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# The Washington Manual™ of Medical Therapeutics

33RD EDITION

**Editors:**
Corey Foster
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Parvin F. Peddi
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Department of Medicine
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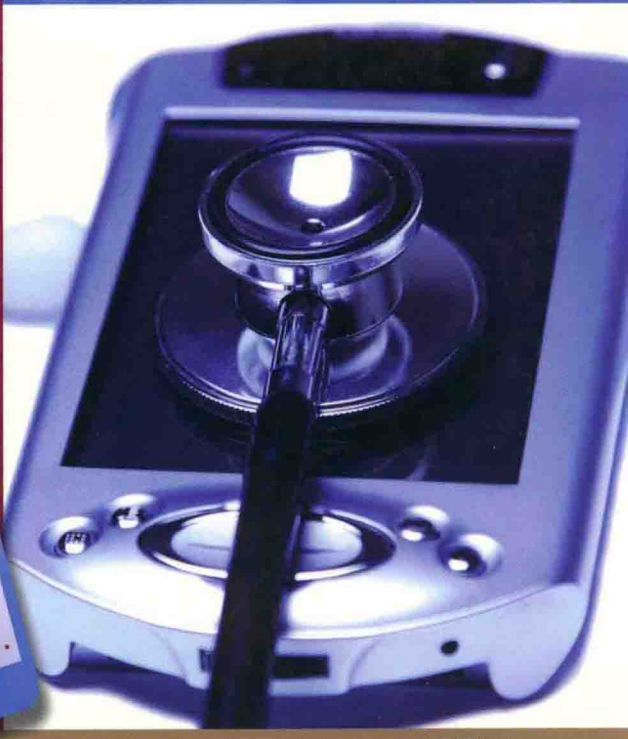


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Washington University in St. Louis School of Medicine

# THE WASHINGTON MANUAL® OF MEDICAL THERAPEUTICS

33rd Edition

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Wolters Kluwer | Lippincott Williams & Wilkins
Health
Philadelphia • Baltimore • New York • London
Buenos Aires • Hong Kong • Sydney • Tokyo

*Acquisitions Editor:* Avé McCracken
*Managing Editor:* Michelle M. LaPlante
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*Marketing Manager:* Kimberly Schonberger
*Design Coordinator:* Teresa Mallon
*Cover Designer:* Becky Baxendell
*Production Services:* Aptara, Inc.
*Printer:* RR Donnelley

33rd Edition


Printed in China

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Adhesive binding:
ISBN: 9781608310036
ISBN: 1608310035

Spiral binding:
ISBN: 9781605470146
ISBN: 160547014[illegible]

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# Chairman's Note

The rate of increase of medical knowledge places an enormous burden on physicians to keep up with recent advances, particularly in novel therapies that will improve patient outcomes. The *Washington Manual® of Medical Therapeutics* provides an easily accessible source of current information that covers a practical clinical approach to the diagnosis, investigation, and treatment of common medical conditions that internists encounter on a regular basis. The pocket-book size of the *Manual* ensures that it will continue to be of enormous assistance to interns, residents, medical students, and other practitioners in need of readily accessible practical clinical information. It meets an important unmet need in an era of information overload.

I acknowledge the authors, which include house officers, fellows, and attendings at Washington University/Barnes-Jewish Hospital. Their efforts and outstanding skill are evident in the quality of the final product. In particular, I am proud of our editors: Corey Foster, Neville F. Mistry, Parvin Peddi, and Shivak Sharma; and the series editors: Katherine Henderson and Tom De Fer, who have worked tirelessly to produce another outstanding edition of the *Manual*. I also recognize Melvin Blanchard, MD, Chief of the Division of Medical Education in the Department of Medicine at Washington University, for his guidance and advice. I am confident that this *Manual* will meet its desired goal of providing practical knowledge that can be directly applied to improving patient care.

Kenneth S. Polonsky, MD
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St. Louis, Missouri

# Preface

It is our pleasure to introduce the 33rd edition of *The Washington Manual of Medical Therapeutics*. "The Manual," as it is fondly labeled here at Washington University, developed from a simple handbook for senior medical students and housestaff. Since its inception, the *Manual* has been edited by Chief Residents. Wayland MacFarlane, MD, was the initial editor, producing the text in 1943. In 1962, Dr. Robert Packman oversaw the first major revision of the *Manual*, transforming it from a short textbook to a portable reference.

Over the past 65 years, the *Manual* has met with tremendous success, becoming the best-selling medical text in the world. It has been translated into more than a dozen languages and can be found in all corners of the globe. As a testament to the rapid advancement of medicine, the *Manual* has also grown significantly in size and content. As the practice of medicine and the use of portable technologies coevolve, the *Manual* must adapt to meet the needs of physicians. To that end, we have revised the outline format used in the last edition, hoping to organize information in a logical and readily accessible format. In our quest to polish the 33rd edition of the *Manual*, we have sought to retain the virtues that have made the work a success: a concise discussion of pathophysiology, an accurate discussion of current therapies, and ease of reading. Alongside the format modifications, we have carefully updated the content of the *Manual* to reflect advancing technologies and therapeutics.

