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SPECIALTY BOARD REVIEW



Tintinalli's Emergency Medicine

Examination and Board Review

- Over 800 case-based Q&A
- Detailed explanations for each answer
 - Questions and answers keyed to *Tintinalli's Emergency Medicine, 9th Edition*

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SUSAN B. PROMES

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Tintinalli's
Emergency Medicine
Examination and Board Review

SUSAN B. PROMES, MD, MBA, FACEP

Professor and Chair

Department of Emergency Medicine

Pennsylvania State University

Penn State Health—Milton Hershey Medical Center

Hershey, Pennsylvania



New York/Chicago/San Francisco/Athens/London/Madrid/Mexico City/
Milan/New Delhi/Singapore/Sydney/Toronto

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*This book is dedicated to my family and colleagues at Penn State University
without which this book would not have come to fruition.*

*Special thanks to my husband, Mark, who is my biggest supporter and my two amazing sons,
Alex and Aaron. Did I tell you? I love you!*



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Contributors

Section Editors

Erica Bates, MD

Assistant Professor of Emergency Medicine and
Internal Medicine
Department of Emergency Medicine
Pennsylvania State University
Penn State Health—Milton S. Hershey Medical Center
Hershey, Pennsylvania

Avram Flamm, DO

Assistant Professor of Emergency Medicine and
Public Health Sciences
Department of Emergency Medicine
Pennsylvania State University
Penn State Health—Milton S. Hershey Medical Center
Hershey, Pennsylvania

Kathryn M. McCans, MD, FAAP

Associate Professor of Emergency Medicine and Pediatrics
Departments of Emergency Medicine and Pediatrics
Pennsylvania State University
Penn State Health—Milton Hershey Medical Center
Hershey, Pennsylvania

Authors

Andrew Beck, MD, MS

Assistant Professor
Department of Emergency Medicine
Brown University
Providence, Rhode Island
Chapter 6 Thoracic-Respiratory Disorders

Amber Billet, MD, FACEP

Program Director
Emergency Medicine Residency Program
WellSpan York Hospital
York, Pennsylvania
Chapter 7 Abdominal and Gastrointestinal Disorders

Ryan P. Bodkin, MD, MBA

Associate Professor of Emergency Medicine
University of Rochester
Rochester, New York
Chapter 14 Environmental Injuries

E. Page Bridges, MD

Assistant Clinical Professor
Department of Emergency Medicine
Prisma Health/University of South Carolina School of
Medicine—Greenville
Greenville, South Carolina
Chapter 7 Abdominal and Gastrointestinal Disorders

Esther H. Chen, MD

Professor
Department of Emergency Medicine
University of California, San Francisco
San Francisco, California
Chapter 9 Obstetrics and Gynecology

Eleanor Dunham, MD, FACEP

Assistant Professor of Emergency Medicine
Department of Emergency Medicine
Pennsylvania State University
Penn State Health—Milton S. Hershey Medical Center
Hershey, Pennsylvania
Chapter 22 Psychosocial Disorders

Paolo Grenga, MD

Clinical Instructor of Emergency Medicine
University of Rochester
Rochester, New York
Chapter 14 Environmental Injuries

Mariana Guerrero, MD

Emergency Medicine Physician
Denver Health and Hospital Authority
Denver, Colorado
Chapter 3 Analgesia, Anesthesia, and Procedural Sedation

Alison Hayward, MD, MPH

Assistant Professor of Emergency Medicine
Warren Alpert School of Medicine
Brown University
Providence, Rhode Island
Chapter 8 Renal and Genitourinary Disorders

Shanna C. Jones, MD, FACEP

Associate Professor
Department of Emergency Medicine
Beaumont Health System
Troy, Michigan
Chapter 11 Systemic Infectious Disorders

Nikita K. Joshi, MD

Medical Director, Alameda Hospital
Department of Emergency Medicine
Alameda Health System
Oakland, California
Chapter 18 Dermatology

Annahieta Kalantari, DO

Associate Professor
Department of Emergency Medicine
Pennsylvania State University
Penn State Health—Milton S. Hershey Medical Center
Hershey, Pennsylvania
Chapter 12 Nervous System Disorders

Linda E. Keyes, MD, FACEP, FAWM

Adjoint Associate Professor of Emergency Medicine
Anschutz Medical Campus
University of Colorado
Aurora, Colorado
Chapter 3 Analgesia, Anesthesia, and Procedural Sedation

