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Supplemental Standard and Learning Objectives for Residency Training in Pharmacotherapy Practice

Prepared jointly by the American Society of Health-System Pharmacists
and the American College of Clinical Pharmacy
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Preamble

Definition

A specialized residency in pharmacotherapy practice is defined as an organized, directed postgraduate program that centers on developing a mastery of knowledge and an expert level of competency in pharmacotherapy. Pharmacotherapy specialists assure the safe, appropriate, and economical use of medications in patients through the application of specialized skills, knowledge, and functions in patient care. A specialized residency in pharmacotherapy should be a minimum of 12 months in length (or integrated with a Pharmacy Practice Residency for a total of 24 months) and is designed to build on those competencies developed by a Residency in Pharmacy Practice.

Purpose and Philosophy

The supplemental residency standard establishes criteria for the training and education of pharmacists to deliver exemplary pharmacotherapy to patients. A pharmacotherapy practice residency embraces the concept that pharmacotherapy practitioners share in the responsibility and accountability for optimal medication therapy outcomes. Therefore, residencies in pharmacotherapy practice must provide residents with opportunities to function independently as practitioners by conceptualizing and integrating accumulated experience and knowledge and transforming it into improved medication therapy for patients. A resident who completes an accredited residency in pharmacotherapy practice should possess competencies that enable attainment of board certification as a pharmacotherapy specialist.

Accreditation Authority

The "ASHP Accreditation Standard for Specialized Pharmacy Residency Training,"[1] together with this supplement, provides the basic criteria used to evaluate pharmacotherapy practice residency programs applying for accreditation by ASHP. Where a difference in criteria exists between these two documents, those contained in this supplement shall prevail.

Qualifications of the Training Site

The training site must meet the requirements set forth in Part I of the "ASHP Accreditation Standard for Specialized Pharmacy Residency Training."[1] Facilities may include, but are not limited to, health systems or tertiary care medical centers, ambulatory care settings, or general hospitals that provide extensive acute and chronic patient care services where pharmaco-

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therapy specialists function as professionals on the health care team and have been delegated responsibility for assuring the safe, appropriate, and economical use of medications.

Qualifications of the Pharmacy Service

When the residency is conducted as part of a pharmacy in a health system, the pharmacy services must meet the requirements set forth in Part IV of the "Accreditation Standard for Specialized Pharmacy Residency Training,"[1] including the provision of comprehensive clinical pharmacy services. The residency program must provide the following training components:

- availability of comprehensive pharmacotherapy experiences in patients with acute and chronic diseases from a variety of patient populations (e.g., internal medicine, surgery, pediatrics, psychiatry, geriatrics);
- active participation as a professional on the health care team;
- patient interviewing and counseling;
- interpretation and application of pharmacokinetic data and principles to patient care;
- participation in the creation and dissemination of new knowledge in pharmacotherapy;
- provision of patient- and population-specific drug information to health professionals and patients;
- participation in medication-use evaluations, in quality improvement activities, and on appropriate institutional committees.

Qualifications of the Program Director

The program director's qualifications shall meet the requirements set forth in Part II of the "ASHP Accreditation Standard for Specialized Pharmacy Residency Training."[1] The program director must be a clinical pharmacist with demonstrated expertise in pharmacotherapy practice, as exemplified by the following: (a) specialty residency training followed by a minimum of 3 years of practice experience or equivalent (i.e., 5 years of practice experience); (b) board certification in Pharmacotherapy; and (c) maintenance of an active patient-care service. The program director should participate in professional pharmacy associations appropriate to his or her area of practice. Other pharmacist preceptors must be able to demonstrate pharmacotherapy expertise in the area for which they serve as a preceptor.

Selection and Qualifications of the Resident

The resident must meet the requirements set forth in the "ASHP Accreditation Standard for Specialized Pharmacy Residency Training."[1] The pharmacotherapy residency program is designed to train highly committed pharmacists to provide exceptional pharmacy services in their area of practice. It is not intended to provide general pharmacy practice competencies but to build on such experiences to create a pharmacotherapy specialist. To this end, residency candidates must have earned a Doctor of Pharmacy degree and previously must have completed an ASHP-accredited pharmacy practice residency if entering into a 12-month residency program (or in the absence of these qualifications, the residency program director must demonstrate and document that the resident possesses the knowledge, skills, and abilities of a pharmacist who has completed a pharmacy practice residency). In cases where shortcomings in these qualifications are noted, the training program must include goals and objectives to address the shortcomings. The resident should participate in professional pharmacy associations appropriate to his or her area of practice.

Content of the Residency Program

The residency in pharmacotherapy practice shall be predicated on the knowledge, skills, and abilities required for an expert level of pharmacotherapy practice. The practice site offering the program shall provide an exemplary training environment; further, the scope of services at the site must be adequate to make possible the attainment of the residency goals and objectives set forth below.

