COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR POSTGRADUATE YEAR TWO (PGY2) THROMBOSIS AND HEMOSTASIS MANAGEMENT PHARMACY RESIDENCY

DEMONSTRATION PGY2

Prepared jointly by the American Society of Health-System Pharmacists (ASHP) and the Anticoagulation Forum

Introduction

The field of thrombosis and hemostasis management is evolving rapidly, and clinical pharmacists are increasingly called upon as experts in the management of therapies utilized to prevent and treat serious and life-threatening bleeding and thrombotic events across care settings. High-quality thrombosis and hemostasis management services involving clinical pharmacists have been shown to improve patient outcomes and reduce health care expenditures. Therefore, rigorous and comprehensive training in the field is necessary to fully prepare pharmacists for positions in this challenging and rewarding discipline.

The PGY2 Thrombosis and Hemostasis Management residency program offers the opportunity to develop clinical, teaching, and leadership skills required to practice with competence and confidence in the discipline. The program encompasses the fields of clinical practice, medication safety, leadership, quality improvement and anticoagulation stewardship and is designed to develop expert skills in caring for patients experiencing or at risk of thrombosis and bleeding. Upon successful completion, the resident will have expertise in the clinical management of the many therapies utilized to prevent and treat thrombosis and bleeding. Residents will be able to develop, implement and advance system-level improvements to measurably improve the safety and quality of patient care, and will be prepared to effectively educate clinicians and non-clinicians regarding these high-risk agents.

ASHP's Commission on Credentialing (COC) has approved the development of Competency Areas, Goals, and Objectives (CAGOs) in the area of thrombosis and hemostasis management in collaboration with the AC Forum and encourages growth in this emerging field of pharmacy. The COC will accept new applications in this novel advanced practice area and the pharmacy residency program shall be called a PGY2 Thrombosis and Hemostasis Management (THM) residency. Programs seeking accreditation in this area will be required to utilize the CAGOs developed and contained in this document to administer their program. The COC shall accredit programs under usual and customary processes and shall monitor the growth of pharmacy residency programs in this novel advanced area for sustainability. PGY2 THM programs in the accreditation process shall be monitored annually for a set period of time, typically over 4 years (demonstration period). Upon completion of the demonstration period, and as determined by the COC, PGY2 THM may become an officially recognized advanced area of pharmacy residency training upon review of growth and sustainability and acceptance within the job market and the term *Demonstration* shall be formally discontinued. The COC shall have the right and responsibility to sunset the novel PGY2 if critical mass is not achieved or no programs are in the accreditation process, as part of its regular consideration across all PGY2 program types.

The competency areas, goals, and objectives are to be used in conjunction with the *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs.* The first five competency areas described herein are required, and the others are elective.

The required competency areas and all of the goals and objectives they encompass must be included in all programs. Programs may add one or more required additional competency areas from the elective competency area choices to meet program-specific needs. Programs selecting an additional competency area are not required to include all of the goals and objectives in that competency area. In addition to the potential additional competency areas described in this document, programs may create their own unique competency areas with associated goals and objectives based on the specific needs of their program. Each of the objectives associated with the goals encompassed by the program's selected program competency areas (required and additional) must be taught and evaluated at least once during the residency year. Elective competency area(s) may also be selected for specific residents when creating their residency development plan.

Each of the objectives listed in this document has been classified according to educational taxonomy (cognitive, affective, or psychomotor) and level of learning. An explanation of the taxonomies is available elsewhere.[1]

Competency areas for PGY1 residencies are available on the ASHP website. PGY2 competency areas, goals, and objectives in advanced areas of pharmacy practice are differentiated from those from PGY1 by specialization and the expectation of PGY2 residents for greater work competence and proficiency.

Definitions

Competency Areas: Categories of the residency graduates' capabilities.

Competency areas are classified into one of three categories:

> *Required*: Five competency areas are required (all programs must include them and all their associated goals and objectives).

> *Additional (for program)*: Competency area(s) that residency programs may choose to use (in addition to the five required areas) to meet program-specific program needs. Additional competency areas also include those developed by individual programs.

> *Elective (for specific residents)*: Competency area(s) or specific goals and objectives within the competency area(s) selected optionally for specific resident(s).

Criteria: Examples that describe competent performance of educational objectives. Since the criteria are examples, they are not all required but are intended to be used to give feedback to residents on how well they are doing and how they can improve on the skill described in educational objectives while they engage in an activity.

Educational Goals (Goal): Broad statement of abilities.

Educational Objectives: Observable, measurable statements describing what residents will be able to do as a result of participating in the residency program.

Example:

Objective R1.1.2: (Applying) Interact effectively with patients, family members, and caregivers.

Criteria:

- Interactions are respectful and collaborative.
- Uses effective communication skills.
- Shows empathy.
- Empowers patients to take responsibility for their health.
- Demonstrates cultural competence.

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[1] Anderson, L. W. and Krathwohl, D. R., et al (Eds.) (2001) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* Allyn & Bacon. Boston, MA (Pearson Education Group).

Competency Area R1: Patient Care

(See the appendix for additional specific requirements.)

Goal R1.1: In collaboration with the health care team, provide comprehensive management for the prevention and treatment of thrombosis and bleeding in a consistent patient care process.

Objective R1.1.1: (Applying) Interact effectively with health care teams to manage therapy for the prevention and treatment of thrombosis and bleeding.
Criteria:
- Interactions are cooperative, collaborative, communicative, and respectful.
- Demonstrates skills in consensus building, negotiation, and conflict management.
- Demonstrates advocacy for the patient.
- Effectively contributes pharmacotherapy knowledge and patient care skills as an essential member of the healthcare team.

Objective R1.1.2: (Applying) Interact effectively with patients requiring prevention and treatment of thrombosis and bleeding, as well as family members, and caregivers.
Criteria:
- Interactions are respectful and collaborative.
- Maintains accuracy and confidentiality of patients' protected health information.
- Uses effective (e.g., clear, concise, accurate) communication skills.
- Shows empathy.
- Empowers patients, family members, and caregivers regarding the patient's well-being and health outcomes.
- Demonstrates cultural competence.
- Communicates with family members to obtain patient information when patients are unable to provide the information.
- Communicates with patient and family about initiation and changes of patient therapies.
- Demonstrates advocacy for caregivers.

Objective R1.1.3: (Analyzing) Collect information on which to base safe and effective therapy for patients requiring prevention and treatment of thrombosis and bleeding.
Criteria:
- Collection/organization methods are efficient and effective.
- Collects relevant information, including:
  - History of present illness.
  - Relevant health data that may include past medical history, health and wellness information, biometric test results, and physical assessment findings, particularly as they relate to thrombosis and bleeding.
  - Social history, particularly as it relates to thrombosis and bleeding (e.g., smoking and heavy alcohol consumption).
  - Medication history, including prescription, non-prescription, illicit, recreational, and non-traditional therapies; other dietary supplements; immunizations; and allergies.
  - Patient assessment (examples include, but are not limited to, physiologic monitoring, laboratory values, diagnostic imaging, procedural results, and scoring systems (e.g., CHA2DS2-VASc, HASBLED, NIHSS Score).