James A. Krueger, MD, FACEP

Consultant, The Poison Control Center at Children's Hospital
of Philadelphia
Assistant Professor, Division of Medical Toxicology
Assistant Professor, Department of Emergency Medicine
Einstein Healthcare Network
Philadelphia, Pennsylvania
Chapter 13 Toxicologic Disorders

Heather M. Kuntz, MD

Associate Professor
Departments of Emergency Medicine and Pediatrics
Loma Linda University Health
Loma Linda, California
Chapter 10 Pediatrics

Eric J. Lee, MD

Assistant Professor
Program Director
Department of Emergency Medicine
University of Oklahoma
Tulsa, Oklahoma
Chapter 8 Renal and Genitourinary Disorders

Jordan Lull, MD

Pediatric Critical Care Fellow
Nationwide Children's Hospital
Columbus, Ohio
Chapter 10 Pediatrics

Nicholas Macklin, MD

Clinical Assistant Professor
Department of Emergency Medicine
Atrium Health Wake Forest Baptist
Winston-Salem, North Carolina
*Chapter 25 Point-of-Care Ultrasound in the Emergency
Department*

Jade Malcho, MD

Clinical Instructor
Department of Emergency Medicine
University of Rochester Medical Center
Rochester, New York
Chapter 24 Special Situations

Kathryn McCabe, MD

Staff Physician Denver Health Medical Center
Clinical Instructor, Emergency Medicine
University of Colorado School of Medicine
Aurora, Colorado
Chapter 17 Eye, Ear, Nose, Throat, and Oral Disorders

Mary P. Mercer, MD, MPH, FAEMS

Professor of Emergency Medicine
University of California, San Francisco
San Francisco, California
Chapter 1 Prehospital Care and Disaster Management

Cathy Nelson-Horan, MD

Assistant Professor
 Department of Emergency Medicine
 Pennsylvania State University
 Penn State Health—Milton S. Hershey Medical Center
 Hershey, Pennsylvania
Chapter 16 Hematologic Disorders

J. Elizabeth Neuman, DO, FACEP

Assistant Professor of Emergency Medicine
 Department of Emergency Medicine
 Pennsylvania State University
 Penn State Health—Milton S. Hershey Medical Center
 Hershey, Pennsylvania
Chapter 19 Traumatic Disorders

Flavia Nobay, MD

Associate Dean of Student Affairs
 Professor of Emergency Medicine
 University of Rochester School of Medicine
 Rochester, New York
Chapter 24 Special Situations

Robert P. Olympia, MD

Professor
 Departments of Emergency Medicine and Pediatrics
 Pennsylvania State University
 Penn State Health—Milton S. Hershey Medical Center
 Hershey, Pennsylvania
Chapter 10 Pediatrics

David M. Painter, MD

Department of Emergency Medicine
 Duke University
 Durham, North Carolina
Chapter 20 Injuries to Bones and Joints

Berenice Perez, MD

Clinical Instructor of Emergency Medicine
 UCSF School of Medicine
 Emergency Department Medical Director
 Alameda Health System Highland Campus
 Oakland, California
Chapter 18 Dermatology

Jordan S. Richardson, DO

Emergency Medicine Physician
 Timpanogos Regional Medical Center
 Orem, Utah
Chapter 5 Cardiovascular Disorders

Ross Rodgers, MD

La Jolla Emergency Specialists
 Scripps La Jolla
 La Jolla, California
Chapter 5 Cardiovascular Disorders

Carlo L. Rosen, MD

Executive Vice Chair
 Department of Emergency Medicine
 Associate Director of Graduate Medical Education
 Beth Israel Deaconess Medical Center
 Associate Professor of Emergency Medicine,
 Harvard Medical School
 Boston, Massachusetts
Chapter 19 Traumatic Disorders

Kim A. Rutherford, MD

Assistant Clinical Professor of Emergency Medicine
 Long Island School of Medicine
 New York University
 Mineola, New York
Chapter 23 Abuse and Assault

Evan S. Schwarz, MD, FACEP, FACMT

Associate Professor of Emergency Medicine
 Medical Toxicology Division Chief
 Washington University
 St. Louis, Missouri
Chapter 5 Cardiovascular Disorders

Krystle Shafer, MD

Director of EM-Critical Care
 Departments of Emergency Medicine and
 Critical Care Medicine
 Wellspan York Hospital
 York, Pennsylvania
Chapter 2 Resuscitation

Bijal Shah, MD

Clinical Assistant Professor
 Department of Emergency Medicine
 Prisma Health/University of South Carolina
 School of Medicine
 Greenville, South Carolina
Chapter 7 Abdominal and Gastrointestinal Disorders

