se diagnosticó mediante estudios de laboratorio de rutina; los niveles de calcio sérico varían entre 10,8 mg/dL y 11,5 mg/dL. Rechazó otros exámenes anteriormente porque "se sentía bien". No recibe medicamentos. Su último período menstrual fue hace 7 años. Mantiene un peso de 67 kg (148 lb) y mide 170 cm (67 pulg). El IMC
 - es de 23 kg/m². La presión arterial es de 126/80 mm Hg y el pulso es de 66/min. El examen no re∨ela anomalías. ¿Cuál de las siguientes opciones sería el paso siguiente más adecuado para e∨aluar el riesgo de fractura?
- A) Recogida de orina durante 24 horas para medir la excreción de entrecruzamientos del colágeno
- OB) Densitometría ósea
- °C) Medición de la acti∨idad de fosfatasa alcalina sérica específica de hueso
- OD) Placas radiográficas posteroanteriores y laterales de la espina dorsal y cadera
- © E) Biopsia de la cresta ilíaca

- 25. Una mujer de 25 años de edad tiene tos y sibilancias diarias desde hace 4 meses. Tiene dificultad para dormir debido a los síntomas. Se perciben sibilancias inspiratorias y espiratorias con una fase de exhalación levemente prolongada. Se comienza un tratamiento con un agonista β₂-adrenérgico por inhalación. Aún presenta síntomas leves durante el día con episodios broncoespásticos que ocurren tres veces por semana durante la noche. ¿Cuál de los siguientes medicamentos se debe incorporar al régimen?
- A) Glucocorticoides inhalados
- B) Ipratropio inhalado
- °C) Eritromicina por ∨ía oral
- [○]D) Furosemida por vía oral
- [○]E) Teofilina por vía oral



- 33. Una adolescente de 15 años de edad consulta al médico porque está preocupada por un riesgo de gonorrea. A su compañero sexual se le diagnosticó recientemente esta enfermedad y mantuvieron relaciones sexuales antes de que comenzara el tratamiento. Luego de realizar un análisis para detectar *Neisseria gonorrhoeae* y *Chlamydia trachomatis*, ¿cuál de las siguientes opciones sería el paso siguiente más adecuado para la atención?
- A) Tratamiento sólo si presenta síntomas
- B) Tratamiento sólo si los cultivos son positivos
- °C) Tratamiento sólo para *N. gonorrhoeae*, de acuerdo con los antecedentes de exposición
- D) Tratamiento para N. gonorrhoeae y C. trachomatis, de acuerdo con los antecedentes de exposición

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NBME International Activities

- Activities in Europe
 - Consultation with some of the Royal Colleges in the UK on their membership examinations
 - Pilot projects in France and Italy using translated
 NBME test material
- Activities in Asia
 - Consultation with the agencies responsible for medical licensure in P.R.C, Korea, and Taiwan
- Activities in Latin America
 - Began with collaborative efforts in Panama

NBME International Activities: Panama

- Resident Selection Examination
 - Ongoing project that began in 2001-02; first test administration in 2003
 - Worked with representatives from Panama to develop test specifications for examination
 - Built and translated examinations using items from NBME basic and clinical science pools
 - Test administrations in Panama; scoring done at NBME in Philadelphia
- Certification Examination
 - Passing score required for entry into internship₅₉

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