Goals are general, broad statements about the knowledge, skills, and abilities expected of program graduates. Sometimes referred to as outcome competencies, goal statements convey the philosophical base upon which the educational objectives subsequently are built.

Educational objectives (terminal objectives and enabling objectives) specify observable, measurable behaviors. *Terminal objectives* (TOs) are the basis for objectively assessing resident performance. The TOs listed under each goal specify behaviors which, in sum, assure goal mastery and, therefore, must be formally assessed when a goal has been selected for active teaching and evaluation. *Enabling objectives* (EOs) represent learning required to master the TO under which they are listed. Enabling objectives

are provided only to assist in identifying learning associated with achieving a goal's terminal objectives. Having this learning spelled out is of use in designing instruction. *Enabling objectives should not be formally assessed.*

An accredited residency in pharmacotherapy practice shall develop the pharmacist's competence to practice in a wide variety of practice settings. However, the following goals and objectives were written to include practice in all settings (e.g., acute care, ambulatory care, subacute care, home health care, nursing home care), and not all residency sites will have patients from all of these settings. Variability also will exist in the entering skills of trainees. Therefore, although all of the goals listed below must be included, variability among programs is expected due to the emphasis placed on these goals in order to meet the overall goals of the residency program and the needs of the institution sponsoring the residency program. The residency program director must assess and document the level of knowledge, skills, and abilities of the entering resident and develop a customized plan that ensures that the resident is able to demonstrate competence in all of the goals and objectives by the end of the residency.

For additional background and guidance on the use of goals and educational objectives, refer to *The Residency Learning System (RLS) Model*,[2] *The Preceptor's Guide to the RLS Model*,[3] and *The Resident's Guide to Learning through the RLS*.[4]

Pharmacotherapy Practice Residency Goal Statements

Practice Foundation Skills

Goal S1: Take personal responsibility for attaining excellence in one's own ability to provide pharmacotherapy.

Goal S2: Understand the role of the pharmacotherapy specialist in leading others to excellence in the practice of pharmacotherapy.

Goal S3: Demonstrate ethical conduct in all pharmacotherapy activities.

Goal S4 Accept responsibility for accurate evaluation of one's own work.

Goal S5: Maintain active involvement in local, state, and national pharmacy organizations.

Goal S6: Communicate clearly when speaking or writing.

Goal S7: Solve problems encountered in daily practice effectively.

Goal S8: Work harmoniously with others in the health system.

Direct Patient Care

Goal P1: Perform direct patient care activities in acute care, chronic care, and ambulatory care settings using a consistent approach that is performed with the efficiency and depth of experience characteristic of a pharmacotherapy specialist.

Goal P2: Design, recommend, implement, monitor, and evaluate patient-specific pharmacotherapy. (This goal always involves a series of integrated and interrelated steps. Because the role of the pharmacist in some health systems includes the implementation and management of the regimen, goal P2E has been included to cover residency programs where this is the case. To facilitate teaching and assessment, the six steps are detailed below as separate but related goal areas.)

- Goal P2A: Build the information base needed to design a medication therapy regimen.
- Goal P2B: Design pharmacotherapeutic regimens.
- Goal P2C: Design monitoring plans for pharmacotherapeutic regimens.
- Goal P2D: Recommend pharmacotherapeutic regimens and corresponding monitoring plans.
- Goal P2E: Implement pharmacotherapeutic regimens and/or corresponding monitoring plans.
- Goal P2F: Redesign pharmacotherapeutic regimens and corresponding monitoring plans based on evaluation of monitoring data.

Goal P3: Provide medication and disease-related education to patients.

Goal P4: Ensure continuity of pharmaceutical care to and from the acute and ambulatory patient-care settings.

Goal P5: Document all pharmacotherapy activities appropriately.

Interpret, Generate, and Disseminate Knowledge in Pharmacotherapy

Provide Drug Information and Medication-Use Education

Goal I1: Provide concise, applicable, comprehensive, and timely responses to requests for drug information from patients, the public, and health care providers.
Goal I2: Present programs that center on disease prevention and wellness promotion.
Goal I3: Prepare and disseminate written drug information.
Goal I4: Coordinate education to physicians, nurses, and other clinical practitioners.

Participate in Developing and Evaluating Medication-Use Policies

Goal I5: Provide pharmacotherapy expertise to the health system in the development of its medication use, patient care, and research-related policies.
Goal I6: Assume responsibility for the health system's ongoing adherence to its medication-use policies.
Goal I7: Generate and disseminate new knowledge in pharmacotherapy (e.g., review article, case report or series, original research).