Luz M. Silverio, MD

Assistant Program Director (Affiliate)
 Department of Emergency Medicine
 Stanford University
 Stanford, California
 Attending Physician
 Department of Emergency Medicine
 Kaiser Permanente Santa Clara
 Santa Clara, California
Chapter 6 Thoracic-Respiratory Disorders

Jessica L. Smith, MD, FACEP

Professor, Clinician Educator
 Department of Emergency Medicine
 The Alpert Medical School Brown University
 Rhode Island Hospital/The Miriam Hospital/Newport Hospital
 Providence, Rhode Island
Chapter 6 Thoracic-Respiratory Disorders

Paul Sokoloski, MD

Penn State Holy Spirit Medical Center
Penn State Hampden Medical Center
Penn State Health
Camp Hill, Pennsylvania
Chapter 4 Wound Management

Joshua J. Solano, MD, FAAEM, FACEP

Associate Professor of Emergency Medicine
Medical Student Clerkship Director
Department of Emergency Medicine
Florida Atlantic University
Boynton Beach, Florida
Chapter 19 Traumatic Disorders

Molly E.W. Thiessen, MD

Emergency Medicine Physician
Denver Health Medical Center
Denver, Colorado
Associate Professor
Department of Emergency Medicine
University of Colorado School of Medicine
Aurora, Colorado
Chapter 17 Eye, Ear, Nose, Throat, and Oral Disorders

Traci Thoureen, MD, MMCI, FACEP

Associate Professor
Department of Emergency Medicine
Duke University Medical Center
Durham, North Carolina
Chapter 20 Injuries to Bones and Joints

Steven J. Walsh, MD

The Poison Control Center at Children's Hospital of
Philadelphia
Division of Medical Toxicology
Department of Emergency Medicine
Einstein Healthcare Network
Philadelphia, Pennsylvania
Chapter 13 Toxicologic Disorders

Monica Kathleen Wattana, MD, FAAEM

Associate Professor of Emergency Medicine
University of Texas MD Anderson Cancer Center
Houston, Texas
Chapter 15 Endocrine, Metabolic, and Nutritional Disorders

Sumintra Wood, MD, MHPE

Attending Physician
Department of Emergency Medicine
Maimonides Medical Center
Brooklyn, New York
Chapter 21 Musculoskeletal Disorders (Non-Traumatic)



Preface

This book is designed as a study tool to complement the popular ninth edition of *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*. To aid in the preparation for the ABEM and AOBEM written examination as well as the annual emergency medicine residency program in-training examination, this edition presents over 800 questions and answers enhanced with tables and visual images, which are in full color. We have also

added a new, dedicated chapter on point-of-care ultrasound. The explanation of the correct answer for each question is referenced directly to a chapter in *Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th edition*. I hope you find this resource helpful as you prepare for your examination.

Susan B. Promes, MD, MBA, FACEP

Prehospital Care and Disaster Management

1

QUESTIONS

1. According to the Emergency Medical Treatment and Active Labor Act (EMTALA) of 1986, hospitals wishing to transfer a patient to another facility for a higher level of care must do the following prior to transferring the patient?
 - (A) Complete all diagnostic tests
 - (B) Collect payment from the patient
 - (C) Have an existing transfer contract with the receiving hospital
 - (D) Perform a medical screening examination and stabilization of the patient
2. Using the Utstein template for cardiac arrest helps an EMS system do which of the following?
 - (A) Collect complete data on cardiac arrest patients and compare outcomes to other EMS systems
 - (B) Create a high-performance cardiopulmonary resuscitation (CPR) program
 - (C) Determine the number of ambulances needed to treat cardiac arrests promptly
 - (D) Transfer cardiac arrest patients to regional ST-segment elevation myocardial infarction (STEMI) centers
3. An ambulance unit responds to the scene of a cardiac arrest patient. Describe the differences or similarities between a defibrillator used by advanced life support (ALS) personnel, such as a paramedic versus that used by basic life support (BLS) personnel, such as an emergency medical technician (EMT)-basic.
 - (A) A defibrillator used by both ALS and BLS personnel does not display the heart rhythm that the patient is experiencing, in case the EMS provider should get confused and delay delivering the shock.
 - (B) The defibrillator used by both ALS and BLS personnel displays the heart rhythm, but the ALS unit can select whether or not to shock, whereas the BLS unit will always deliver a shock.
 - (C) The ALS unit uses an automatic external defibrillator (AED), whereas the BLS unit uses a manual defibrillator.
 - (D) The ALS unit uses a defibrillator with a manual defibrillator option, whereas the BLS unit uses an AED.
4. A football player cannot get up off of the field after a big tackle and is reporting that he cannot feel or move his legs. He is moving his arms and is in no respiratory distress. As the paramedics are seeking to transfer him to an ambulance, the coach asks if they should remove his helmet. Which of the following is the BEST action of the paramedic?
 - (A) The face mask and helmet should be removed from the patients, but the shoulder pads left in place prior to transport, in order to maintain neutral positioning of the spine.
 - (B) The face mask and shoulder pads should be removed from the patient, but most of the helmet left in place prior to transport, in order to maintain neutral positioning of the spine.
 - (C) The helmet and shoulder pads should both be removed prior to transport, in order to maintain neutral positioning of the spine.
 - (D) The helmet and shoulder pads should not be removed until the patient arrives at the emergency department, as they help to maintain neutral positioning of the spine.

