



**Educational Outcomes, Goals, and Objectives for Postgraduate Year Two  
(PGY2) Pharmacy Residencies in Infectious Diseases**

**Prepared in collaboration with the Society of Infectious Diseases Pharmacists**

**Overview of PGY2 Pharmacy Residency in Infectious Diseases**

The PGY2 pharmacy residency in infectious diseases is designed to transition PGY1 residency graduates from generalist practice to specialized practice focused on the care of patients with infectious diseases. Residency graduates are equipped to participate as integral members of interdisciplinary teams caring for patients with infectious diseases, assuming responsibility for their pharmaceutical care. They are also trained to provide this care as an independent practitioner. The wealth of residency graduates' knowledge of infectious diseases and their treatment with the anti-infectives class of medications combined with extensive care of individuals with an infectious disease produces a pharmacist who can successfully serve health care organizations as the ultimate resource for information about anti-infectives and for decision-making affecting the care of these patients. This includes leadership in formulary decision-making for anti-infectives.

Exiting residents have been trained to assume responsibility for identifying and implementing opportunities to improve the medication-use system in the infectious diseases practice area.

Groomed for practice leadership, infectious diseases pharmacy residency graduates can be expected to continue their pursuit of expertise in practice; to possess advanced skills to identify the pharmacotherapy and medication-use training needs of other health care professionals caring for individuals with infectious diseases; to deliver effective training to those health professionals; and to contribute to public health efforts for health improvement, wellness, and the prevention of infectious diseases. In this public health role they are trained to initiate efforts to reduce the spread of antibiotic resistance and vaccine preventable diseases.



## **Explanation of the Contents of This Document:**

Each of the document's objectives has been classified according to educational taxonomy (cognitive, affective, or psychomotor) and level of learning. An explanation of the taxonomies is available elsewhere.<sup>1</sup>

The order in which the required educational outcomes are presented in this document does not suggest relative importance of the outcome, amount of time that should be devoted to teaching the outcome, or sequence for teaching.

The educational outcomes, goals, and objectives are divided into those that are required and those that are elective. The required outcomes, including all of the goals and objectives falling under them, must be included in the design of all programs. The elective outcomes are provided for those programs that wish to add to the required outcomes. Programs selecting an elective outcome are not required to include all of the goals and objectives falling under that outcome. In addition to the potential elective outcomes contained in this document, programs are free to create their own elective outcomes with associated goals and objectives. Other sources of elective outcomes may include elective educational outcomes in the list provided for PGY1 pharmacy residencies and educational outcomes for training in other PGY2 areas. Each of the goals falling under the program's selection of program outcomes (required and elective) must be evaluated at least once during the resident's year.

**Educational Outcomes (Outcome):** Educational outcomes are statements of broad categories of the residency graduates' capabilities.

**Educational Goals (Goal):** Educational goals listed under each educational outcome are broad sweeping statements of abilities.

**Educational Objectives (OBJ):** Resident achievement of educational goals is determined by assessment of the resident's ability to perform the associated educational objectives below each educational goal.

**Instructional Objectives (IO):** Instructional objectives are the result of a learning analysis of each of the educational objectives. They are offered as a resource for preceptors encountering difficulty in helping residents achieve a particular educational objective. The instructional objectives falling below the educational objectives suggest knowledge and skills required for successful performance of the educational objective that the resident may not possess upon entering the residency year. Instructional objectives are teaching tools only. They are not required in any way nor are they meant to be evaluated.

---

<sup>1</sup> Nimmo, CM. Developing training materials and programs: creating educational objectives and assessing their attainment. In: Nimmo CM, Guerrero R, Greene SA, Taylor JT, eds. Staff development for pharmacy practice. Bethesda, MD: ASHP; 2000.

**Required Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases**

***Outcome R1: Promote health improvement, wellness, and the prevention of infectious diseases.***

Goal R1.1 Contribute to the development and delivery of health improvement, wellness, and screening initiatives for preventing infectious diseases.

OBJ R1.1.1 (Synthesis) Participate in a public health department’s system for reporting infectious diseases.

*IO Explain the infectious diseases pharmacy specialist’s role in working with public health officials to maintain systems for reporting the incidence of infectious diseases.*

OBJ R1.1.2 (Comprehension) Explain the infectious diseases pharmacy specialist’s role in the development of emergency protocols for public health disasters (e.g., natural disaster, bioterrorism, epidemic).

