

3.5 DRUG SAFETY, PHARMACOECONOMICS, AND PHARMACOEPIDEMIOLOGY

The availability and use of pharmaceutical agents has widely expanded in healthcare, as have concerns about adverse drug events (ADEs). When prescribing medications, hospitalists should strive to use evidence-based therapies and must evaluate the benefits, harms, and financial costs of drug therapy for individual patients. Annually in the United States, 380,000 to 450,000 preventable ADEs occur in hospitalized patients.¹ Notably, 82% of American adults take at least 1 medication and 29% take 5 or more, and drug-drug interactions account for 3% to 5% of ADEs.^{2,3} The occurrence of ADEs is associated with increased mortality, morbidity, prolonged hospitalization, and higher costs of care.⁴ In clinical practice, hospitalists should promote and lead multidisciplinary teams to develop and implement protocols, guidelines, and clinical pathways that recommend preferred drug therapies. In addition, hospitalists should have familiarity in interpreting outcomes measurement (pharmacoepidemiology) and economic analyses (pharmacoeconomics).

KNOWLEDGE

Hospitalists should be able to:

- Describe principles of evaluating clinical efficacy, pharmacokinetics, dosing, drug and food interactions, and adverse effects that can affect the choice of agent, dosing frequency, and route of administration.
- Explain the evidence-based rationale for prophylactic drug therapies, comparing the costs, risks, and benefits of competing strategies.
- Explain how pharmacodynamics may change with age, liver disease, and renal insufficiency.
- Describe the incidence of various types of ADEs in hospitalized patients, which may include adverse effects, interactions, and errors.
- Recognize the risk of ADEs during care transitions.
- Explain the role of polypharmacy in the development of delirium, ADEs, and noncompliance.
- Describe how the overuse of antibiotics promotes antibiotic resistance.
- Describe potential complications associated with administration of blood products.
- Describe key principles for interpreting pharmacoeconomic analyses, including inflation rate, discounting rate, incremental analysis, sensitivity analysis, and inherent bias.
- Describe the clinical efficacy, safety profile, pharmacokinetics, dosing, drug and food interactions, and costs of commonly prescribed medications and biological agents (eg, blood products).

SKILLS

Hospitalists should be able to:

- Adjust prescribing strategies for patients according to con-

ditions that may influence pharmacokinetics, such as age or comorbidities.

- Apply treatment guidelines to individual patients to use antibiotics judiciously to reduce cost and the emergence of antibiotic resistance.
- Integrate knowledge of benefits and risks of drug therapies into medical decision-making for individual patients and routinely reassess decisions.
- Minimize ADEs by following best practice models of medication ordering and administration.
- Document medications accurately and legibly, taking into account approved abbreviations, and indicate start and stop dates for short-term medications.
- Arrange appropriate follow-up for therapies that require outpatient monitoring, dosage adjustment, and education (eg, anticoagulants, antibiotics).
- Balance the benefits, risks, and cost of prophylactic therapies, which may include venous thromboembolism and stress ulcer prophylaxis.
- Convert intravenous medications to the oral route when indicated to promote patient safety, satisfaction, and reduce cost.
- Follow standard practices for transfusion of blood products.
- Educate patients and families regarding the indications, benefits, potential adverse effects, alternatives, and directions for use of the prescribed medications.
- Educate patients and families about the importance of acquiring medication information and communicating medication history to clinicians at each transition of care.
- Reconcile outpatient medications with inpatient medications at the time of admission and discharge.
- Critically assess and apply results of outcome studies to improve drug treatment and safety for individual patients.
- Lead, coordinate, and/or participate in the development, use, and dissemination of local, regional, and national practice guidelines and patient safety alerts pertaining to the prevention of complications.
- Apply principles of pharmacoepidemiology and pharmacoeconomics to implement practice guidelines and protocols for a hospital.

ATTITUDES

Hospitalists should be able to:

- Appreciate that ADEs must be monitored and that steps must be taken to reduce their incidence.
- Exemplify safe medication prescribing and administration practices.
- Engage collaboratively with multidisciplinary teams, which may include pharmacy, nursing service, social work, case management, long-term care facilities, and outpatient care teams, to improve drug safety for individual patients and reduce costs.

References

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4. Classen DC, Pestotnik SL, Evans RS, Lloyd JF, Burke JP. Adverse drug events in hospitalized patients. Excess length of stay, extra costs, and attributable mortality. *JAMA*. 1997;277(4):301-306.