5. An EMS medical director is looking to introduce a supraglottic airway device to his/her system. What is a factor that may influence this decision?
- (A) A laryngeal mask airway (LMA) is considered a definitive airway.
 - (B) Endotracheal intubation is a skill that is easily maintained in daily practice by emergency medical technicians (EMTs).
 - (C) Increasing the number of advanced prehospital providers within a system may reduce opportunities for individuals to maintain skills.
 - (D) Rapid-sequence induction (RSI) medications have a low risk profile in the prehospital setting.
6. A 10-day-old infant is diagnosed with septic shock and requires transfer from a community hospital to a tertiary care center that is 30 minutes by helicopter or 2 hours by ground ambulance. What factor will determine if the child will be transferred by helicopter?
- (A) The child cannot be transferred via helicopter EMS if he is placed on a vasopressor drip.
 - (B) Should the child develop respiratory distress during transport, the emergency medical technicians (EMTs) aboard the flight will not have the training or skills to manage a pediatric airway.
 - (C) The method of transportation is determined by the receiving physician (at the tertiary center).
 - (D) The pilot of the helicopter will determine whether or not the flight is feasible based on weather and other flight conditions.
7. What is a problem of which a helicopter air medical team should be aware?
- (A) Chest tubes should not be left to suction during flight, or a pneumothorax may expand.
 - (B) Endotracheal cuff pressure could lead to tracheal mucosal damage or necrosis.
 - (C) Medications used for rapid sequence intubation (RSI) in the air, have a different dose-effect than on land.
 - (D) While transporting a patient with decompression illness, the altitude may improve or resolve their symptoms.
8. You have been asked to be the medical director for an upcoming, outdoor, rock concert that is expected to draw a crowd of over 100,000 people. Part of your responsibility includes creating a medical plan in advance of the event to submit to the city EMS agency. As you work to create this plan, you should consider a number of issues. Select the statement that is TRUE from the following options:
- (A) Environmental factors including changes in weather, temperature, time of day, access to food, water and toileting can all play a factor in the volume and range of medical emergencies that develop over the course of an event.
 - (B) Local law enforcement agencies routinely train in addressing mass casualty incidents (MCIs) and can be relied on to render medical care should an MCI occur.
 - (C) Medical treatment protocols that are authorized under your supervision are considered independent of local EMS policies and protocols.
 - (D) You can expect your volunteer medical responders to rely on their personal cellphones to communicate between each other and the local 911 services.
9. What is the role of the lead safety officer within the incident command system (ICS) structure?
- (A) Develop processes and accountability to ensure the health and safety of the paid and volunteer workers who are supporting the event
 - (B) Monitor the crowd size and movement, and direct foot traffic in a safe manner
 - (C) Plan for the upcoming operational period and distribute important bulletins, including safety information to team members
 - (D) Set up and operate rest stations for event staff
10. You have been asked to represent the emergency department on your hospital's disaster planning committee. Before the group moves on to updating the hospital disaster plans and organizing simulation exercises for staff, the committee chair has asked that the group first assess how the national and local environment has changed and may affect the likelihood of certain types of natural or man-made disasters. For example, a large chemical plant has recently opened about 1 mile from the hospital, and nowhere in the existing disaster plan is there a strategy for addressing an active shooter scenario. This process of assessing local threats and prioritizing preparedness efforts specific to your hospital is called a(n):
- (A) Hazard vulnerability analysis
 - (B) Incident command system
 - (C) Surge plan
 - (D) Table-top exercise