OBJ R1.1.3 (Comprehension) Explain the role of the infectious diseases pharmacy specialist in advocacy for vaccination.

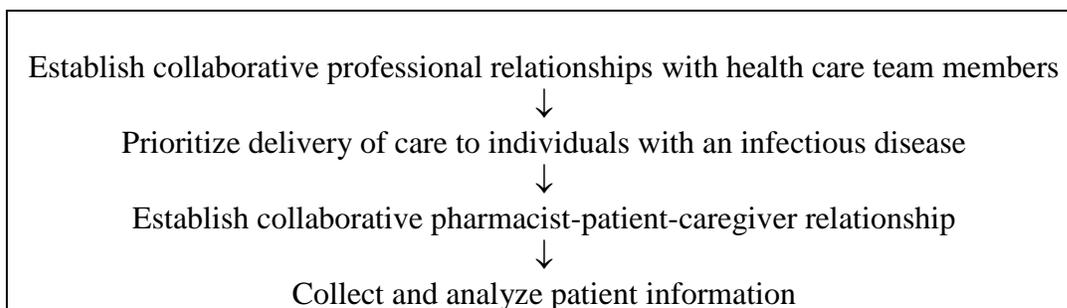
*IO Explain the importance of vaccination in the prevention and control of the spread of infectious diseases.*

*IO Explain how to secure credentials for administering vaccinations.*

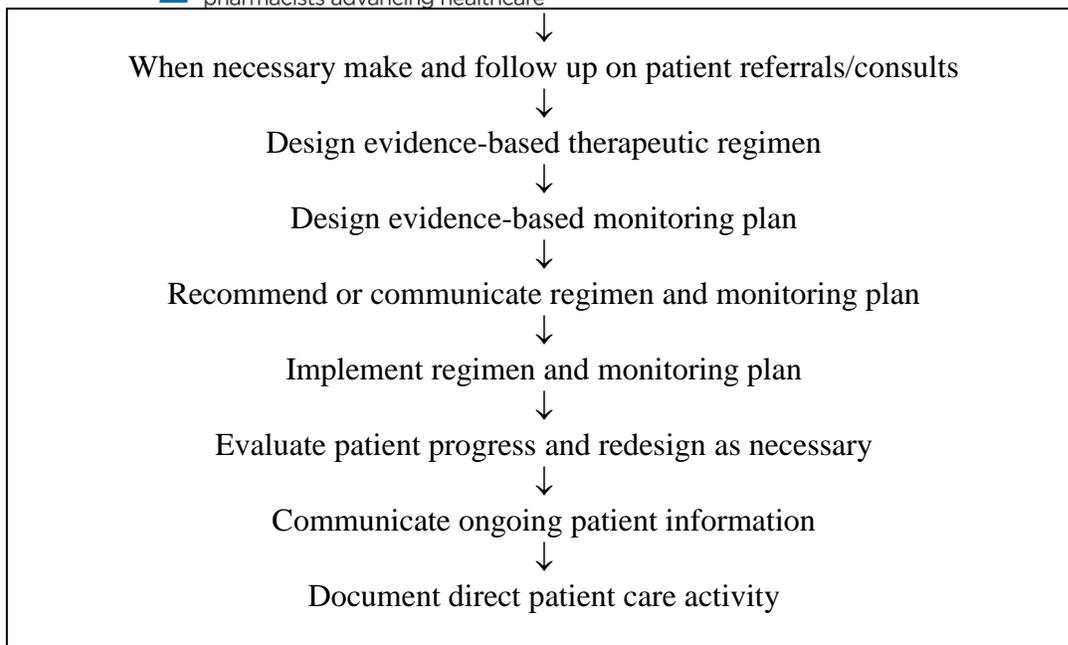
OBJ R1.1.4 (Comprehension) Explain the impact of the agricultural use of anti-infectives<sup>2</sup> in animal husbandry on human pharmacotherapy.

***Outcome R2: Optimize the outcomes of individuals with an infectious disease by providing evidence-based, patient-centered medication therapy as an integral member of an interdisciplinary team or as an independent clinician.***

*(A residency in infectious diseases pharmacy is dependent upon the availability of a broad range of patient categories and professional practice experience. Therefore, learning experiences in direct patient care should occur in diverse patient populations, a variety of disease states, and a range of complexity of patient problems.)*



<sup>2</sup> Anti-infective: This term includes antibacterials, antifungals, antivirals, antiparasitics, vaccines, and biological response modifiers employed in the management of infectious diseases.