Practice Management

Develop Personal Practice Management Skills

Goal M1: Understand the process for establishing a pharmacotherapy specialty residency in one's own health system.
Goal M2: Work through the political and decision-making structure to accomplish one's practice area goals.
Goal M3: Prioritize job responsibilities.

Manage Integrated Pharmaceutical Care Services

Goal M4: Evaluate current pharmacy services to determine if the services are meeting the health care needs of the patients.
Goal M5: Enhance the skills of pharmacy technicians, pharmacy students, pharmacy residents, or pharmacists.
Goal M6: Understand the conduct and use of prospective and retrospective financial and clinical outcomes analyses.
Goal M7: Understand how to document and justify clinical services.
Goal M8: Understand the practices and processes that allow direct billing to third-party payers for patient care services provided by pharmacists.

Goal Statements with Associated Terminal and Enabling Objectives

Practice Foundation Skills

Goal S1: Take personal responsibility for attaining excellence in one's own ability to provide pharmacotherapy.
- TO S1.1 (Characterization) Use a systematic, ongoing process to self-assess and meet learning needs.
- TO S1.2 (Characterization) Adhere to an efficient system for arranging and storing information related to one's practice.

Goal S2: Understand the role of the pharmacotherapy specialist in leading others to excellence in the practice of pharmacotherapy.
- TO S2.1 (Comprehension) Explain the role the pharmacotherapy specialist can play in assisting other pharmacists in improving clinical skills.

Goal S3: Demonstrate ethical conduct in all pharmacotherapy activities.
- TO S3.1 (Characterization) Act ethically in the conduct of all pharmacotherapy activities.

Goal S4: Accept responsibility for accurate evaluation of one's own work.
- TO S4.1 (Synthesis) Develop and implement an effective system for assessing the quality and accuracy of one's own work.
- TO S4.2 (Organization) Consistently assess the quality of one's own work independent of the evaluation of others.

Goal S5: Maintain active involvement in local, state, and national pharmacy organizations.
- TO S5.1 (Organization) Maintain active involvement in pharmacy associations at the local, state, and national levels.
  - *EO S5.1.1 (Comprehension) Explain a strategy for attaining a leadership position in a professional pharmacy association.*
- TO S5.2 (Synthesis) Create a presentation for a pharmacy organization on some aspect of pharmacotherapy.

Goal S6: Communicate clearly when speaking or writing.
- TO S6.1 (Synthesis) Organize all written

or oral communication in a logical manner.

TO S6.2 (Application) Address all communication at the level appropriate for the audience.

TO S6.3 (Application) Use correct grammar, punctuation, spelling, style, and formatting conventions in the preparation of all written communications.

TO S6.4 (Complex Overt Response) Speak clearly and distinctly.

TO S6.5 (Application) Use public speaking skills to speak effectively in large and small group situations.

TO S6.6 (Application) Use listening skills effectively in the performance of job functions.

TO S6.7 (Application) Use a knowledge of visual aids to enhance the effectiveness of communications.

TO S6.8 (Application) Use persuasive communication techniques.

TO S6.9 (Organization) Reflect a professional image in all communications.

TO S6.10 (Application) Use effective strategies for communicating with patients who are non-English speakers or who are impaired (e.g., blind, deaf, cognitively impaired, illiterate).

Goal S7: Solve problems encountered in daily practice effectively.

TO S7.1 (Application) Demonstrate consistent use of a systematic approach to problem-solving.

Goal S8: Work harmoniously with others in the health system.

TO S8.1 (Application) Use a knowledge of interpersonal skills to effectively manage working relationships.

TO S8.2 (Application) Use consensus-building skills.

Direct Patient Care

Goal P1: Perform direct patient care activities in acute care, chronic care, and ambulatory care settings using a consistent approach that is performed with the efficiency and depth of experience characteristic of a pharmacotherapy specialist.

TO P1.1 (Synthesis) Devise efficient strategies in the practice of pharmacotherapy that maximize the delivery of appropriate pharmaceutical care to each patient within a limited timeframe.

TO P1.2 (Synthesis) Formulate solutions to the broad range of complex patient-care problems encountered by the pharmacotherapy specialist that maximize the achievement of pharmaceutical care outcomes.

TO P1.3 (Synthesis) Provide comprehensive and authoritative information using a style that enhances acceptance of the information and recommendations presented.

EO P1.3.1 (Analysis) Determine situations in which the pharmacist should be assertive in providing information and recommendations.

TO P1.4 (Characterization) Display initiative in preventing, identifying, and resolving pharmacotherapy problems.

Goal P2: Design, recommend, implement, monitor, and evaluate patient-specific pharmacotherapy. (This goal always involves a series of integrated and interrelated steps. Because the role of the pharmacist in some health systems includes the implementation and management of the regimen, goal P2E has been included to cover residency programs where this is the case. To facilitate teaching and assessment, the six steps are detailed below as separate, but related goal areas.)