- Pharmacogenomics and pharmacogenetic information, if available.
  - Adverse drug reactions.
  - Medication adherence and persistence.
  - Patient lifestyle habits, preferences and beliefs, health and functional goals, and socioeconomic factors that affect access to medications, risk of bleeding (e.g., contact sports) and thrombosis and other aspects of care.
- Ensures sources of information are the most reliable available, including electronic, face-to-face, and others.
- Recording system is functional for subsequent problem solving and decision making.
- Clarifies information as needed.
- Displays understanding of limitations of information in health records and takes appropriate actions to acquire critically important information (e.g., timing and strength of most recent DOAC dose before a procedure or major bleeding event), document pertinent information obtained, and have inaccuracies clarified in the medical record.
- Poses appropriate questions as needed.

Objective R1.1.4: (Analyzing) Analyze and assess information on which to base safe and effective therapy for patients requiring prevention and treatment of thrombosis and bleeding.
Criteria:
- Includes accurate assessment of patient's:
  - Health and functional status.
  - Risk factors.
  - Health data.
  - Cultural factors (e.g., willingness to receive blood products).
  - Health literacy.
  - Access to medications.
  - Immunization status.
  - Need for preventive care and other services, when appropriate.
  - Presence of external or implanted medical devices (e.g., mechanical heart valves, left atrial appendage occlusion device, left ventricular assist device).
  - Other aspects of care, as applicable.
- Identifies medication therapy problems, including:
  - Lack of indication for medication.
  - Medical conditions for which there is no medication prescribed.
  - Medication prescribed or continued inappropriately for a particular medical condition.
  - Suboptimal medication regimen (e.g., dose, dosage form, duration, schedule, route of administration, and method of administration).
  - Medication toxicity requiring medication therapy modifications (e.g., heparin induced thrombocytopenia).
  - Abnormal lab values requiring medication therapy modifications.
  - Therapeutic duplication.
  - Adverse drug or device-related events or the potential for such events.
  - Clinically significant drug–drug, drug–disease, drug–nutrient, drug–DNA test interaction, drug–laboratory test interaction, or the potential for such interactions.
  - Use of harmful social, recreational, nonprescription, nontraditional, or other medication therapies.
  - Patient not receiving full benefit of prescribed medication therapy.
  - Problems arising from the financial impact of medication therapy on the patient.

- o Patient lacks understanding of medication therapy.
- o Patient not adhering to medication regimen and root cause (e.g., knowledge, recall, motivation, financial, system).
- o Patient assessment needed.
- o Discrepancy between prescribed medications and established care plan for the patient.
- Prioritizes patient's health care needs in the advanced practice area.
  - o Access to laboratory monitoring or ability for patient self-testing (warfarin patients).
  - o Preference for oral medication over injectable (e.g., when LMWH may be preferred over DOAC in guidelines, but patient preference for DOAC despite known risks/limitations).

Objective R1.1.5: (Creating) Design, or redesign, safe and effective patient-centered therapeutic regimens and monitoring plans (care plans) for patients requiring prevention and treatment of thrombosis and bleeding.
Criteria:
- Specifies evidence-based, measurable, achievable therapeutic goals that reflect shared decision making between the patient/family/caregiver and multidisciplinary team and include consideration of:
  - o Relevant patient-specific information, including culture and preferences.
  - o The goals of other interprofessional team members.
  - o The patient's disease state(s).
  - o Thrombosis and bleeding history.
  - o Presence of implanted devices.
  - o Patient self-monitoring capabilities (e.g., PST).
  - o Medication-specific information.
  - o Best evidence, including clinical guidelines and the most recent literature.
  - o Effectively interprets new literature for application to patient care.
  - o Ethical issues involved in the patient's care.
  - o Quality-of-life issues specific to the patient.
  - o End of life issues, when needed.
  - o Integration of all the above factors influencing the setting of goals.
- Designs/redesigns regimens that:
  - o Are appropriate for the disease states being treated.
  - o Reflect:
    - ▪ Best available evidence.
    - ▪ Clinical experience.
    - ▪ The therapeutic goals established for the patient.
    - ▪ The patient's and caregiver's specific needs.
    Consideration of:
    - Any pertinent pharmacogenomic or pharmacogenetic factors.
    - Pertinent ethical issues.
    - Pharmacoeconomic components (patient, medical, and systems resources).
    - Patient preferences, culture, and/or language differences.
    - Patient-specific factors, including physical, mental, emotional, and financial factors that might impact adherence to the regimen.
    - Drug shortages.
  - o Adhere to the health system's medication-use policies.
  - o Follow applicable ethical standards.
  - o Address wellness promotion and lifestyle modification.
  - o Support the organization's or patient's insurance formulary.

- o   Address medication-related problems and optimize medication therapy.
- o   Engage the patient through education, empowerment, and promotion of self-management.
- Designs/redesigns monitoring plans that:
  - o   Effectively evaluate achievement of therapeutic goals.
  - o   Ensure adequate, appropriate, and timely follow-up.
  - o   Establish parameters that are appropriate measures of therapeutic goal achievement.
  - o   Reflect consideration of best evidence.
  - o   Select the most reliable source for each parameter measurement.
  - o   Have appropriate value ranges selected for the patient.
  - o   Have parameters that measure efficacy.
  - o   Have parameters that measure potential adverse drug events.
  - o   Have parameters that are cost-effective.
  - o   Have obtainable measurements of the parameters specified.
  - o   Reflects consideration of adherence.
  - o   Anticipates potential future drug-related problems.
  - o   When applicable, reflects preferences and needs of the patient.
  - o   Plan represents the highest level of patient care.