Goal R2.1 When appropriate, establish collaborative professional relationships with members of the infectious diseases health care team (e.g., infection control personnel, clinical microbiology laboratory staff, physicians).

OBJ R2.1.1 (Synthesis) Implement a strategy that effectively establishes cooperative, collaborative, and communicative working relationships with members of the interdisciplinary infectious diseases health care team.

*IO Explain the training and expected areas of expertise of the members of the infectious diseases interdisciplinary team with which one works.*

*IO For each of the professions with which one interacts on the infectious diseases interdisciplinary team, explain the profession's view of its role and responsibilities in collaborations on patient-centered care.*

*IO Explain the expectations of the pharmacist's role on the infectious diseases team from the viewpoint of different collaborating professions.*

*IO Explain the professional dynamics of the different services that contribute to the care of individuals with an infectious disease.*

*IO Identify the interpersonal dynamics of each member of the infectious diseases team.*

Goal R2.2 Prioritize the delivery of care to individuals with an infectious disease.

OBJ R2.2.1 (Synthesis) Devise a plan for deciding which individuals with an infectious disease to focus on if given limited time and multiple patient care responsibilities.

*IO Explain factors to consider when determining priority for care among individuals with an infectious disease.*

*IO Explain how the complexity or severity of the problems of individuals with an infectious disease may mandate urgency of care and reordering of current priorities for care (e.g. medical emergencies).*



pharmacists advancing healthcare

OBJ R2.2.2 (Synthesis) Formulate a strategy for continuity of pharmaceutical care in all applicable treatment settings.

*IO Explain the types of patient and caregiver education required to facilitate self-care.*

*IO Explain methods for coordinating information between multiple pharmacy and other health care workers serving the needs of individuals with an infectious disease that will facilitate the provision of pharmaceutical care.*

*IO Explain methods for assuring continuity of pharmaceutical care across all treatment settings (e.g., hospital, clinic, home) used by a specific patient.*

Goal R2.3 Establish collaborative pharmacist-patient-caregiver relationships.

OBJ R2.3.1 (Synthesis) Formulate a strategy that effectively establishes a patient-centered pharmacist-patient-caregiver relationship.

*IO Explain the impact of fear, anger, depression, loss, grief and their opposites on patients' perception of their disease.*

*IO Explain the impact of fear, anger, depression, loss, grief, and their opposites on the health care professional's approach to caring for individuals with an infectious disease.*

*IO Explain social and pharmacoeconomic issues encountered frequently in individuals with an infectious disease.*

*IO Explain problems associated with emotional attachments between health care professionals and patients.*

*IO Explain the importance of including in the strategy an explanation to the patient of the infectious diseases pharmacist's role in his/her care.*

Goal R2.4 Collect and analyze patient information.

OBJ R2.4.1 (Analysis) Collect and organize all patient-specific information needed by the infectious diseases pharmacist to anticipate, prevent, detect, and/or resolve medication-related problems and to make appropriate evidence-based, patient-centered medication therapy recommendations.

*IO Accurately write and interpret medical terminology and abbreviations particular to the discussion of an infectious disease.*

*IO Identify the types of patient-specific information, including complementary and alternative medicines, the pharmacist requires to anticipate, prevent, detect, and/or resolve medication-related problems and to make appropriate evidence-based, patient-centered medication therapy recommendations for individuals with an infectious disease.*

*IO Explain signs and symptoms, epidemiology, risk factors, pathogenesis, natural history of disease, pathophysiology, clinical course, etiology, and treatment of those infectious diseases listed in the appendix.*

*IO Explain signs and symptoms, epidemiology, risk factors, pathogenesis, pathophysiology, clinical course (onset, peak and duration), etiology, and treatment of allergic responses, including hypersensitivity reactions to anti-infectives.*

*IO Explain the mechanism of action, pharmacokinetics, pharmacodynamics, pharmacogenomics, pharmacoeconomics, usual regimen (dose, schedule, form, route, and method of administration), indications, contraindications,*



pharmacists advancing healthcare

*interactions, adverse reactions, and therapeutics of anti- infective classes listed in the appendix.*