11. You are working in the emergency department when a fire breaks out in a nearby large skilled nursing facility, requiring evacuation of 75 medically complex patients, some with burns and fire-related injuries, directed to your hospital. As your team is triaging and treating the large influx of patients, you realize that most of them require at least short-term admission until longer-term care facilities can be identified. Your hospital's incident command system has been activated. The hospital administration is opening areas of the hospital, calling in extra staff, doubling up patients in in-patient rooms, and modifying a medical ward into an intensive care unit in order to accommodate this large number of admitted patients. This process of finding additional space and expanding treatment capacity is known as:
- (A) Alternate standards of care
 - (B) Incident command system
 - (C) Surge plan
 - (D) Triage plan
12. One of the MOST common types of illnesses to affect victims and relief workers following an earthquake is:
- (A) Fractures
 - (B) Hypertension
 - (C) Myocardial infarction
 - (D) Respiratory illnesses
13. The National Disaster Medical System (NDMS) is a government agency that coordinates deploying highly organized and experienced medical teams into disaster areas as part of the first response. Relief workers on these teams are expected to be ready to depart to a disaster area within 6 to 12 hours of being activated, and they are expected to be self-sufficient for at least:
- (A) 2 days (48 hours)
 - (B) 3 days (72 hours)
 - (C) 7 days (168 hours)
 - (D) 14 days (336 hours)
14. The MOST common cause of primary fatality among blast victims is injury to the:
- (A) Abdomen
 - (B) Head
 - (C) Heart
 - (D) Lung
15. A 30-year-old woman who is 27 weeks pregnant is brought to your emergency department after being found at the site of a bomb explosion at an appliance store. She had been a few yards away from the center of the blast. She initially had ringing in her ears, but now is asymptomatic with normal vital signs and a normal examination.
- (A) Discharge home
 - (B) Give steroids and admit the patient to labor and delivery for an urgent C-section
 - (C) If initial examination and testing is normal and if the patient remains asymptomatic, admit her to labor and delivery for observation and fetal monitoring
 - (D) If initial examination and testing is normal, observe the patient in the emergency department for 6 hours and if patient remains asymptomatic, discharge her to home
16. A 28-year-old woman is the first of 10 patients brought to your emergency department from an office building where there was a suspected nerve agent release. The patient is seizing, has copious frothy sputum and nasal secretions, wheezing, and an episode of diarrhea. In addition to managing her airway, which medications should you administer?
- (A) Adenosine, pralidoxime, and midazolam
 - (B) Adenosine, physostigmine, and phenytoin
 - (C) Atropine, pralidoxime, and midazolam
 - (D) Atropine, pralidoxime, and phenytoin
17. A congresswoman's office received a letter in the mail that contains a death threat and a powdery, white substance. At least 12 people have been exposed to that letter and present to your emergency department. None are currently experiencing symptoms. The sample is sent to the lab to test for *Bacillus anthracis* and other substances. At this time, the 12 patients should be given the following treatment:
- (A) Anthrax immunoglobulin
 - (B) Anthrax vaccination
 - (C) Intravenous penicillin
 - (D) Oral ciprofloxacin

18. In helping to manage an outbreak of an infectious disease (such as an agent of potential bioterrorism), among other things, a public health system should provide which of the following to the public?
- (A) A clear and concise case definition for diagnosis of “presumptive” or “suspect” cases
 - (B) Immediate public vaccination programs
 - (C) Mandatory quarantine orders for any infectious agent
 - (D) Specialized treatment centers for people with suspected infections
19. You are treating patients brought from an explosion at a nuclear reactor, all of whom are presumed to have been exposed to radiation. While providing medical stabilization and decontamination, which laboratory test will help you estimate the amount of radiation exposure and prognosticate survival?
- (A) Creatinine
 - (B) Lymphocyte count
 - (C) Stool guaiac
 - (D) Urine pH
20. Your emergency department has been notified that it will receive 15 patients from the site of an explosion at a nuclear reactor. Many have serious traumatic injuries, and all have presumed radiation exposure. Your treatment team has established the appropriate decontamination, treatment, and post-decontamination areas, with sufficient staff having donned personal protective equipment. You are helping to establish the triage process for this mass casualty event. The first patient to arrive from the scene is a 25-year-old woman who was struck in the chest and abdomen with a metal pipe. She is pale, cool, and diaphoretic with a respiratory rate of 36, a thready pulse, and chest wall crepitus. What is the MOST appropriate initial treatment for her?
- (A) Perform a chest radiograph to determine if she has a pneumothorax
 - (B) Send her to the wet decontamination shower to remove any external radiation before definitive treatment
 - (C) Stabilize her injuries in a “contaminated” treatment room before completing decontamination
 - (D) Triage her to the “Green” zone, as she can walk