Objective R1.1.6: (Applying) Ensure implementation of therapeutic regimens and monitoring plans (care plans) for patients requiring prevention and treatment of thrombosis and bleeding, by taking appropriate follow-up actions.
Criteria:
- Effectively recommends or communicates patients' regimens and associated monitoring plans to relevant members of the health care team.
  - o   Poses appropriate questions as needed.
  - o   Recommendation is persuasive.
  - o   Presentation of recommendation accords patient's right to refuse treatment.
  - o   If patient refuses treatment, pharmacist exhibits responsible professional behavior.
  - o   Creates an atmosphere of collaboration.
  - o   Skillfully defuses negative reactions.
  - o   Communication conveys expertise.
  - o   Communication is assertive but not aggressive.
  - o   Where the patient has been directly involved in the design of the plans, communication reflects previous collaboration appropriately.
- Ensures recommended plan is implemented effectively for the patient, specifically that the:
  - o   Plan represents the highest level of patient care.
  - o   Therapy corresponds with the recommended regimen.
  - o   Regimen is initiated at the appropriate time.
  - o   Patient receives their medication as directed.
  - o   Medications in situations requiring immediacy are effectively facilitated.
  - o   Medication orders are clear and concise.
  - o   Activity complies with the health system's policies and procedures.
  - o   Tests correspond with the recommended monitoring plan.
  - o   Tests are ordered, performed and interpreted at the appropriate time.
- Takes appropriate action based on analysis of monitoring results (redesign regimen and/or monitoring plan if needed).
- Appropriately initiates, modifies, discontinues, or administers medication therapy as authorized.
- Responds appropriately to notifications and alerts in electronic medical records and other

information systems that support medication ordering processes (based on factors such as patient weight, age, gender, comorbid conditions, drug interactions, renal function, and hepatic function).
- Provides thorough and accurate education to patients and caregivers, when appropriate, including information on medication therapy, adverse effects, compliance, appropriate use, handling, and medication administration.
- Addresses medication and health related problems and engages in preventive care strategies, including vaccine administration.
- Schedules follow-up care as needed to achieve goals of therapy.

Objective R1.1.7: (Applying) For patients requiring prevention and treatment of thrombosis and bleeding, document direct patient care activities appropriately in the medical record, or where appropriate.
Criteria:
- Accurately and concisely communicates therapy recommendations to healthcare professionals representing different disciplines.
- Documents patient/caregiver communication and all relevant direct patient care activities in a timely manner.

Objective R1.1.8: (Applying) Demonstrate responsibility for patient outcomes for patients requiring prevention and treatment of thrombosis and bleeding.
Criteria:
- Gives priority to patient care activities.
- Routinely ensures all steps of the medication management process.
- Assumes responsibility for medication therapy outcomes.
- Actively works to identify the potential for significant medication-related problems.
- Actively pursues all significant existing and potential medication-related problems until satisfactory resolution is obtained.
- Ensures appropriate transitions of care.
- Communicates with patients and family members/caregivers about their medication therapy.
- Determines barriers to patient adherence and makes appropriate adjustments.

Goal R1.2: Ensure continuity of care for patients requiring prevention and treatment of thrombosis and bleeding during transitions between care settings.

Objective R1.2.1: (Applying) Facilitate transitions of care effectively for patients requiring prevention and treatment of thrombosis and bleeding.
Criteria:
- Participates in thorough medication reconciliation when necessary.
- When appropriate, follows up on identified drug-related problems, additional monitoring, pending laboratory tests and results, and education in a timely and caring manner.
- Provides accurate, pertinent, and timely follow-up information when patients transfer to another facility, level of care, pharmacist, or provider, as appropriate.
- Takes appropriate and effective steps to help avoid unnecessary hospital admissions and/or readmissions.
- Provides appropriate information to other pharmacists and other healthcare clinicians during transitions to mitigate medication therapy problems.

Goal R1.3: Manage and facilitate provision of therapies to support safe and effective care for patients requiring prevention and treatment of thrombosis and bleeding.

Objective R1.3.1: (Applying) Differentiate between antithrombotic and hemostatic stewardship metrics and the differences between process and outcomes measures.

Criteria:
- Identifies different clinical and financial metrics used to assess appropriate use of antithrombotic and hemostatic agents.
- Utilizes both process and outcome measures to optimize and improve patient care.

Objective R1.3.2: (Evaluating) Evaluate stewardship program principles, processes and outcomes based on established core elements of stewardship and patient centered outcomes.

Criteria:
- Demonstrates understanding of effective methods for measuring appropriate use of antithrombotic and hemostatic agents.
- Participates effectively in evaluating the stewardship program's impact on use of antithrombotic and hemostatic agents on patient clinical outcomes and financial outcomes.
- Uses best practices to identify problems and opportunities for improvements in stewardship activities.

Objective R1.3.3: (Applying) Facilitate aspects of the medication-use process for patients requiring prevention and treatment of thrombosis and bleeding.

Criteria:
- Makes effective use of technology to aid in decision-making and increase safety.
- Demonstrates commitment to medication safety.
- Effectively prioritizes workload and organizes workflow.
- Checks accuracy of medications dispensed, including correct patient identification, medication, dosage form, label, dose, number of doses, and expiration dates; and proper repackaging and relabeling medications, including compounded medications (sterile and nonsterile).
- Promotes safe and effective drug use on a day-to-day basis.

Objective R1.3.4: (Applying) Manage aspects of the medication-use process related to formulary management for patients requiring prevention and treatment of thrombosis and bleeding.

Criteria:
- Follows appropriate procedures regarding exceptions to the formulary, if applicable, in compliance with policy.
- Ensures non-formulary medications are evaluated, dispensed, administered, and monitored in a manner that ensures patient safety.
- Demonstrates a working knowledge of the medical evidence impacting the selection and use of agents in clinical care.

Objective R1.3.5: (Applying) Facilitate provision of therapies for patients requiring prevention and treatment of thrombosis and bleeding following best practices and local organization policies and procedures.

Criteria:
- Correctly interprets appropriateness of a medication order before preparing or permitting the distribution of the first dose, including:

- o Identifying, clarifying, verifying, and correcting any medication order errors.
- o Considering complete patient-specific information.
- o Identifying existing or potential drug therapy problems.
- o Determining an appropriate solution to an identified problem.
- o Securing consensus from the prescriber for modifications to therapy.
- o Ensuring that the solution is implemented.
- Prepares medication using appropriate techniques and following the organization's policies and procedures and applicable professional standards, including:
  - o When required, accurately calibrating equipment (e.g., point of care INR devices).
  - o Ensuring intravenous solutions are appropriately concentrated, without incompatibilities; stable; and appropriately stored.
  - o Adhering to appropriate safety and quality assurance practices.
  - o Preparing labels that conform to the health system's policies and procedures, as appropriate.
  - o Ensuring that medication has all necessary and appropriate ancillary labels.
  - o Inspecting the final medication before dispensing for accuracy, as appropriate.
- When dispensing medication products:
  - o Follows the organization's policies and procedures.
  - o Ensures the patient receives the medication(s) as ordered.
  - o Ensures the integrity of medication dispensed.
  - o Provides any necessary written and/or verbal counseling for the patient and support/education for relevant interdisciplinary staff (e.g., nursing, respiratory therapy).
  - o Ensures the patient receives medication on time.
- Maintains accuracy and confidentiality of patients' protected health information.
- Obtains agreement on modifications to medication orders when acting in the absence of, or outside, an approved protocol or collaborative agreement.
- Ensures appropriate dosing, preparation, and dispensing the following types of medications:
  - o Blood factor products.
  - o Anticoagulant reversal agents.
  - o Medications used in emergency response, cardiac arrest, stroke response.
- References appropriate literature resources to ensure use of proper practices regarding compatibility, fluid overload, and concentrations.