*IO Explain current trends and issues in nontraditional medication therapy (e.g., interactions, adverse events).*

*IO Explain host factors instrumental in all aspects of anti-infective pharmacotherapy.*

*IO Accurately interpret microbiological and serological data (e.g., culture, stains).*

OBJ R2.4.2 (Analysis) Determine the presence of any of the following medication therapy problems in the pharmacotherapy of an individual with an infectious disease:

1. Medication used with no medical indication.
2. Patient has medical conditions for which there is no medication prescribed.
3. Medication prescribed inappropriately for a particular medical condition.
4. Immunization regimen is incomplete.
5. Current medication therapy regimen contains something inappropriate (dose, dosage form, duration, schedule, route of administration, method of administration).
6. Presence of therapeutic duplication.
7. Medication to which the patient is allergic has been prescribed.
8. There are adverse drug- or device-related events or potential for such events.
9. There are clinically significant drug-drug, drug-disease, drug-nutrient, or drug-laboratory test interactions or potential for such interactions.
10. Medical therapy has been compromised by social, recreational, nonprescription, complementary, or alternative drug use by the patient or others.
11. Patient not receiving full benefit of prescribed medication therapy.
12. There are problems arising from the financial impact of medication therapy on the patient.
13. Patient lacks understanding of medication therapy.
14. Patient not adhering to medication regimen.

OBJ R2.4.3 (Analysis) Using an organized collection of patient-specific information, summarize the health care needs of an individual with an infectious disease.

Goal R2.5 When necessary, make and follow up on referrals/consults for individuals with an infectious disease.

OBJ R2.5.1 (Evaluation) When presented with an individual with an infectious disease with health care needs that cannot be met by the pharmacist, make a referral/consult to the appropriate health care provider based on the patient's acuity and the presenting problem.

OBJ R2.5.2 (Synthesis) Devise a plan for follow-up for a referral/consult for an individual with an infectious disease.

Goal R2.6 Design evidence-based therapeutic regimens for individuals with an infectious disease.



pharmacists advancing healthcare

OBJ R2.6.1 (Synthesis) Specify therapeutic goals for an individual with an infectious disease incorporating the principles of evidence-based medicine that integrate patient-specific data, disease and medication-specific information, ethics, and quality-of-life considerations.

- IO Identify the sources of disease management and drug-use guidelines currently used in infectious diseases practice.*
- IO Explain various genetic, race, gender-related, age-related, and disease-related factors that influence the achievement of therapeutic goals.*
- IO Explain how a patient's performance status or mental status might affect the setting of therapeutic goals.*
- IO Explain the potential impact of patient, family member, caregiver, and/or health care professional misconceptions of realistic treatment outcomes on the setting of pharmacotherapeutic goals.*

OBJ R2.6.2 (Synthesis) Design a patient-centered regimen that meets the evidence-based therapeutic goals established for an individual with an infectious disease; integrates patient-specific information, disease information, drug information (e.g., pharmacokinetics, pharmacodynamics, pharmacogenomics), ethical issues and quality-of-life issues; and considers pharmacoeconomic principles.

- IO Explain various sources of disease management and drug-use guidelines applicable to infectious diseases populations.*
- IO Explain the potential impact of anti-infective medication side effects, costs, and scheduling on the adherence and persistence of individuals with an infectious disease treated in the ambulatory versus acute care environment.*
- IO Explain factors to consider when comparing the benefits and risks of an alternate anti-infective therapy.*
- IO Explain the rationale for drug combinations used in the treatment of individuals with an infectious disease.*
- IO Explain various host-related (e.g., genetic, race, gender, age, disease) factors that influence response to an infectious disease-related drug therapy.*
- IO Explain additional concerns with microbial resistance, adherence/persistence, cost, and route of administration when making decisions on anti-infective regimens.*
- IO Explain strategies for anticipating and desensitizing patients with hypersensitivity reactions.*

Goal R2.7 Design evidence-based monitoring plans for individuals with an infectious disease.

OBJ R2.7.1 (Synthesis) Design a patient-centered, evidenced-based monitoring plan for a therapeutic regimen that effectively evaluates achievement of the therapeutic goals set for an individual with an infectious disease.