ANSWERS

1. **The answer is D.** (Chapter 1) The Emergency Medical Treatment and Active Labor Act (EMTALA) was enacted to ensure that patients seeking emergency care were not turned away or transferred to another facility at an unsafe time in their treatment. It is common for patients to be transferred from one facility to another for a higher level of care (e.g., a patient with severe traumatic injuries who presents to a community hospital could be transferred to a regional trauma center). EMTALA lays out clear requirements for transferring facilities and physicians to follow in order to optimize safe transfer. The most basic requirement is that the first facility must perform a medical screening examination and basic measures of stabilization before transferring the patient. Liability for adverse events during transfer is borne by the transferring physician (at the sending hospital).

2. **The answer is A.** (Chapter 1) The Utstein template is a standardized format for collecting data on cardiac arrests that has been validated through research studies. Use of standardized definitions allows EMS systems to compare outcomes for equivalent patient groups (e.g., cardiac arrests due to ventricular fibrillation vs. nonshockable rhythms). High-performance cardiopulmonary resuscitation (CPR) is a specific method of performing cardiopulmonary resuscitation that delivers real-time feedback to providers. Regionalization of care to specialty centers has been shown to be beneficial to patient outcomes for time-sensitive conditions such as for ST-elevation myocardial infarction and stroke.

3. **The answer is D.** (Chapter 2) The advanced life support (ALS) unit is staffed by a paramedic who can interpret the rhythm displayed on the defibrillator monitor and decide when to deliver a shock (and with how many joules of energy), whereas the basic life support (BLS) unit uses an automatic external defibrillator, which internally records and automatically interprets the rhythm, and then is automatically programmed to deliver a shock if the rhythm is interpreted as ventricular tachycardia or ventricular fibrillation.

4. **The answer is D.** (Chapter 2) The helmet and shoulder pads should not be removed until the patient arrives at the emergency department, as they help to maintain neutral positioning of the spine. The helmet and shoulder pads of the patient help to maintain the spine in a neutral position and should not be removed until after transport to the hospital. In fact, the recommendation is to wait until after initial assessment and radiographs are completed. Removal

of the helmet and shoulder pads requires several people in order to maintain spinal alignment. However, the face-mask of a helmet can and should be removed early on in evaluation in order to better access the patient's airway.

5. **The answer is C.** (Chapter 2) Airway and ventilatory management are important prehospital skills for addressing life-threatening conditions, such as respiratory distress. Endotracheal intubation and cricothyrotomy are the only definitive airway management techniques. However, both are also high-risk procedures with opportunity for error and increased patient harm if not performed correctly. Both skills may be difficult to maintain due to infrequency of the procedure, and some EMS systems may elect to limit (or not include them) in local scope of practice for certain patient populations (such as pediatrics). A system that has a high number of paramedics performing a small number of infrequent procedures (such as intubation) may determine that they have insufficient volume or simulation time to maintain proficiency of the skills. Although not considered truly definitive airways, supraglottic devices such as the laryngeal mask airway (LMA) can provide an effective bridging intervention to maintain oxygenation and ventilation of critical patients in the prehospital setting. Rapid sequence induction medications have a high-risk profile in the prehospital setting.

6. **The answer is D.** (Chapter 3) Air medical transport is an important part of prehospital care, especially for EMS systems serving more rural communities. There can be many different configurations of the team members on an air medical transport unit. The most common is nurse-paramedic. Due to the higher-risk patient care needs and longer transport times, air medical crews undergo increased training and have expanded scope of practice (increased medications, drips, etc.). Flight safety is a key principle of air medical EMS in order to ensure the lowest risk of accidents. It is standard practice that a pilot will be blinded to the clinical details (including age and condition of the patient) to ensure that the decision to fly is being made exclusively based on the flight conditions and not due to emotional considerations for the patient in need.

7. **The answer is B.** (Chapter 3) Pressure-related problems can occur at altitude. This is described by Boyle's law: the volume of gas increases when pressure decreases at a constant temperature. Therefore, as the volume of an endotracheal tube (ETT) cuff cannot change at altitude, the pressure of the air inside the cuff could increase above the perfusion pressure of the tracheal mucosa and cause necrosis.

