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CHAPTER

MODELS AND STANDARDS OF ANTICOAGULATION CARE DELIVERY

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INTRODUCTION

Anticoagulant medications are highly effective for the treatment and prevention of thrombosis, but continued efforts are necessary to optimize the safety and efficacy of this drug class. Anticoagulants are a common source of medication errors in the hospital and adverse drug events (ADEs) for patients at home.[1,2] As a class, anticoagulants cause approximately 10% of drug-related adverse outcomes among hospitalized patients and more than 30% of ADEs among Medicare beneficiaries.[3,4] The direct-acting oral anticoagulants (DOACs) have the potential to improve the safety of oral anticoagulant therapy, but each new medication brings an additional layer of complexity in anticoagulation management.

The Department of Health and Human Services' National Action Plan for Adverse Drug Event Prevention report underscores that quality improvement efforts for anticoagulant medications are necessary to improve patient safety and reduce cost.[5] The report stressed a need for sharing best practices and highlighted organizations like the Anticoagulation Forum (ACF) and their Anticoagulation Centers of Excellence program (excellence.acforum.org), which includes a resource center for sharing references, documents, and protocols/guidelines. This chapter will review models and standards of anticoagulation management service (AMS) practices for optimal anticoagulation therapy management in the inpatient and ambulatory care settings.

INPATIENT ANTICOAGULATION CARE DELIVERY

Structure

Comprehensive pharmacy services are essential for successful delivery of safe and effective anticoagulation therapy in the acute care setting.[6] Overall structure of the inpatient AMS may vary, but multidisciplinary stakeholders should be represented to establish hospital procedures and protocols/guidelines relating to anticoagulant therapy, including:

- Physician champion
- Pharmacy services
    - Clinical
    - Operational
- Nursing
- Physician groups
    - Cardiology
    - Hematology
- Information technology
- Laboratory
- Dietary
- Outpatient anticoagulation clinic

The reporting structure for the AMS should be clearly defined in hospital policy, procedure, and collaborative drug therapy management agreements.[6] Front-line staff operating under collaborative drug therapy management (CDTM) agreements should be educated as to the appropriate steps for managing clinical scenarios that are out of scope or beyond their clinical expertise. Strong leadership from both administrative executives as well as a clinical physician champion is essential to support the AMS throughout the organization.[6] An example of inpatient anticoagulation service operational structure is provided in **Figure 23-1**. Individual health systems may need to tailor anticoagulation service structure according to local regulatory requirements and infrastructure limitations.

Standards of Practice

The AMS should ensure the anticoagulation delivery processes are standardized wherever possible.[6] A summary of inpatient AMS standards is provided in **Table 23-1**. The use of protocols/guidelines to provide evidence-based decision support improves accuracy of anticoagulation dose decisions, ensures the timeliness of appropriate laboratory monitoring, and minimizes errors. Protocols/guidelines should be widely available, and all prescribers should be encouraged to use them. Anticoagulant protocols/guidelines should identify commonly prescribed oral and parenteral anticoagulants (e.g., unfractionated heparin [UFH], low molecular weight heparin [LMWH], factor Xa inhibitors, direct thrombin inhibitors, warfarin) and highlight appropriate dosing, monitoring, and follow-up. In addition, special situations affecting drug selection and dosing should also be covered, including:

- Renal insufficiency and dialysis
- Pediatric patients
- Liver disease
- Pregnancy
- Obesity
- Low weight or malnourished