Competency Area R2: Advancing Practice and Improving Systems of Care

Goal R2.1: Demonstrate ability to manage formulary and medication-use processes for patients requiring prevention or treatment of thrombosis or bleeding, as applicable to the organization.

Objective R2.1.1: (Creating) Prepare or revise a drug class review, monograph, treatment guideline, or protocol related to care of patients, including proposals for medication-safety technology improvements in those requiring prevention or treatment of thrombosis or bleeding.
Criteria:
- Displays objectivity.
- Effectively synthesizes information from the available literature.
- Applies evidenced-based principles.
- Consults relevant sources.

- Considers medication-use safety and resource utilization.
- Uses the appropriate format.
- Effectively communicates any changes in medication formulary, medication usage, or other procedures to appropriate parties.
- Demonstrates appropriate assertiveness and timeliness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- When appropriate, includes proposals for medication-safety technology improvements.

Objective R2.1.2: (Evaluating) Participate in medication-use evaluation related to care for patients requiring prevention or treatment of thrombosis or bleeding.
Criteria:
- Uses evidence-based principles to develop criteria for use.
- Demonstrates a systematic approach to gathering data.
- Accurately analyzes data gathered.
- Demonstrates appropriate confidence and assertiveness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- Implements approved changes, as applicable.

Objective R2.1.3: (Analyzing) Identify opportunities for medication-use system improvements related to care of patients requiring prevention or treatment of thrombosis or bleeding.
Criteria:
- Identifies problems and opportunities for improvement and analyzes relevant background data.
- Evaluates data generated by health information technology or automated systems to identify opportunities for improvement.
- Utilizes best practices to identify opportunities for improvements.
- When needed, makes medication-use policy recommendations based on a review of practice standards, guidelines, and other evidence (e.g., National Quality Measures, Institute for Safe Medication Practices alerts, Joint Commission sentinel alerts).

Goal R2.2: Contribute to the organization's efforts to identify actual or potential failures and/or promote appropriate antithrombotic and hemostatic agent use within the current medication-use systems/policies.

Objective R2.2.1: (Applying) Demonstrate understanding of the steps and applicability of a root cause analysis (RCA) and failure mode and effect analysis (FMEA).
- Utilizes organizational templates and processes in the evaluation of medication errors and patient harm events involving bleeding and thrombosis.
- Identifies appropriate sources of information to support the evaluation of care processes in the context of organizational policy and recognized best practices.

Objective R2.2.2: (Analyzing) Contribute to the organization's evaluation of, and response to thrombotic and hemostatic therapy-related events.
- Effectively uses currently available technology and automation that support a safe medication-use process.

- Appropriately and accurately determines, investigates, reports, tracks, and trends adverse drug events, medication errors, and efficacy concerns using accepted institutional resources and programs.
- Participates in the development and implementation of corrective actions in response to thrombotic and hemostatic therapy-related events.

Goal R2.3: Demonstrate ability to conduct a quality improvement and/or research project related to the care of patients requiring prevention or treatment of thrombosis or bleeding.

Ideally, objectives R2.3.1-R2.3.6 will be addressed through residents working on one quality improvement or research project; however, if this is not possible, all objectives must be addressed by the end of the residency year and can be addressed through work on more than one initiative.

Objective R2.3.1: (Analyzing) Identify, and/or demonstrate understanding of, a quality improvement project and/or research project to improve the care of patients requiring prevention or treatment of thrombosis or bleeding, or for a topic for advancing the pharmacy profession in the field of thrombosis and hemostasis.

Criteria:
- Appropriately identifies or understands problems and opportunities for improvement or research projects.
- Conducts a comprehensive literature search and draws appropriate conclusions.
- Determines an appropriate research question or topic for a practice-related project of significance to patient care that can realistically be addressed in the desired time frame.
- Uses best practices or evidence-based principles to identify opportunities for improvement.
- Accurately evaluates or assists in the evaluation of data generated by health information technology or automated systems to identify opportunities for improvement.

Objective R2.3.2: (Creating) Develop a plan or research protocol for a quality improvement project or research study.

Criteria:
- Develops specific aims, selects an appropriate study design, and develops study methods to answer the research question(s).
- Applies safety design practices (e.g., standardization, simplification, human factors training, lean principles, FOCUS-PDCA, other process improvement or research methodologies) appropriately and accurately.
- Plan for improvement includes appropriate reviews and approvals required by department or organization and addresses the concerns of all stakeholders.
- Applies evidence-based and/or basic pharmacoeconomic principles, if needed.
- Develops a feasible design for a prospective or retrospective clinical or outcomes analysis project that considers who or what will be affected by the project.
- Identifies and obtains necessary approvals, (e.g., IRB, quality review board, funding) and responds promptly to feedback or reviews for a practice-related project.
- Acts in accordance with the ethics of research on human subjects, if applicable.
- Implements the project as specified in its design.

- Plan design is practical to implement and is expected to remedy or minimize the identified challenge or deficiency.

Objective R2.3.3: (Evaluating) Collect and evaluate data for the project.

Criteria:

- Collects the appropriate types of data as required by project design.
- Uses appropriate electronic data and information from internal information databases, external online databases, appropriate Internet resources, and other sources of decision support, as applicable.
- Uses appropriate methods for analyzing data in a prospective and retrospective clinical, humanistic, and/or economic outcomes analysis.
- Develops and follows an appropriate research or project timeline.
- Correctly identifies need for additional modifications or changes to the project.
- Applies results of a prospective or retrospective clinical, humanistic, and/or economic outcomes analysis to internal business decisions and modifications to a customer's formulary or benefit design as appropriate.
- Uses continuous quality improvement (CQI) principles to assess the success of the implemented change, if applicable.
- Considers the impact of the limitations of the project or research design on the interpretation of results.
- Accurately and appropriately develops a plan to address opportunities for additional changes.

Objective R2.3.4: (Applying) Implement the project.

Criteria:

- Plan is based on appropriate data.
- Effectively presents plan (e.g., accurately recommends or contributes to recommendation for operational change, formulary addition or deletion, implementation of medication guideline or restriction, or treatment protocol implementation) to appropriate audience.
- Demonstrates appropriate assertiveness in presenting pharmacy concerns, solutions, and interests to external stakeholders.
- Gains necessary commitment and approval for implementation.
- Follows established timeline and milestones.
- Effectively communicates any changes in medication formulary, medication usage, or other procedures to appropriate parties.
- Outcome of change is evaluated accurately and fully.

Objective R2.3.5: (Evaluating) Assess project results and the need to make changes to improve care of patients and/or patient outcomes, if applicable.

Criteria:

- Evaluates data and/or outcome of project accurately and fully.
- Includes operational, clinical, economic, and humanistic outcomes of patient care, if applicable.
- Uses continuous quality improvement (CQI) principles to assess the success of the implemented change, if applicable.
- Correctly identifies need for additional modifications or changes based on outcome.
- Accurately assesses the impact of the project, including its sustainability (if applicable).