8. **The answer is A.** (Chapter 4). Planning for an appropriate medical response during a mass gathering is critical for maintaining the health and safety of participants and spectators, as well as for ensuring the maintenance of services for the surrounding community. Preparations should include an interdisciplinary team and all-hazards approach to planning. It is important for medical directors to understand the conditions that could be exacerbated by the crowd size, venue, and the nature of the event. Historical data about the event or similar events are important for preparation of the medical plan. Environmental factors including changes in weather, temperature, time of day, access to food, water, and toileting can all play a factor in the volume and range of medical emergencies that occur during a mass gathering. An appropriate plan should include resources and communication systems that do not jeopardize the local medical response system. Sometimes, additional EMS personnel may contract with an event organizer to provide care or transportation for medical emergencies. These providers must still work within the local scope of practice and EMS policies. Medical directors should also coordinate with local safety officials including law enforcement and fire to plan for potential response to different types of mass casualty incidents that could result due to crowd conditions or terrorism. While some law enforcement agencies understand the basics of medical care, the medical director should not assume that police or fire personnel will be assisting in rendering medical attention.

9. **The answer is A.** (Chapter 4) Within the incident command system (ICS), the safety officer is a member of the command staff and his or her role is to develop processes and accountability to ensure the health and safety of the paid and volunteer workers who are supporting the event (or disaster response). Members of the operations and logistics sections would be responsible for ensuring the health and safety of the event participants, as well as executing the plan and processes outlined by the safety officer (including setting up and operating rest stations). Members of the planning section are responsible for planning ahead for the next operational period.

10. **The answer is A.** (Chapter 5) A hazard vulnerability analysis (HVA) is an assessment performed by a local hospital or EMS agency that helps to categorize the different types of disasters that might affect their community (e.g., earthquake, flood, active shooter, etc.). By assessing which events are the most likely to occur and which would produce the significant strain on the response capabilities, a hospital can prioritize disaster planning efforts. The incident command system (ICS) is a standardized organizational system for the immediate response phase of a

disaster. A surge plan is the specific plan of action that hospital will take in response to a sudden large increase (or “surge”) in patient volume or critical care needs. A tabletop exercise is a written and verbal simulation exercise in which a group of key stakeholders will reason through a series of challenges that could occur in the setting of a disaster or mass casualty incident (MCI).

11. **The answer is C.** (Chapter 5) A surge plan is the specific plan of action that hospital will take in order to increase treatment capabilities in response to a sudden large increase (or “surge”) in patient volume or critical care needs. Alternate standards of care denote a specific legal determination that can only be claimed when the governor of a state has requested a declaration of state of emergency, under the Stafford Act. The Incident Command System (ICS) is a standardized organizational system for the immediate response phase of a disaster. A triage plan describes the process for receiving and sorting a large volume of patients from a mass casualty incident (MCI).

12. **The answer is D.** (Chapter 6) Respiratory illnesses are the most common types of illnesses to occur among victims *and* relief workers following an earthquake. This phenomenon is thought to be due to the large amount of particulate matter from collapsed buildings and roads and which can cause reactive airway disease in victims and relief workers. Additionally, in the weeks to months that follow large groups of victims and volunteers may still be living in crowded shelters and other enclosed spaces, with opportunity to spread infectious respiratory illnesses. Acute conditions including fractures and myocardial infarctions are more common (than at baseline) during or immediately following an earthquake. And chronic conditions such as hypertension can become exacerbated among survivors due to lack of access to medications.

13. **The answer is B.** (Chapter 6) Relief workers who respond with the National Disaster Medical System (NDMS) are expected to be self-sufficient (with supplies for their personal care and for basic team operations for delivery of medical care) for at least 72 hours (3 days) after deployment to a disaster area.

14. **The answer is D.** (Chapter 7) Pulmonary barotrauma is the most common cause of fatal primary blast injury. The lung is particularly susceptible to blast injuries because of the number of air-filled spaces and vasculature, which allow for significant pressure differentials to be generated across tissue barriers (thereby damaging them). Such pressure differentials can lead to hemorrhage, contusions, pneumothorax, hemothorax, and pneumomediastinum.

15. **The answer is C.** (Chapter 7). Direct injuries to the fetus are uncommon in pregnant women who are victims of a blast event, as the fetus is surrounded by amniotic fluid. However, direct injuries to the placenta are common. After life-threatening conditions have been stabilized or ruled out, any woman in the second or third trimester of pregnancy should be admitted to the labor and delivery floor for continuous fetal monitoring and obstetric evaluation.