Goal P2A: Build the information base needed to design a medication therapy regimen.

TO P2A.1 (Synthesis) Collect, generate, and organize all patient-specific information needed by the pharmacotherapy specialist to prevent, detect and resolve medication-related problems and to make appropriate medication therapy decisions.

EO P2A.1.1 (Comprehension) Identify the types of information the pharmacotherapy specialist requires to detect and resolve medication-related problems and to make appropriate

medication therapy decisions.

EO P2A.1.2 (Comprehension) Explain signs and symptoms, etiology, risk factors, epidemiology, pathophysiology, pathogenesis, clinical course, and treatment of diseases specified in the appendix.

EO P2A.1.3 (Comprehension) Explain the mechanism of action, pharmacokinetics, pharmacodynamics, pharmacoeconomics, usual regimen (dose, schedule, form, route, and method of administration), indications, contraindications, interactions, adverse reactions, and clinical use of medications applicable to the diseases in the appendix.

EO P2A.1.4 (Comprehension) Where known, explain the mechanism of action, pharmacokinetics, pharmacodynamics, usual regimen (dose, schedule, form, route, and method of administration), indications, contraindications, interactions, adverse reactions, and clinical use of nontraditional medications applicable to the diseases in the appendix.

EO P2A.1.5 (Comprehension) Explain various forms of medication and nonmedication therapy, to include lifestyle modification, and the use of devices for disease prevention and treatment for diseases listed in the appendix.

EO P2A.1.6 (Synthesis) Integrate effective communication techniques in interviews with patients, caregivers, health care professionals, or others so that the patient-specific information needed by the pharmacotherapy specialist is collected.

EO P2A.1.7 (Adaptation) When appropriate, measure patient vital signs and use appropriate physical assessment skills to screen the cardiovascular, pulmonary, dermatologic, psychiatric, and neurologic systems.

TO P2A.2 (Evaluation) Appraise patients' current medication and nonmedication therapy based on an integration of pathophysiologic, pharmacotherapeutic, pharmacokinetic, pharmacodynamic, economic, ethical, and legal considerations as well as knowledge of the current literature and one's own practice experience to determine the presence of any of the following medication therapy problems:

1. medication used with no medical indication
2. medical conditions for which there is no medication prescribed
3. medication prescribed is either inappropriate or not the optimal choice for a particular patient
4. incomplete immunization regimen
5. anything inappropriate in the current medication therapy regimen (dose, dosage form, schedule, duration, route of administration, method of administration)
6. presence of therapeutic duplication
7. prescription of medication to which the patient is allergic
8. presence of or potential for adverse drug events
9. presence of or potential for clinically significant drug-drug, drug-disease, drug-nutrient, or drug-laboratory test interactions
10. interference with medical therapy by social, recreational, OTC, or nontraditional drug use or by diet
11. patient not receiving full benefit of prescribed medication therapy
12. treatment problems arising from financial impact of medication therapy on the patient
13. patient lack of understanding of medication therapy
14. patient not adhering to

medication therapy

EO P2A.2.1 (Evaluation) Prioritize patients' pharmacotherapy problems.

Goal P2B: Design pharmacotherapeutic regimens.

TO P2B.1 (Evaluation) Using an organized collection of patient-specific information, summarize patients' health care needs.

TO P2B.2 (Synthesis) Specify medication and nonmedication therapy goals for patients that integrate pathophysiologic, pharmacotherapeutic, pharmacokinetic, pharmacodynamic, economic, ethical, and legal concerns, as well as a knowledge of current literature and one's own practice experience with patient-specific and quality-of-life considerations.

TO P2B.3 (Synthesis) Design a pharmacotherapeutic regimen, including modifications to existing medication and nonmedication therapy, that meets the goals established for a patient and integrates pathophysiologic, pharmacotherapeutic, pharmacokinetic, pharmacodynamic, economic, ethical, and legal concerns, as well as a knowledge of current literature and one's own practice experience with patient-specific and quality-of-life considerations.

Goal P2C: Design monitoring plans for pharmacotherapeutic regimens.

TO P2C.1 (Synthesis) Design monitoring plans for pharmacotherapeutic regimens that effectively evaluate achievement of the patient-specific medication and non-medication therapy goals and that integrate pathophysiologic, pharmaco-therapeutic, pharmaco-kinetic, pharmacodynamic, economic, ethical, and legal concerns, as well as a knowledge of current literature and one's own practice experience with patient-specific and quality-of-life considerations.

EO P2C.1.1 (Comprehension) Explain the rationale for monitoring parameters selected and the frequency that they are obtained to assess achievement of medication and nonmedication goals for a pharmacotherapeutic regimen for the diseases listed in the appendix.