*The Washington Manual of Medical Therapeutics* has established a tradition of excellence that we aspire to preserve. No discussion of the *Manual* would be complete without mention of the Washington University medicine housestaff, fellows, medical students, and attendings. We are inspired daily by their brilliance, compassion, and dedication. It is truly an honor that they turn to the *Manual* for guidance. We are deeply indebted for the substantial support and direction that Katherine Henderson and Tom De Fer, the series editors, provided in the creation of this edition of the *Manual*. We also thank Avé McCracken and the editorial staff at Lippincott Williams & Wilkins for their assistance and patience with our busy schedules.

We have had the honor and pleasure of serving as Chief Residents of the Shatz-Strauss, Karl-Flance, and Kipnis-Daughaday firms and the Wohl Clinic of the Department of Medicine at Washington University. Our Firm Chiefs, Megan Wren, William Clutter, and Geoffrey Cislo, have been instrumental over the course of the year, serving as mentors and role models. Our program director, Melvin Blanchard, has been a great help in the production of the *Manual*. Our Chairman of Medicine, Kenneth Polonsky, provided guidance and support in the creation of this text. We thank our families for their support and inspiration. To Raquel, Gabriel, and Isabel; Srinivas; Victoria—our gratitude is beyond measure. To my late father, Dr. Farookh Mistry, I will never forget your kindness, wisdom, and encouragement.

Corey Foster, MD
Neville F. Mistry, MD
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Shivak Sharma, MD

# Contents

# 1 Patient Care in Internal Medicine

Mark Thoelke and Christopher J. Gutjahr

## General Care of the Hospitalized Patient

### GENERAL PRINCIPLES

- Although a general approach to common problems can be outlined, **therapy must be individualized.** All diagnostic and therapeutic procedures should be explained carefully to the patient, including the potential risks, benefits, and alternatives. This explanation minimizes anxiety and provides the patient and the physician with appropriate expectations.
- The period of hospitalization represents a complex interplay of multiple caregivers that subjects the patient to potential harm by **medical errors and iatrogenic complications.** Every effort must be made to minimize these risks. Basic measures include:
  - Use of standardized abbreviations and dose designations
  - Excellent communication between physicians and other caregivers
  - Institution of appropriate prophylactic precautions
  - Prevention of nosocomial infections, including attention to hygiene and discontinuation of unnecessary catheters
  - Medicine reconciliation at all transfers of care
- **Hospital orders**
  - **Admission orders** should be written promptly after evaluation of a patient. Each set of orders should bear the **date and time** of writing and the legible signature of the physician. Consideration should be given to including a **printed signature** and a **contact number.** All orders should be clear, concise, organized, and legible. Computer order entry will facilitate aspects of this process.
  - To ensure that no important therapeutic measures are overlooked, the **content and organization** of admission orders may follow the outline below (the **mnemonic ADC VANDALISM**):
    - **A**dmitting service, location, and physician responsible for the patient
    - **D**iagnoses
    - **C**ondition of the patient
    - **V**ital signs with frequency
    - **A**ctivity limitations
    - **N**ursing instructions (e.g., Foley catheter to gravity drainage, wound care, daily weights)
    - **D**iet. Remember that "npo" may preclude oral medications unless specified
    - **A**llergies, sensitivities, and previous drug reactions
    - **L**aboratory tests and radiographic studies
    - **I**V fluids, including composition and rate
    - **S**edatives, analgesics, and other PRN medications
    - **M**edications, including dose, frequency, route, and indication. State "First dose now" when appropriate
  - **Orders should be reevaluated frequently** and altered as patient status dictates.

- **Discharge**
  - **Discharge planning** begins at the time of admission. Assessment of the patient's social situation and potential discharge needs should be made.
  - **Early coordination** with nursing, social work, and case coordinators/managers facilitates efficient discharge and a complete postdischarge plan.
  - **Patient education** should occur regarding changes in medications and other new therapies. Compliance with treatment is influenced by patient's understanding of that treatment.
  - **Prescriptions** should be written for all new medication, and the patient should be provided with a complete medication list including instructions and indications.
  - **Communication** with physicians who will be resuming care of the patient after discharge is important for optimal follow-up care.