16. **The answer is C.** (Chapter 8) The syndrome being described is consistent with an anticholinergic toxidrome which could be caused by organophosphate poisoning (OP) including intentional OP poisoning such as from sarin gas (an acetylcholinesterase inhibitor). Treatment includes atropine to address the muscarinic effects, which should be titrated until clearing of the secretions. Pralidoxime is given to address the nicotinic effects. Midazolam can be used to treat seizures.

17. **The answer is D.** (Chapter 9) Persons exposed to suspected anthrax (but not currently symptomatic) should be started on oral ciprofloxacin (and prophylaxis should continue for 60 days). If active systemic or pulmonary disease is suspected, the patient should be admitted to the hospital and antibiotic coverage should be broadened to include IV antibiotics. For patients who are critically ill, anthrax immunoglobulin should be considered as adjunctive

therapy. Anthrax vaccination has not been well studied in terms of efficacy but may be recommended to high-risk first responder or military personnel in certain settings.

18. **The answer is A.** (Chapter 9) During an outbreak, critical information that a public health system should provide includes a case definition for the particular agent in the question. A case definition imparts definitive clinical and diagnostic criteria for an individual patient. Within the case definition, criteria should be supplied that define “presumptive” or “suspect” cases for patients awaiting confirmatory testing.

19. **The answer is B.** (Chapter 10) Following an exposure to ionizing radiation, a lymphocyte count is among the most useful prognostic and diagnostic indicators, as its level at different times following the procedure can provide an estimate of relative dose received as well as an accurate prognostic indicator of mortality.

20. **The answer is C.** (Chapter 10) Because radioactive contamination is never immediately life threatening, treatment of life-threatening injuries (such as significant trauma or respiratory distress) should not be delayed while awaiting or performing decontamination. So, as long as treating providers are wearing sufficient protective gear, decontamination may be delayed until after treatment is rendered.

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Resuscitation

QUESTIONS

- A 45-year-old Japanese man presents to the emergency department after he had a witnessed syncopal event. The patient denies any prodromal symptoms prior to the event nor injuries secondary to the event. He denies recent illness, chest pain before or after the event, bloody or back bowel movements, shortness of breath, recent surgeries, or lower extremity swelling. He has no significant past medical history or social history and he takes no medications. He is adopted and does not know his family history. Physical examination including vital signs are unremarkable. Laboratory evaluation shows no abnormalities. Chest x-ray shows no acute abnormalities. ECG was performed and is shown in Figure 2.1. What is the appropriate NEXT step in care for this patient?

 - Consult cardiology for automatic implantable cardioverter-defibrillator (AICD) placement
 - Consult cardiology for emergent cardiac catheterization
 - Discharge patient home with outpatient follow-up with his primary care physician
 - Order a CT angiogram to rule out pulmonary embolism
- A 46-year-old woman presents to the emergency department with severe pneumonia and septic shock. She is given antibiotics, is intubated, and a central line is placed. Despite appropriate fluid resuscitation, the patient remains with mean arterial pressures below 65. The decision is made to initiate vasopressor therapy. Which vasopressor agent is considered first line for septic shock?

 - Dopamine
 - Epinephrine
 - Norepinephrine
 - Vasopressin

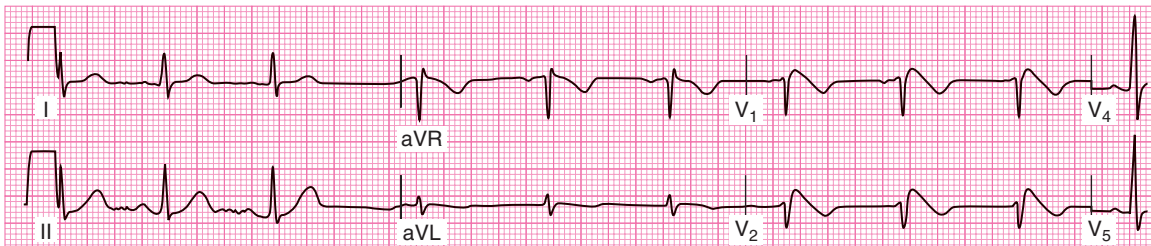


FIGURE 2.1 Reproduced with permission from J.E. Tintinalli, J.S. Stapczynski, O.J. Ma, D. Yealy, G.D. Meckler, D.M. Cline: Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th Edition. McGraw-Hill Education; 2020.