Goal P2D: Recommend pharmacotherapeutic regimens and corresponding monitoring plans.

TO P2D.1 (Application) In a systematic and logical manner, recommend a pharmacotherapeutic regimen to the prescriber and patient.

Goal P2E: Implement pharmacotherapeutic regimens and/or corresponding monitoring plans.

TO P2E.1 (Evaluation) When appropriate, initiate or modify medication therapy orders according to the health system's policy.

EO P2E.1.1 (Comprehension) Explain the requirements that must be met for the pharmacist to initiate a pharmacotherapeutic regimen.

TO P2E.2 (Application) When appropriate, order tests required by the monitoring plan according to the health system's policies and procedures.

Goal P2F: Redesign pharmacotherapeutic regimens and corresponding monitoring plans based on evaluation of monitoring data.

TO P2F.1 (Evaluation) Interpret the meaning of monitoring data by integrating patient-specific information with one's practice experience, appropriate literature and policies.

TO P2F.2 (Synthesis) Modify a pharmacotherapeutic regimen as necessary based on evaluation of monitoring data by integrating pathophysiologic, pharmaco-therapeutic, pharmacokinetic, pharmacodynamic, economic, ethical, and legal concerns, as well as a knowledge of current literature and one's own practice experience with patient-specific and quality-of-life considerations.

TO P2F.3 (Application) When appropriate, collect outcome data based on the patient's response to therapy.

EO P2F.3.1 (Comprehension) Explain the

importance of collecting outcome data based on the patient's response to therapy each time pharmacotherapy is provided.

Goal P3: Provide medication and disease-related education to patients.

TO P3.1 (Synthesis) Design patient education regarding disease states, medication use and lifestyle modification using knowledge of current biomedical literature and one's own practice experience.

Goal P4: Ensure continuity of pharmaceutical care to and from the acute and ambulatory patient-care settings.

TO P4.1 (Application) Use a systematic procedure to communicate pertinent pharmacotherapeutic information to and from the acute and ambulatory patient-care settings.

Goal P5: Document all pharmacotherapy activities appropriately.

TO P5.1 (Organization) Integrate documentation into all pharmacotherapy activities.

EO P5.1.1 (Comprehension) Explain the importance of documenting pharmacotherapy activities.

EO P5.1.2 (Application) Follow institutional policies and procedures when documenting pharmacotherapy activities.

EO P5.1.3 (Application) Report the results of ADRs to appropriate committees, product manufacturers, and the Food and Drug Administration (FDA).

EO P5.1.4 (Application) Report the outcome of a patient-specific corrective action plan to appropriate individuals or committees.

EO P5.1.5 (Application) When detecting a significant adverse drug event resulting from a drug product defect, report the event according to the health system's policies and procedures.

EO P5.1.6 (Application) Report the results of significant drug interactions to appropriate individuals and committees.

Interpret, Generate, and Disseminate Knowledge in Pharmacotherapy

Provide Drug Information and Medication-Use Education

Goal I1: Provide concise, applicable, comprehensive, and timely responses to requests for drug information from patients, the public, and health care providers.

TO I1.1 (Analysis) Discriminate between the requesters' statements of need and the actual drug information needs by asking for appropriate additional information.

TO I1.2 (Synthesis) Formulate a systematic, efficient, and thorough procedure for retrieving drug information.

EO I1.2.1 (Comprehension) Explain the strengths and weaknesses of manual and electronic methods of retrieving biomedical literature.

EO I1.2.2 (Knowledge) State sources of information for the pathophysiologic, pharmacokinetic, pharmacodynamic, therapeutic, pharmacoeconomic, ethical and legal concerns of diseases listed in the appendix.

TO I1.3 (Evaluation) Determine from all relevant data and literature the appropriate information to evaluate.

TO I1.4 (Evaluation) Evaluate the usefulness of literature gathered.

EO I1.4.1 (Analysis) Assess the potential for bias of the author or preparer of all forms of medication-related information.

EO I1.4.2 (Evaluation) Determine whether a study's methodology is adequate to support its conclusions.

EO I1.4.2.1 (Evaluation) Determine whether the end point established for a study is appropriate.

EO I1.4.2.1.1 (Comprehension) Explain methods used to test study end point.

EO I1.4.2.2 (Comprehension) Explain the effects of patient selection (e.g., volunteers, patients, or patients with different disease severity) on study

outcomes.

EO I1.4.2.3 (Comprehension) Explain the effects of various methods of blinding (e.g., double-blind, single-blind, open-research designs) on study outcomes.

EO I1.4.2.4 (Comprehension) Explain the effects of various methods of drug assay and quality assurance procedures (e.g., HPLC, assay coefficient of variation) on study outcomes.