- Accurately and appropriately develops a plan to address opportunities for additional changes.

Objective R2.3.6: (Creating) Effectively develop, present orally, and prepare a written summary of the results of a thrombosis and hemostasis-related project that is suitable for publication, using correct grammar, punctuation, spelling, style, and formatting conventions (the presentation may be virtual)**.**
Criteria:
- Outcome of change is reported accurately to appropriate stakeholders(s) and policy-making bodies according to departmental or organizational processes.
- Report includes implications for changes to or improvement in pharmacy practice.
- Report uses an accepted manuscript style suitable for publication in the professional literature.
- Oral presentations to appropriate audiences within the department and organization or to external audiences use effective communication and presentation skills and tools (e.g., handouts, slides) to convey points successfully.

Goal R2.4: Serve as an organizational resource for regulatory compliance related to bleeding and thrombosis-related systems and policies.

Objective R2.4.1: (Evaluating) Evaluate the organization's antithrombotic and/or hemostatic use processes, systems and policies for appropriate compliance with relevant standards, laws and regulations.
Criteria:
- Assesses organizational policies and procedures for alignment with most recent regulations and accreditation standards.
- Develops recommendations for improvement of existing systems and policies.
- Proposes strategies for the effective implementation of processes, systems and policies.
- Participates in continuous quality improvement (e.g., medication safety reporting, site surveys, oversight committees).

Competency Area R3: Leadership and Management

Goal R3.1: Demonstrate leadership skills for successful self-development

Objective R3.1.1: (Applying) Demonstrate personal, interpersonal, and teamwork skills critical for effective leadership.
Criteria:
- Demonstrates efficient time management.
- Manages conflict effectively.
- Demonstrates effective negotiation skills.
- Demonstrates ability to lead interprofessional teams.
- Uses effective communication skills and styles.
- Demonstrates understanding of perspectives of various health care professionals.

- Effectively expresses benefits of personal profession-wide leadership and advocacy.
- Effectively provides leadership in patient care related services, including interprofessional teams, code blue, and rapid response teams.

Objective R3.1.2: (Applying) Apply a process of ongoing self-evaluation and personal performance improvement.
Criteria:
- Accurately summarizes own strengths and areas for improvement (in knowledge, values, qualities, skills, and behaviors).
- Effectively uses a self-evaluation process for developing professional direction, goals, and plans.
- Effectively engages in self-evaluation of progress on specified goals and plans.
- Demonstrates ability to use and incorporate constructive feedback from others.
- Effectively uses principles of continuous professional development (CPD) planning (reflect, plan, act, evaluate, record/review).

Goal R3.2: Demonstrate comprehensive management skills to support the provision of safe and effective care for patients requiring prevention and treatment of thrombosis and bleeding.

Objective R3.2.1: (Applying) Contribute to pharmacy departmental management of issues related to the care of patients requiring prevention and treatment of thrombosis and bleeding.
Criteria:
- Helps identify and define significant departmental needs.
  - Personnel/staffing needs.
  - Staff scheduling and contingencies.
  - Staff qualifications.
  - Assesses and develops educational opportunities for advanced practice area service line staff.
- Helps develop plans that address departmental needs.
  - Orientation.
  - Training and supervision.
  - Effectively participate in, or evaluate, strategic plan.
- Participates effectively on committees or informal work groups to complete group projects, tasks, or goals.
- Participates effectively in implementing changes, using change management and quality improvement best practices and tools, consistent with team, departmental, and organizational goals.

Objective R3.2.2: (Applying) Cultivate and maintain an updated thrombosis and hemostasis practice, utilizing current best practices and therapies.
Criteria:
- Reviews and interprets the most recent primary literature.
- Evaluates clinical practice activities for potential contributions to scholarship.
- Accurately assesses successes and areas for improvement (e.g., a need for staffing projects or education) in managing one's own practice.
- Makes accurate, criteria-based assessments of one's own ability to perform practice tasks.
- Regularly integrates new learning into subsequent performances of a task until expectations are

met.
- Routinely seeks applicable learning opportunities when performance does not meet expectations.
- Demonstrates effective workload and time-management skills.
- Assumes responsibility for personal work quality and improvement.
- Is well prepared to fulfill responsibilities (e.g., patient care, projects, management, and meetings).
- Sets and meets realistic goals and timelines.
- Demonstrates awareness of own values, motivations, and emotions.
- Demonstrates enthusiasm, self-motivation, and a "can-do" approach.
- Strives to maintain a healthy work–life balance.
- Works collaboratively within the organization's political and decision-making structure.
- Demonstrates pride in and commitment to the profession through appearance, personal conduct, planning to pursue board certification.
- Demonstrates pride in and commitment to the profession of pharmacy and thrombosis/hemostasis management through membership in professional organizations related to thrombosis and hemostasis.
- Demonstrates personal commitment to and adheres to organizational and departmental policies and procedures.

Competency Area R4: Teaching, Education, and Dissemination of Knowledge

Goal R4.1: Provide effective therapy and practice-related education on prevention and treatment of thrombosis and bleeding to patients,   caregivers, health care professionals, students, and the public (individuals and groups).

Objective R4.1.1: (Applying) Design effective educational activities related to thrombosis and hemostasis management.
Criteria:
- Accurately defines educational needs, including learning styles, with regard to target audience (e.g., individual versus group) and learning level (e.g., health care professional versus patient, student versus PGY1 resident).
- Selects topics of significance to thrombosis and hemostasis as outlined in the appendix.
- Defines educational objectives that are specific, measurable, at a relevant learning level (e.g., applying, creating, evaluating), and address the audiences' defined learning needs.
- Plans use of teaching strategies that match learner needs, including active learning (e.g., patient cases, polling).
- Selects content that is relevant, thorough, evidence based (using primary literature where appropriate), timely and reflects best practices.
- Includes accurate citations and relevant references and adheres to applicable copyright laws.

Objective R4.1.2: (Applying) Use effective presentation and teaching skills to deliver education related to thrombosis and hemostasis management.
Criteria:

- Demonstrates rapport with learners.
- Captures and maintains learner/audience interest throughout the presentation.
- Implements planned teaching strategies effectively.
- Effectively facilitates audience participation, active learning, and engagement in various settings (e.g., small or large group, distance learning).
- Presents at appropriate rate and volume and without exhibiting poor speaker habits (e.g., excessive use of "um" and other interjections).
- Body language, movement, and expressions enhance presentations.
- Summarizes important points at appropriate times throughout presentations.
- Transitions smoothly between concepts.
- Effectively uses audio-visual aids and handouts to support learning activities.