# PROPHYLACTIC MEASURES

## Venous Thromboembolism Prophylaxis

### GENERAL PRINCIPLES

#### Epidemiology

**Venous thromboembolism (VTE)** is the most common preventable cause of death in hospitalized patients. Roughly 75% of fatal pulmonary emboli occur in nonsurgical patients. **Risk factors** for VTE include advanced age, previous VTE, trauma, conditions associated with prolonged immobility (major surgery, stroke, paralysis), obesity, heart failure, malignancy, pregnancy, inflammatory bowel disease, and coagulation factor deficiency.

#### Prevention

- All able patients should be encouraged to ambulate several times a day.
- Acutely ill patients with severe respiratory disease, with congestive heart failure (CHF), or who are bedridden and have additional risk factors described above should be considered for **prophylactic dosing** of low-dose unfractionated heparin (UFH; 5,000 units SC q8h or q12) or low-molecular-weight heparin (LMWH; enoxaparin, 40 mg SC or 4,000 units SC daily, or dalteparin, 5,000 units SC daily), or fondaparinux 2.5 mg SC daily.
- Aspirin alone is not adequate deep vein thrombosis (DVT) prophylaxis.
- At-risk patients with contraindications to anticoagulation prophylaxis should receive mechanical prophylaxis with intermittent pneumatic compression or graded compression stockings (*Chest 2008 Jun;133(6 Suppl):381S–453S*).
- Treatment of VTE is reviewed in Chapter 17, Disorders of Hemostasis and Thrombosis.

## Pressure Ulcers

### GENERAL PRINCIPLES

#### Epidemiology

**Pressure ulcers** typically occur within the first 2 weeks of hospitalization and can develop within 2 to 6 hours. There has been a 63% increase in incidence of pressure

ulcers over the last decade. Once they develop, pressure ulcers are difficult to heal and have been associated with increased mortality (*J Gerontol A Biol Sci Med Sci 1997; 52:M106*).

### Prevention

**Prevention** is the key to management of pressure ulcers. The majority of pressure ulcers are preventable. Evidence for best practices is lacking, making pressure ulcers a "never event" a questionable goal. Measures include:

- **Risk factor assessment,** including immobility, limited activity, incontinence, impaired nutritional status, impaired circulation, and altered level of consciousness.
- **Skin care,** including daily inspection with particular attention to bony prominences and minimizing exposure to moisture from incontinence, perspiration, or wound drainage. Moisturizers should be applied to dry sacral skin.
- Nutritional supplements in patients at risk.
- Interventions aimed at **relieving or redistributing pressure,** including frequent repositioning (minimum of every 2 hours, or every 1 hour for wheelchair-bound patients), pillows or foam wedges between bony prominences, maintenance of the head of the bed at the lowest degree of elevation, and use of lifting devices when moving patients. **Pressure-reducing devices** (foam, dynamic air mattresses) and pressure-relieving devices (low-air-loss, air-fluidized beds) can also be used (*JAMA 2006; 296:974*).

## DIAGNOSIS

### Clinical Presentation

*Physical Examination*

National Pressure Ulcer Advisory Panel Staging:

- **Suspected deep tissue injury:** Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer, or cooler as compared to adjacent tissue.
- **Stage I:** Intact skin with nonblanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.
- **Stage II:** Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.
- **Stage III:** Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon, or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.
- **Stage IV:** Full thickness tissue loss with exposed bone, tendon, or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.
- **Unstageable:** Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green, or brown) and/or eschar (tan, brown, or black) in the wound bed.

### TREATMENT

- **Initial interventions** include use of pressure-relieving devices, occlusive dressings, pain control, normal saline for cleansing, use of topical agents that promote wound healing (DuoDERM, silver sulfadiazine [Silvadene], bacitracin zinc, Neosporin, Polysporin), avoidance of agents that delay healing (antiseptic agents, such as Dakin solution, hydrogen peroxide; wet-to-dry gauze), and removal of necrotic debris.
- **Adequate nutrition** with particular attention to protein intake (1.25 to 1.50 g protein/kg/d), vitamin C (500 mg PO daily), and zinc sulfate (220 mg PO daily) supplementation in the presence of deficiencies may also facilitate healing.
- For clean pressure ulcers that continue to produce exudate or are not healing after 2 to 4 weeks of therapy, consider a 2-week trial of **topical antibiotic** (e.g., silver sulfadiazine, double antibiotic).
- **Other adjunctive therapies** for nonhealing ulcers include electrical stimulation, radiant heat, negative pressure therapy, and surgical intervention (*JAMA 2008;300:2647*).

## Other Precautions

### GENERAL PRINCIPLES

#### Prevention

- **Fall precautions** should be written for patients who have a history of falls or are at high risk of a fall (i.e., those with dementia, syncope, orthostatic hypotension). Falls are the most common accident in hospitalized patients, frequently leading to injury. Fall risk should not be equated with confinement to bed, which may lead to debilitation and higher risk of future falls.
- **Seizure precautions** should be considered for patients with a history of seizures or those at risk of seizing. Precautions include padded bed rails and an oral airway at the bedside.
- **Restraint orders** are written for patients who are at risk of injuring themselves or interfering with their treatment due to disruptive or dangerous behaviors. Restraint orders must be reviewed and renewed every 24 hours. Physical restraints may exacerbate agitation. Bed alarms or sitters are alternatives in appropriate settings.