EO I1.4.2.5 (Comprehension) Explain the types of pharmacotherapy studies (e.g., kinetic, economic, dynamic) and the kind(s) of data analysis appropriate for each.

EO I1.4.2.6 (Comprehension) Explain how the choice of statistical methods used for data analysis (e.g., t test, ANOVA) affects the interpretation of study results and conclusions.

EO I1.4.2.7 (Application) Determine if a study's findings are clinically significant.

EO I1.4.2.8 (Comprehension) Explain the strengths and limitations of different study designs.

TO I1.5 (Evaluation) Determine whether a study's conclusions are support-ed by the study results.

EO I1.5.1 (Comprehension) Explain how data from a study can be applied to expanded patient populations.

TO I1.6 (Synthesis) Formulate responses to drug information requests based on analysis of the literature and one's practice experience.

TO I1.7 (Evaluation) Assess the effectiveness of drug information recommendations.

Goal I2: Present programs that center on disease prevention and wellness promotion.

TO I2.1 (Synthesis) Design programs for the general public that center on disease prevention and wellness promotion.

Goal I3: Prepare and disseminate written drug information.

TO I3.1 (Synthesis) Edit and author a newsletter providing pertinent pharmacotherapeutic information that meets the needs and interests of the reader.

EO I3.1.1 (Application) Use editing skills to revise newsletter articles for publication.

TO I3.2 (Synthesis) Write timely and authoritative consults and notes according to the health system's policies and procedures.

EO I3.2.1 (Comprehension) Explain the content and format of formal consults.

EO I3.2.2 (Comprehension) Explain the content and format of a progress note.

TO I3.3 (Synthesis) Prepare drug monographs that conform to acceptable guidelines to make recommendations for formulary status of medications.

TO I3.4 (Evaluation) Determine the adequacy of a drug monograph for submission to the health system's pharmacy and therapeutics committee.

Goal I4: Coordinate education to physicians, nurses, and other clinical practitioners.

TO I4.1 (Evaluation) Determine educational needs for the health system's physicians, nurses, and other practitioners on medication therapy issues.

TO I4.2 (Synthesis) Devise an overall strategy for meeting the educational needs for the health system's physicians, nurses, and other practitioners on medication therapy issues.

Participate in Developing and Evaluating Medication-Use Policies

Goal I5: Provide pharmacotherapy expertise to the health system in the development of its medication use, patient care, and research-related policies.

TO I5.1 (Comprehension) Explain the role of the pharmacotherapy specialist in the establishment of a health system's formulary.

TO I5.2 (Synthesis) Establish and review criteria by which a specific medication or medication category

selection can be continuously updated.

TO I5.3 (Synthesis) Design medication-use evaluations (MUEs) as needed to resolve medication therapy problems.

TO I5.4 (Synthesis) Provide authoritative pharmacotherapeutic guidance to a team developing collaborative treatment algorithms (e.g., critical pathways such as diabetic ketoacidosis or total hip arthroplasty, therapeutic guidelines).

EO I5.4.1 (Comprehension) Explain the principles guiding the structure of a critical pathway.

EO I5.4.2 (Comprehension) Explain the principles guiding the structure of a therapeutic guideline.

Goal I6: Assume responsibility for the health system's ongoing adherence to its medication-use policies.

TO I6.1 (Characterization) Demonstrate leadership in assuring the health system's adherence to its medication-use policies.

Goal I7: Generate and disseminate new knowledge in pharmacotherapy (e.g., review article, case report or series, original research).

TO I7.1 (Comprehension) Explain sources of and procedures for securing funding of investigations of pharmacotherapy-related issues.

TO I7.2 (Synthesis) Design investigations of pharmacotherapy-related issues using the scientific method.

EO I7.2.1 (Comprehension) Explain the application of the scientific method to the design of investigations.

EO I7.2.2 (Comprehension) Explain the application of regulatory requirements for coordinating research in humans or animals to the design of investigations.

EO I7.2.3 (Evaluation) Defend the selection of a design methodology for an investigation (pharmacokinetics, pharmacoepidemiology, pharmacoeconomics, pharmacodynamics, pharmacotherapeutics, toxicology, analytical methodology, medication use evaluation, pharmacometrics, survey, and/or psychosocial aspects of the use of drugs by society)

EO I7.2.4 (Comprehension) Explain the use of various analytical methodologies (e.g., assay, protein-binding test) in the design of investigations.

EO I7.2.5 (Evaluation) Defend the choice of a particular statistical method for analyzing data in an investigation.

TO I7.3 (Evaluation) Justify the proposal for an investigative study to the appropriate oversight committee.

TO I7.4 (Application) Execute an investigation of a pharmacotherapy-related issue according to the specified design.

EO I7.4.1 (Comprehension) Explain methods for the management of data collected in an investigation.