- IO Explain the use of treatment guidelines, protocols, and/or critical pathways in the design of monitoring plans.*
- IO State monitoring parameters for therapeutic response to those infectious diseases listed in the appendix.*



pharmacists advancing healthcare

*IO State parameters for monitoring adverse events for the anti-infective classes listed in the appendix.*

*IO Explain considerations of practicality, clinical utility, and economics in choosing frequency of monitoring.*

Goal R2.8 Recommend or communicate regimens and monitoring plans for individuals with an infectious disease.

OBJ R2.8.1 (Application) Recommend or communicate a patient-centered, evidence-based therapeutic regimen and corresponding monitoring plan to other members of the interdisciplinary team and an individual with an infectious disease in a way that is systematic, logical, accurate, timely, sensitive, and secures consensus from the team and patient.

*IO Explain the kinds of issues that require particular sensitivity when discussing treatment plans with individuals with an infectious disease.*

Goal R2.9 Implement regimens and monitoring plans.

OBJ R2.9.1 (Application) When appropriate, initiate the patient-centered, evidence-based therapeutic regimen and monitoring plan for an individual with an infectious disease according to the organization's policies and procedures.

*IO Explain the organization's policies and procedures for ordering diagnostic or monitoring tests.*

*IO Explain the organization's policies and procedures for issuing medication orders.*

OBJ R2.9.2 (Application) When necessary, contribute to the work of the team to facilitate patient access to necessary anti-infectives.

*IO Explain the general framework of patient assistance programs available for anti-infectives.*

*IO Explain the pharmacist's role (versus other interdisciplinary team members) in securing payer coverage or patient assistance.*

*IO Explain circumstances in which it may be appropriate to redesign a patient's medication regimen in order to ensure that a patient will have financially viable access to the prescribed anti-infectives.*

*IO Explain various approaches used to adjust medication regimens in order to facilitate patient access to anti-infectives.*

*IO Explain organizational policies and procedures for securing compassionate use medications needed for an individual patient.*

*IO Explain organizational policies and procedures for securing the use of an investigational drug needed for an individual patient.*

OBJ R2.9.3 (Application) Use effective patient education techniques to provide counseling to individuals with an infectious disease and their caregivers, including information on anti-infective therapy, interactions, adverse effects, adherence, persistence, appropriate use, handling, storage, and administration.

*IO Explain issues unique to the counseling of individuals with an infectious disease.*

*IO Explain the critical role of adherence and persistence in the short and long-term success of anti-infective therapy.*



pharmacists advancing healthcare

Goal R2.10 Evaluate the progress of individuals with an infectious disease and, as necessary, redesign regimens and monitoring plans.

OBJ R2.10.1 (Evaluation) Accurately assess the progress toward the therapeutic goal(s) of an individual with an infectious disease.

*IO Explain factors that may contribute to the unreliability of assays and microbial cultures.*

OBJ R2.10.2 (Synthesis) As necessary, redesign the regimen and monitoring plan of an individual with an infectious disease based on evaluation of monitoring data and therapeutic outcomes.

*IO Explain how the rapidity of evolving infectious diseases research can affect the redesign of a patient's therapeutic regimen.*

*IO Explain a scenario where therapeutic failure leads to redesigning a patient's anti-infective regimen.*

Goal R2.11: Communicate ongoing patient information.

OBJ R2.11.1 (Application) Ensure that accurate and timely medication-specific information regarding a specific individual with an infectious disease reaches those who need it at the appropriate time.

*IO Recognize instances in which there is urgency in communicating the results of monitoring to the appropriate members of the infectious diseases team.*

OBJ R2.11.2 (Application) When given an individual with an infectious disease who is transitioning from one health care setting to another, communicate pertinent pharmacotherapeutic information to the receiving health care professionals.

*IO Identify information critical to ongoing implementation or monitoring a plan of pharmaceutical care.*

*IO Identify the key recipients of critical information and the most effective means of communicating such information for a given care setting.*

Goal R2.12: Document direct patient care activities appropriately.

OBJ R2.12.1 (Analysis) Appropriately select direct patient care activities for individuals with an infectious disease for documentation.

OBJ R2.12.2 (Application) Use effective communication practices when documenting a direct patient care activity for an individual with an infectious disease.

*IO If working for a public health agency, explain the agency's requirements for the documentation of patient follow-up (e.g., anti-tubercular prophylaxis and therapy, vaccination programs).*

***Outcome R3: Manage and improve anti-infective-use processes.***

Goal R3.1 Contribute to the maintenance of the organization's formulary for anti-infectives.