Objective R4.1.3: (Applying) Use effective written communication to disseminate knowledge related to thrombosis and hemostasis management.
Criteria:
- Writes in a manner that is easily understandable and free of errors.
- Demonstrates thorough understanding of the topic.
- Notes appropriate citations and references.
- Includes critical evaluation of the literature and knowledge advancements or a summary of what is currently known on the topic.
- Develops and uses tables, graphs, and figures to enhance reader's understanding of the topic when appropriate.
- Writes at a level appropriate for the target readership (e.g., physicians, pharmacists, other health care professionals, patients, and the public).
- Creates one's own work and does not engage in plagiarism.

Objective R4.1.4: (Applying) Appropriately assess effectiveness of education related to thrombosis and hemostasis management.
Criteria:
- Selects assessment method (e.g., written or verbal assessment or self-assessment questions, case with case-based questions, and learner demonstration of new skill) that matches activity.
- Provides timely, constructive, and criteria-based feedback to learner.
- If used, assessment questions are written in a clear, concise format that reflects best practices for test item construction.
- Determines how well learning objectives were met.
- Plans for follow-up educational activities to enhance or support learning and (if applicable) ensure that goals were met.
- Identifies ways to improve education-related skills.
- Obtains, reviews, and applies feedback from learners and others to improve effectiveness as an educator.

Goal R4.2: Effectively employ appropriate preceptor roles when engaged in teaching students, pharmacy technicians, or fellow health care professionals.

Objective R4.2.1: (Analyzing) When engaged in teaching related to thrombosis and hemostasis management, select a preceptor role that meets learners' educational needs.

Criteria:
- Accurately assesses the learner's skill level to determine the appropriate preceptor role for providing practice-based teaching.
- Instructs students, technicians, or others as appropriate.
- Models skills, including "thinking out loud," so learners can "observe" critical-thinking skills.
- Coaches, including effective use of verbal guidance, feedback, and questioning, as needed.
- Facilitates, when appropriate, by allowing learner independence and using indirect monitoring of performance.

Competency Area R5: Management of Bleeding and Thrombotic Emergencies

Goal R5.1: Demonstrate understanding of the management of bleeding and thrombotic medical emergencies.

Objective R5.1.1: (Applying) Demonstrate understanding and application of the management of bleeding emergencies according to the organization's policies and procedures.
- Demonstrates ability to assess patient-reported bleeding to determine if referral to the emergency room is required (triage).
- Obtains patient history related to bleeding event (e.g. history of bleeding / clotting disorders, home antithrombotic therapy) and recommends appropriate labs to guide management.
- Formulates a bleeding management plan based on institutional guidelines, patient factors (e.g., goals of care, labs, timing of most recent dose), and bleed-related factors (e.g., location, severity, underlying cause).
- Anticipates pharmacologic and non-pharmacologic therapy needs during medical emergencies.
- Accurately prepares/dispenses needed medication during medical emergencies.
- Develops a follow-up process including any additional interventions, ongoing bleeding management, reinitiation and potential modification of anticoagulation therapy, mitigation of modifiable bleeding risk factors (e.g., dual antithrombotic therapy, uncontrolled HTN).
- Effectively communicates with interdisciplinary teams.

Objective R5.1.2: (Applying) Demonstrate understanding and management of thrombotic emergencies according to the organization's policies and procedures.
- Demonstrates ability to assess patient reporting signs/symptoms of thrombosis to determine if referral to the emergency room is required (triage).
- Obtains patient history related to thrombotic event (e.g., history of bleeding/clotting disorders, home antithrombotic therapy) and assesses appropriate labs/imaging to guide management.
- Formulates a management plan based on institutional guidelines, patient factors (e.g., goals of care, labs/imaging, past medical history), and thrombosis-related factors (e.g., location, severity, underlying cause/provoking factors).
- Anticipates pharmacologic and non-pharmacologic therapy needs during medical emergencies.
- Accurately prepares/dispenses medication during medical emergencies.
- Develops a follow-up process including any additional interventions, reinitiation and potential

modification of anticoagulation therapy, mitigation of modifiable thrombotic risk factors.

- Effectively communicates with interdisciplinary teams.

ELECTIVE COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR POSTGRADUATE YEAR TWO (PGY2) THROMBOSIS AND HEMOSTASIS MANAGEMENT PHARMACY RESIDENCY

Competency Area E1: Academia

Goal E1.1: Demonstrate understanding of key elements of the academic environment and faculty roles within it.

Objective E1.1.1: (Understanding) Demonstrates understanding of key elements of the academic environment and faculty roles within it.

Criteria:
- Accurately describes variations in the expectations of different colleges/schools of pharmacy for teaching, practice, research, and service, including public versus private colleges/schools of pharmacy and relationships between scholarly activity and teaching, practice, research and service.
- Accurately describes the academic environment, including how the decisions by university and college administration impact the faculty and how outside forces (e.g. change in the profession, funding source, accreditation requirements) impact administrator and faculty roles.
- Accurately described faculty roles and responsibilities.
- Accurately describes the types and ranks of faculty appointments, including the various types of appointments (e.g. non-tenure, tenure-track, and tenured faculty), various ranks of faculty (e.g. instructor, assistant professor, associate professor, full professor), and the role and implications of part-time and adjunct faculty as schools continue to expand and faculty shortages occur, and promotion and tenure process for each type of appointment, including types of activities that are considered in the promotion process and for tenure.
- Accurately explains the role and influence of faculty in the academic environment, including faculty in governance structure (e.g. the faculty senate, committee service) and faculty related to teaching, practice, research, and service roles (e.g. curriculum development and committee service).
- Accurately identifies resources available to help develop academic skills, including the role of academic-related professional organizations (e.g. AACP) and other resources to help develop teaching skills and a teaching philosophy.
- Accurately identifies and describes ways that faculty maintain balance in their roles.
- Accurately describes typical affiliation agreements between a college of pharmacy and a practice site (e.g., health system, hospital, clinic, retail pharmacy).

Goal E1.2: Exercise case-based and other teaching skills essential to pharmacy faculty.

Objective E1.2.1: (Applying) Develop and deliver cases for workshops and exercises for laboratory experiences.

Criteria:
- Identifies the appropriate level of case-based teachings for small group instruction.
- Identifies appropriate exercises for laboratory experiences.
- Provides appropriate and timely feedback to improve performance.

Objective E1.2.2: (Evaluating) Compare and contrast methods to prevent and respond to academic and professional dishonesty and adherance to copyright laws.

Criteria:

- Accurately evaluates physical and attitudinal methods to prevent academic dishonesty.
- Accurately describes methods of responding to incidents of academic dishonesty.
- Accurately explains the role of academic honor committees in cases of academic dishonesty.
- Identifies examples and methods to address unprofessional behavior in learners.
- Accurately describes copyright regulations as related to reproducing materials for teaching purposes.
- Accurately describes copyright regulations as related to linking and citing on-line materials.

Goal E1.3: Develops and practices a philosophy of teaching.

Objective E1.3.1: (Creating) Develop or update a teaching philosophy statement.