EO I7.4.2 (Evaluation) Analyze data collected in an investigation of a pharmacotherapy-related issue to draw appropriate conclusions.

EO I7.4.3 (Comprehension) Explain the relationship between the results of an investigation and conclusions that may be drawn from it.

TO I7.5 (Synthesis) Prepare a manuscript describing an investigation of a pharmacotherapy-related issue that is suitable for submission to a particular peer-reviewed publication.

EO I7.5.1 (Comprehension) Explain the uniform requirements for manuscripts submitted to biomedical journals developed by the International Committee of Medical Journal Editors.

EO I7.5.2 (Application) Use knowledge of where to locate publication policies and procedures to secure information needed to prepare a manuscript for publication.

Practice Management

Develop Personal Practice Management Skills

Goal M1: Understand the process for establishing

a pharmacotherapy specialty residency in one's own health system.

TO M1.1 (Comprehension) Explain the process and resources needed to establish a pharmacotherapy specialty residency in a particular health system.

Goal M2: Work through the political and decision-making structure to accomplish one's practice area goals.

TO M2.1 (Synthesis) Formulate effective strategies for influencing the health system's political and decision-making structure to accomplish a pharmacotherapy practice goal.

Goal M3: Prioritize job responsibilities.

TO M3.1 (Evaluation) Appraise each job responsibility for its relative importance to all job responsibilities and prioritize accordingly.

Manage Integrated Pharmaceutical Care Services

Goal M4: Evaluate current pharmacy services to determine if the services are meeting the health care needs of the patients.

TO M4.1 (Evaluation) Determine if a pharmacotherapy service meets the desired patient care outcomes for the past year.

Goal M5: Enhance the skills of pharmacy technicians, pharmacy students, pharmacy residents, or pharmacists.

TO M5.1 (Synthesis) Design effective learning experiences for pharmacy technicians, pharmacy students, pharmacy residents, or pharmacists.

TO M5.2 (Application) Use effective educational techniques to provide learning experiences for pharmacy technicians, pharmacy students, pharmacy residents or pharmacists.

Goal M6: Understand the conduct and use of prospective and retrospective financial and clinical outcomes analyses.

TO M6.1 (Comprehension) Explain the conduct and use of prospective and retrospective financial/clinical outcomes analyses.

EO M6.1.1 (Comprehension) Explain the principles and methodology of basic pharmacoeconomic analysis.

EO M6.1.2 (Comprehension) Compare and contrast the purposes of prospective and retrospective financial/clinical outcomes analyses.

EO M6.1.3 (Comprehension) Compare and contrast study designs appropriate for prospective and retrospective financial/clinical outcomes analyses.

EO M6.1.4 (Comprehension) Compare and contrast the types of data that must be collected in prospective and retrospective financial/clinical outcomes analysis.

EO M6.1.5 (Comprehension) Explain possible reliable sources of data for a financial/clinical outcomes analysis.

EO M6.1.6 (Comprehension) Compare and contrast methods for analyzing data in a prospective and retrospective financial/clinical outcomes analysis.

EO M6.1.7 (Comprehension) Explain how results of a prospective or retrospective financial/clinical outcomes analysis can be applied to internal business decisions and modifications of a formulary.

Goal M7: Understand how to document and justify clinical services.

TO M7.1 (Comprehension) Explain systematic methods for documenting clinical services.

TO M7.2 (Comprehension) Explain approaches to justifying clinical services.

TO M7.3 (Comprehension) Explain how the principles and methods of pharmacoeconomic analysis can be used to justify clinical services.

Goal M8: Understand the practices and processes that allow direct billing to third-party payers for patient care services provided by pharmacists.

TO M8.1 (Comprehension) Explain the practices that allow direct billing to third-party payers for patient care services provided by pharmacists (e.g. diabetes education).

TO M8.2 (Comprehension) Explain the processes that allow direct billing to third-party payers for patient care services provided by pharmcists.

References

1. American Society of Hospital Pharmacists. ASHP accreditation standard for specialized pharmacy residency training (with guide to interpretation). Am J Hosp Pharm 1994;51:2034–41.
2. The Residency Learning System (RLS) Model. Bethesda, MD: American Society of Health-System Pharmacists, 1996.
3. The Preceptor's Guide to the RLS Model. Bethesda, MD: American Society of Health-System Pharmacists, 1996.
4. The Resident's Guide to the RLS Model. Bethesda, MD: American Society of Health-System Pharmacists, 1996.