OBJ R3.1.1 (Evaluation) Make recommendations for additions or deletions to the organization's anti-infective formulary based on literature and/or comparative reviews.

*IO State the elements of a comparative review for an anti-infective.*

*IO Explain the importance of each of the anti-infective-specific elements of a comparative review.*



pharmacists advancing healthcare

- IO* *State resources to consult in the preparation of an anti-infective comparative review.*
- OBJ R3.1.2 (Evaluation) Make recommendations for anti-infective class decisions based on comparative reviews.
- OBJ R3.1.3 (Synthesis) Formulate effective strategies for communicating anti-infective drug use policies to providers.
  - IO* *Explain routes of communication of formulary information in the infectious diseases setting.*
- OBJ R3.1.4 (Evaluation) When presented with a real or hypothetical anti-infective shortage, identify an appropriate alternative.
  - IO* *State resources for identifying medications in short supply.*
  - IO* *Explain the organization's system for communicating information regarding drug shortages.*
  - IO* *Explain a strategy for making optimal choices for alternative medications.*
- OBJ R3.1.5 (Evaluation) When the needs of a particular patient warrant, determine if a non-formulary anti-infective should be considered for use.
  - IO* *Identify the appropriate literature that supports the use of a non-formulary medication in a clinical situation.*
  - IO* *Explain the organization's system for approving, obtaining, and handling non-formulary medications used by patients.*
- OBJ R3.1.6 (Synthesis) Contribute to the activities of the anti-infective subcommittee of the pharmacy and therapeutics (P&T) committee.
- Goal R3.2 Lead the review of existing, or the development and implementation of, anti-infective guidelines/protocols.
  - OBJ R3.2.1 (Analysis) Identify the need for an anti-infective guideline/ protocol by comparing the applicability of existing guidelines/protocols to the needs of the organization.
    - IO* *Identify mechanisms for prevention of infection (e.g., surgical prophylaxis, anti-infective order forms, pneumococcal vaccine).*
  - OBJ R3.2.2 (Synthesis) Develop a medication-related guideline/protocol for the care of individuals with an infectious disease based on best evidence and the characteristics of the local environment and patients.
    - IO* *Explain factors to consider when tailoring an existing guideline/ protocol to the needs of one's organization.*
  - OBJ R3.2.3 (Synthesis) Formulate a strategy that will allow for successful implementation of an anti-infective guideline/protocol for the care of individuals with an infectious disease.
    - IO* *Explain the importance of using an interdisciplinary approach to implementation of an anti-infective guideline/protocol.*
- Goal R3.3 Contribute to organizational decision-making for infection control.
  - OBJ R3.3.1 (Synthesis) Formulate a strategy for assuring infectious diseases pharmacy specialist representation on the organization's policy-making committee for infection control.
    - IO* *Explain the meaning of the term "antimicrobial stewardship".*



pharmacists advancing healthcare

- OBJ R3.3.2 (Synthesis) Contribute evidence-based pharmacy support for organizational infection control activities.
- Goal R3.4 Assist the organization in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the use of anti-infective agents (e.g., Joint Commission requirements; ASHP standards, statements, and guidelines; state and federal laws regulating pharmacy practice; OSHA regulations).
  - OBJ R3.4.1 (Evaluation) Determine appropriate activities and documentation to meet accreditation, legal, regulatory, and safety requirements in the area of infectious diseases.
- Goal R3.5 Identify opportunities for improvement of the organization's use of anti-infectives.
  - OBJ R3.5.1 (Comprehension) Explain those aspects of the organization's anti-infective use that place patients at risk for adverse drug events (ADEs).
  - OBJ R3.5.3 (Evaluation) Identify opportunities for improvement in the organization's use of anti-infectives by comparing anti-infective use to relevant best practices.
    - IO *Explain the meaning of the term "continuous quality improvement."*

***Outcome R4: Demonstrate excellence in the provision of educational activities for health care professionals and health care professionals in training centering on optimizing anti-infective pharmacotherapy.***