Criteria:

- Teaching philosophy includes:
    - self-reflection on personal beliefs about teaching and learning;
    - identification of attitudes, values, and beliefs about teaching and learning;
    - illustrates personal beliefs on practice and how these beliefs and experiences are incorporated in a classroom or experiential setting with trainees.
    - If updating, reflection on how one's philosophy has changed.

Objective E1.3.2: (Creating) Prepare a practice-based teaching activity.

Criteria:

- Develops learning objectives using active verbs and measurable outcomes.
- Plans teaching strategies appropriate for the learning objectives.
- Uses materials that are appropriate for the target audience.
- Organizes teaching materials logically.
- Plans relevant assessment techniques.
- When used, develops examination questions that are logical, well-written, and test the learners' knowledge rather than their test-taking abilities.
- Participates in a systematic evaluation of assessment strategies (e.g., post-exam statistical analysis) when appropriate.
- Ensures activity is consistent with learning objectives in course syllabus.

Objective E1.3.3: (Applying) Deliver a practice-based educational activity, including didactic or experiential teaching, or facilitation.

Criteria:

- Incorporates at least one active learning strategy in didactic experiences appropriate for the topic.
- Uses effective skills in facilitating small and large groups.
- For experiential activities:
    - organizes student activities (e.g., student calendar);
    - effectively facilitates topic discussions and learning activities within the allotted time;
    - effectively develops and evaluates learner assignments (e.g., journal clubs, presentations, SOAP notes;

- o effectively assesses student performance; and,
- o provides constructive feedback.

Objective E1.3.4: (Creating) Develop teaching philosophy, skills, and experiences in a teaching portfolio.

Criteria:

- Portfolio includes:
  - o a statement describing one's teaching philosophy;
  - o curriculum vitae;
  - o teaching materials including slides and other handouts for each teaching experience;
  - o documented self-reflections on one's teaching experiences and skills, including strengths, areas for improvement, and plans for working on the areas for improvement;
  - o peer/faculty evaluations; and,
  - o student/learner evaluations.

Competency Area E2: Publishing

Goal E2.1: Contribute to medical literature related to thrombosis and hemostasis therapy management.

Objective E2.1.1: (Applying) Write a manuscript suitable for publication related to thrombosis and hemostasis management.

Criteria:

- Selects appropriate publication for submission of article.
- Writes in a style appropriate for the audience of the publication (e.g., health care professional and/or the public).

Objective E2.1.2: (Applying) Conduct a peer review of a manuscript submitted for publication related to thrombosis and hemostasis management.

Criteria:

- Compares the formats and contents of submitted manuscripts to similar published works.
- Identifies flaws and weaknesses in the content and language of submitted manuscripts.
- Organizes comments and suggestions for improvements to submitted manuscripts.

Objective E2.1.3: (Creating) Submit an article related to thrombosis and hemostasis management to a non-peer-reviewed publisher.

Criteria:

- Article is suitably formatted.
- Follows appropriate submission procedures.
- Effectively addresses reviewer comments, if appropriate.

Competency Area E3: Initiating an Advanced Practice Area-Related Service

Goal E3.1: Develop a proposal for a new advanced practice area-related service.

Objective E3.1.1: (Creating) Write a proposal for an advanced practice area-related service.
Criteria:
- Proposal meets a perceived need of the health system and its patients.
- Proposal is clear and persuasive.

Objective E3.1.2: (Creating) Present a proposal for a new advanced practice area-related service.
Criteria:
- Identifies appropriate concerned entities as audience for presentation.
- Uses effective presentation skills.

Objective E3.1.3: (Applying) Implement a new advanced practice area-related service.
Criteria:
- Identifies appropriate strategies for implementing the new service.
- Effectively employs selected strategies for implementing the new service.

Objective E3.1.4: (Evaluating) Appraise a new advanced practice area-related pharmacy service.
Criteria:
- Accurately evaluates adequacy of the new service in meeting the stated goals.

Competency Area E4: Professional Service

Goal E.4.1: Interact and collaborate with a professional society to develop professional resources related to thrombosis and hemostasis management.

Objective E.4.1.1: (Applying) Participate in professional society activities (e.g., local or national in scope) that advance the scale and expansion of high-quality thrombosis and hemostasis management services.
Criteria:
- Plans activities for practicing professionals.
- Organizes professional events and activities.
- Builds personal and societal collaborative networks to advance key initiatives.
- Models professional behaviors and successful practices to increase the impact of professional efforts.

Objective E.4.1.2: (Creating) Develop and disseminate resources to advance the quality and safety of thrombosis and management practices.
Criteria:
- Identifies a gap in available resources needed to advance professional practice.
- Plans the development and dissemination of new resources in collaboration with one or more local,

regional or national professional organizations.
- Organizes information and resources necessary for the development and dissemination of the resources.
- Designs and disseminates the new resources through engaged professional societies.

Competency Area E5: Continuity of Care

Goal E.5.1: Evaluate the thrombosis and hemostasis-related care processes of patients receiving clinical services in one or more post-acute care settings (e.g., inpatient rehabilitation, long-term care).

Objective E.5.1.1: (Analyzing) Examine care processes within and between care setting(s) and identify opportunities to improve the quality of thrombosis and hemostasis management.
Criteria:
- Selects the care settings and patient population of interest.
- Creates a process for evaluating the quality of care.
- Identifies system flaw(s) that may increase the risk of patient harm or suboptimal clinical outcomes.

Objective E.5.1.2: (Evaluating) Recommend specific system modifications to enhance the quality of thrombosis and hemostasis-related patient care.
Criteria:
- Evaluates the medical literature to identify potential strategies for system improvement.
- Develops an evidence-based strategy for improving care processes within the setting(s) of interest.
- Presents the proposed improvement strategy to decision-makers within the care setting(s) of interest.

Objective E.5.1.3: (Creating) Test the feasibility of one or more system changes targeting thrombosis and hemostasis management practices within or between care settings.
Criteria:
- Creates resource(s) needed to demonstrate the logistics and workflows involved in the proposed improvement strategy.
- Demonstrates the feasibility of the improvement strategy in real or hypothetical patient cases.
- Revises and finalizes the resources based on initial experiences and feedback from multidisciplinary team.

The effective date for implementation of these educational outcomes, goals and objectives is July 1, 2022.

PGY2 THROMBOSIS AND HEMOSTASIS MANAGEMENT PHARMACY RESIDENCY APPENDIX

Core Areas or Types of Patient Care Experiences

It is expected that all postgraduate year two (PGY2) Thrombosis and Hemostasis Management (THM) residents will acquire new knowledge, skills, and experience related to the prevention and treatment of thrombosis and bleeding. The primary method for residents to achieve patient care competence in this field is to practice clinically in collaboration with knowledgeable and experienced multidisciplinary experts in the field. Additionally, knowledge of broader health system operations and the development of leadership skills occurs primarily through experiences in administrative and operational efforts.