# ACUTE INPATIENT CARE

- New or recurrent symptoms that require evaluation and management frequently develop in hospitalized patients.
- Evaluation should generally include a directed history, including a complete description of the symptom (i.e., alleviating and precipitating factors, quality of the symptom, associated symptoms, and the course of the symptom, including acuity of onset, severity, duration, and previous episodes); physical examination; review of the medical problem list; review of medications with attention to recent medication discontinuation, addition, or dosage adjustment; and consideration of recent procedures.

- Further evaluation should be directed by the initial assessment, the acuity and severity of the complaint, and the diagnostic possibilities.
- An approach to selected common complaints is presented in this section.

# Chest Pain

## GENERAL PRINCIPLES

Chest pain is a common complaint in the hospitalized patient, and the severity of chest discomfort does not always correlate with the gravity of its cause. Chest pain should be evaluated to distinguish potentially life-threatening conditions such as pulmonary embolus, myocardial infarction, and aortic dissection from less serious cases.

## DIAGNOSIS

### Clinical Presentation

#### *History*

**History** should be taken in the context of the patient's other medical conditions, particularly previous cardiac or vascular history, cardiac risk factors, and factors that would predispose to a pulmonary embolus.

#### *Physical Examination*

**Physical examination** is ideally conducted during an episode of pain and includes vital signs (with bilateral BP measurements if considering aortic dissection), a careful cardiopulmonary and abdominal examination, and inspection and palpation of the chest for possible trauma, rash, and reproducibility of the pain.

### Diagnostic Testing

Assessment of **oxygenation status, chest radiography, and electrocardiogram (ECG)** is appropriate in most patients. Serial cardiac enzymes should be obtained if there is suspicion of ischemia. Spiral computed tomography (CT) and VQ scans are employed to diagnose pulmonary embolus.

## TREATMENT

- If **cardiac ischemia** is a concern, initial therapy should include supplemental oxygen, aspirin, and administration of nitroglycerin, 0.4 mg SL, or morphine sulfate, 1 to 2 mg IV, or both. Treatment of ischemic heart disease is discussed in Chapter 3, Preventative Cardiology and Ischemic Heart Disease.
- If a **gastrointestinal (GI) source** of chest pain is suspected, a combination of Maalox and diphenhydramine (30 mL of each in a 1:1 mix) can be administered.
- **Costochondritis** or other **musculoskeletal pain** typically responds to nonsteroidal anti-inflammatory drug (NSAID) therapy.
- **Prompt empiric anticoagulation** while awaiting testing should be considered if there is high suspicion for myocardial infarction or pulmonary embolism (barring contraindication).

# Dyspnea

## GENERAL PRINCIPLES

**Dyspnea** is most commonly caused by a cardiopulmonary abnormality, such as CHF, cardiac ischemia, bronchospasm, pulmonary embolus, infection, mucus plugging, and aspiration. Dyspnea must be promptly and carefully evaluated.

## DIAGNOSIS

### Clinical Presentation

*History*

Initial evaluation should include a review of the medical history for underlying pulmonary or cardiovascular disease, and a directed history.

*Physical Examination*

A detailed cardiopulmonary examination should take place, including vital signs with comparison of current findings to those documented earlier.

### Diagnostic Testing

- Oxygen assessment should take place promptly. Arterial blood gas measurement provides more information than pulse oximetry. Chest radiography is useful in most patients.
- Other diagnostic and therapeutic measures should be directed by the findings in the initial evaluation and the severity of the suspected diagnosis.

## TREATMENT

Therapeutic measures should be directed by the findings in the initial evaluation and the severity of the suspected diagnoses.

# Acute Hypertensive Episodes

## GENERAL PRINCIPLES

### Etiology

- Acute hypertensive episodes in the hospital are most often caused by inadequately treated essential hypertension.
- Volume overload and pain may exacerbate hypertension and should be recognized appropriately and treated.
- Hypertension associated with withdrawal syndromes (e.g., alcohol, cocaine, etc.) and rebound hypertension associated with sudden withdrawal of antihypertensive medications (i.e., clonidine, $\alpha$-adrenergic antagonists) should be considered. These entities should be treated as discussed in Chapter 3, Preventative Cardiology and Ischemic Heart Disease.

## TREATMENT

Treatment decisions should consider baseline BP, presence of symptoms (e.g., chest pain or shortness of breath), and current and baseline antihypertensive medications.