Appendix. Diseases Covered in Residency Goals and Objectives

Bone and Joint
- *Required*
  - Bone and joint infections
  - Rheumatoid arthritis
  - Degenerative joint disease
  - Osteoporosis
  - Gout
- *Elective*
  - Osteomalacia
  - Seronegative spondyloarthropathies

Cardiovascular
- *Required*
  - Hypertension
  - Systolic and diastolic dysfunction
  - Arrhythmias
  - Coronary artery disease: stable and unstable angina
  - Acute myocardial infarction
  - Thromboembolic disorders
  - Hyperlipidemias
  - Cardiopulmonary resuscitation
  - Hypertensive urgencies/emergencies
  - Endocarditis
  - Peripheral vascular disease
- *Elective*
  - Congenital heart disease
  - Valvular heart disease
  - Primary pulmonary hypertension
  - Cor pulmonale

Dermatologic
- *Required*
  - Skin and soft tissue infections
  - Acne
  - Drug-induced skin disorders
  - Urticaria
- *Elective*
  - Burns
  - Fungal infections
  - Eczema
  - Skin cancer
  - Psoriasis
  - Pressure sores

Endocrine and Exocrine
- *Required*
  - Diabetes mellitus
  - Breast cancer
  - Testicular cancer
  - Thyroid disorders
- *Elective*
  - Diabetes insipidus
  - Tumors of the endocrine system
  - Adrenal disorders
  - Female endocrine disorders
  - Ovarian cancer
  - Contraception

Eye, Ear, Nose, and Throat
- *Required*
  - Otitis
  - Pharyngitis
  - Sinusitis
- *Elective*
  - Glaucoma
  - Head and neck cancer
  - Epiglottitis
  - Ophthalmic infections

Fluid and Electrolytes/Metabolic
- *Required*
  - Parenteral and enteral nutrition
  - Fluid and electrolytes
  - Acid-base disorders

Gastrointestinal
- *Required*
  - Gastroesophageal reflux disease
  - Nausea/vomiting
  - Peptic ulcer disease
  - Stress ulcer disease/upper gastrointestinal hemorrhage
  - Cirrhosis
  - Hepatitis
  - Pancreatitis
  - Inflammatory bowel disease
  - Intraabdominal infections
  - Cholelithiasis
  - Colo-rectal cancer
- *Elective*
  - Zollinger-Ellison syndrome
  - Malabsorption syndrome
  - Lower gastrointestinal bleeding
  - Gastrointestinal cancers
  - Gastroesophageal motility disorders
  - Gastrointestinal infections

Genitourinary
- *Required*
  - Urinary tract infections
  - Sexually transmitted diseases
  - Prostatitis/prostatic hypertrophy
  - Prostate cancer
  - Sexual dysfunction
- *Elective*
  - Enuresis/urinary incontinence
  - Reproductive disorders
  - Tumors of the ureter/bladder

Hematologic
- *Required*
  - Anemias
  - Clotting factor disorders
  - Sickle cell disease
- *Elective*
  - Acute and chronic leukemia

Disseminated intravascular coagulation
Porphyria
G6PD deficiency
Idiopathic thrombocytopenic purpura
Thrombotic thrombocytopenic purpura

Immunologic
Required
Acquired immunodeficiency syndrome
Anaphylaxis
Allergic rhinitis
Stevens-Johnson syndrome
Elective
Lymphomas
Kawasaki disease
Angioedema
Polymyositis
Scleroderma
Sjögren's syndrome
Organ transplantation
Immunodeficiency diseases

Neurologic
Required
Epilepsy/status epilepticus
Pain management
Stroke
Central nervous system infections
Headache/migraine
Peripheral neuropathy
Parkinson's disease
Elective
Tremors
Neuromuscular diseases/myasthenia gravis
Head trauma

Psychiatric
Required
Drug or alcohol overdose
Anxiety disorders
Depressive disorders
Dementia
Delirium
Addiction/chemical dependency
Elective
Substance-induced organic mental disorders
Schizophrenia
Bipolar disorders
Organic mental syndromes
Disorders evident in infancy and childhood
Sleep disorders

Renal
Required
Acute and chronic renal failure
Upper urinary tract infections
Hemodialysis and peritoneal dialysis
Elective
Kidney tumors
Congenital renal disease
Nephrolithiasis
Glomerulonephritis

Respiratory
Required
Asthma
Chronic obstructive pulmonary disease/emphysema
Pneumonia
Adult respiratory distress syndrome
Acute respiratory failure
Tuberculosis
Elective
Apnea of prematurity
Bronchopulmonary dysplasia
Lung cancer
Neonatal respiratory distress syndrome
Sleep apnea
Fat embolism syndrome

Multisystem Diseases
Required
Sepsis/shock
Antimicrobial prophylaxis
Systemic fungal infections
Toxicology of most frequent drug overdoses
Vaccines, toxoids, immunobiologicals, and diagnostics
Elective
Cystic fibrosis
Trauma/surgery
Parasitic disease
Inborn errors of metabolism
Nutritional deficiency