The following areas of emphasis are essential for THM residents to develop sufficient expertise to practice independently in the field. Residents are required to have direct patient care experience in the following content areas: Ambulatory Anticoagulation Management, Emergent/Acute Care Thrombosis and Hemostasis Management, and Clinical Laboratory Science. Other content areas may be covered if applicable to the program's patient population. Residents are required to have direct patient care experiences for topics listed in the first column, "**Required – Direct Patient Care Experience**". Topics in the second and third columns, **"Required – Case-Based Application Acceptable"** and **"Elective Direct or Non-direct Patient Care"**, may be covered by direct patient care or by case-based application through didactic discussion, reading assignments, case presentations, simulations, and/or written assignments or alternative approaches. This list is not all-inclusive, but reflects content that would provide an adequate foundation for PGY2 THM residency graduates.

Programs should track progress on the topic areas throughout the residency year.

Table 1. Clinical Content Areas for a PGY2 Thrombosis and Hemostasis Management Residency

Discipline / Practice Area Category	Required Content Area (Direct Patient Care Experience)	Required Case-Based/Topic Discussion Application (Non-direct Patient Care Acceptable)	Elective (Direct Patient Care or Non-direct Patient Care accepted)
Ambulatory Anticoagulation Management	Anticoagulation Management during Transitions of Care	Arterial Thromboembolism	Patients with mechanical devices requiring anticoagulation management (e.g., LVADs)
	Atrial Fibrillation, Uncomplicated	Atrial Fibrillation, Special Populations (e.g., Dialysis, Hepatic Dysfunction)	
	Atrial Fibrillation, Complicated (Cover cases with the following complicating factors: Behavioral Health Comorbidity, Elderly, Obesity, Renal Insufficiency, Social	Calciphylaxis	

	Determinants of Health)		
	Bleeding, OAC-related	Inferior Vena Cava Filters	
	Heart Valves (Bioprosthetic, mechanical)	Inherited and acquired thrombophilias (e.g., Antiphospholipid Syndrome, factor V Leiden)	
	Periprocedural Management (Elective Procedures, OACs)	Left Atrial Appendage Occlusion Devices	
	Venous Thromboembolism	Peripheral Artery Disease	
		Venous Thromboembolism, Special Populations (e.g., Cancer, Pediatrics,Obstetrics/Gynecology)	
		Warfarin Patient Self-Testing/Self-Management	
Emergent/Acute Care Thrombosis and Hemostasis Management	Acute Coronary Syndrome	Acquired bleeding/clotting disorders (e.g., DIC, acquired factor deficiency, drug-induced disorders)	Heart Transplant
	Advanced Cardiac Life Support	Acute hypercoagulable states (Thrombophilia, Heparin Induced Thrombocytopenia, Antiphospholipid Syndrome)	National Comprehensive Stroke Center Requirements
	Anticoagulation Management during transitions of care	Anticoagulant and Antiplatelet Reversal with Specific and Non-Specific approaches	
	Arterial Thromboembolism	Anticoagulation Overdose	
	Atrial Fibrillation, Acute (new onset)	Antiplatelet Therapy for Coronary Artery Bypass Grafts and Peripheral Arterial Grafts	
	Major Bleeding, (clinical management and anticoagulant reversal; intracranial, gastrointestinal)	Heparin resistance (AT deficiency)	
	Periprocedural Management of anticoagulation (Urgent/Emergent Procedures)	Inferior Vena Cava Filters	
	Valve Dysfunction (regurgitation and stenosis; Repair and Replacement;	Left Ventricular Thrombus	

	mechanical, bioprosthetic)		
	Venous Thromboembolism Acute Uncomplicated (i.e., ED to home)	Mechanical Circulatory Support (e.g., balloon pump, temporary ventricular assist devices; prevention and treatment of thrombosis and bleeding)	
	Venous Thromboembolism, Complicated (Cover cases with the following complicating factors: Behavioral Health Comorbidity, Elderly, Obesity, Renal Insufficiency, Social Determinants of Health)	Minor Bleeding (requiring a transient assessment and potential adjustment in management)	
	VTE Prophylaxis (including risk assessment, modality, duration)	Percutaneous Coronary Interventions	
	Stroke (ischemic, hemorrhagic, transient ischemic attack)	Traumatic bleeding, Mass Transfusion, Coagulopathy	
		Venous Thromboembolism, Special Populations (e.g., Absorption Disorders, Cancer, Dialysis, Hepatic Dysfunction, Obstetrics/Gynecology Pediatrics, Thrombophilias/Hypercoagulable States)	
		Blood Factor Management	
		Renal Replacement Therapy	
		Inherited bleeding disorders (hemophilia A/B, von Willebrand disease)	
		Extracorporeal Life Support	
Clinical Laboratory Science*	Assessment of Parenteral Anticoagulation therapy (Activated Clotting Time, Activated Partial Thromboplastin Time, Anti-Xa activity, Thrombin Time)	Assessment for Coagulopathy or Thrombophilia (D-Dimer, Factor V Leiden, Protein C or S deficiency, Prothrombin Mutation, Fibrinogen, Lupus related thrombophilia including Beta2 glycoprotein Antibodies and Lupus Anticoagulant, Platelet Factor 4 Antibody, HIT – platelet activation and functional assays,	Assessment of other blood related dyscrasia's (ADAMS TS 13, Factor Inhibitor levels – Bethesda units or non-vitamin dependent clotting factor activity levels, Ristocetin cofactor

		Disseminated Intravascular Coagulopathy Panel)	assay, von Willebrand factor antigen)
	Assessment of Oral Anticoagulation Therapy (PT/INR, DOAC Levels, Clotting specific Factor levels)	Key Laboratory Process Considerations (Regent changes that can alter current management, collection considerations and reporting times, CLIA requirements and send out turnaround times, impact on stewardship activities, variability between reagents and laboratories)	Additional Laboratory related processes (Hepzyme, Pharmacogenetic Testing for anticoagulants and antiplatelet agents, Point of Care, Reagent validation process including assessments curves)
		Interpretation of Laboratory results (Assay specificity and sensitivity, potential interference on an assay leading to false positive or negative results)	Viscoelasticity testing (thromboelasto-graphy, rotational thromboelastometry; to detect a coagulation disorder, assess the presence of anticoagulation effects or direct utilization of blood related products including concentrated clotting factors)
		Combining probability scores or other diagnostic procedures with laboratory testing (HIT scoring methods or PE probability, ultrasound, computer tomography)	

*Each required Clinical Laboratory Science experience should encompass: 1) System Logistics (i.e., local processes for ordering and communicating results of tests within and across settings); 2) Test Theory (i.e., the scientific basis for the individual assay); and, 3) Clinical Interpretation (i.e., evaluation of results) in the context of actual patient care. Residents are not required to perform or personally observe the performance of the individual lab tests, although individual sites may elect to include that aspect to enhance learning.