- Goal R4.1 Provide effective education to health care professionals and health care professionals in training centering on optimizing anti-infective pharmacotherapy.
  - OBJ R4.1.1 (Application) Use effective educational techniques in the design of all educational activities.
    - IO *Identify emerging issues in infectious diseases pharmacy that would be suitable for interdisciplinary educational sessions.*
    - IO *Explain the differences in effective educational strategies when teaching colleagues versus residents versus students versus health professionals in other disciplines.*
    - IO *Design instruction that meets the individual learner's needs.*
      - IO *Explain the concept of learning styles and its influence on the design of instruction.*
    - IO *Write appropriately worded educational objectives.*
    - IO *Explain the match between instructional delivery systems (e.g., demonstration, written materials, videotapes) and the specific types of learning each facilitates.*
    - IO *Design instruction that employs strategies, methods, and techniques congruent with the objectives for education or training.*
      - IO *Explain effective teaching approaches for the various types of learning (e.g., imparting information, teaching psychomotor skills, inculcation of new attitudes).*
  - OBJ R4.1.2 (Synthesis) Design an assessment strategy that appropriately measures the specified objectives for education and fits the learning situation.
    - IO *Explain appropriate assessment techniques for assessing the learning outcomes of educational or training programs.*



pharmacists advancing healthcare

OBJ R4.1.3 (Application) Use skill in the four preceptor roles employed in practice-based teaching (direct instruction, modeling, coaching, and facilitation).

*IO Explain the stages of learning that are associated with each of the preceptor roles.*

OBJ R4.1.4 (Application) Use skill in case-based teaching.

*IO Explain the importance of identifying the key teaching points for a case before attempting to construct it.*

*IO Explain factors to consider when deciding the patient data to present in a case.*

OBJ R4.1.5 (Application) Use public speaking skills to speak effectively in large and small group situations.

*IO Explain techniques that can be used to enhance audience interest.*

*IO Explain techniques that can be used to enhance audience understanding of one's topic.*

*IO Explain speaker habits that distract the audience.*

***Outcome R5: Serve as an authoritative resource on the optimal use of medications used to treat individuals with an infectious disease.***

Goal R5.1 Select core biomedical literature resources appropriate for infectious diseases pharmacy practice.

OBJ R5.1.1 (Application) Use a knowledge of standard resources to select core primary, secondary, and tertiary biomedical literature resources appropriate for infectious diseases pharmacy practice.

Goal R5.2 Contribute the infectious diseases pharmacy practice perspective to technology and automation systems decisions.

OBJ R5.2.1 (Synthesis) When appropriate, contribute to the organization's design of its technology and automation systems.

*IO Explain the infectious diseases pharmacist's role in contributing to the design of technology systems (e.g., CPOE, PDAs, software) for the organization.*

*IO Explain the infectious diseases pharmacist's role in contributing to decisions regarding automation systems (e.g., smart pumps).*

Goal R5.3 Establish oneself as an organizational expert for infectious diseases pharmacy-related information and resources.

OBJ R5.3.1 (Synthesis) Implement a successful strategy for earning credibility within the organization to be an authoritative resource on the pharmaceutical care of individuals with an infectious disease.

*IO Identify barriers to the infectious diseases pharmacist for earning credibility with members of the infectious diseases team.*

*IO Identify barriers to the infectious diseases pharmacist for earning credibility within the organization.*

OBJ R5.3.2 (Comprehension) Explain the resources that the specialist should negotiate when establishing a new infectious diseases pharmacy practice.

***Outcome R6: Demonstrate leadership and practice management skills.***



pharmacists advancing healthcare

- Goal R6.1 Exhibit the ongoing development of essential personal skills of an infectious diseases pharmacy practice leader.
- OBJ R6.1.1 (Characterization) Practice self-managed continuing professional development with the goal of improving the quality of one's own performance through self-assessment and personal change.
    - IO State criteria for judging one's performance of tasks that are critical in one's own practice.*
    - IO Explain the role of participation in infectious diseases and pharmacy professional organization meetings in the ongoing development of expertise in infectious diseases pharmacy.*
    - IO Explain the importance of staying current with pertinent infectious diseases-related literature when one's goal is to develop expertise in the field.*
    - IO Explain the process and requirements for acquiring Board of Pharmaceutical Specialties (BPS) added qualifications in infectious diseases pharmacotherapy.*
  - OBJ R6.1.2 (Characterization) Demonstrate commitment to the professional practice of infectious diseases pharmacy through active participation in the activities of local, state, and/or national infectious diseases and pharmacy professional organizations.
    - IO Assess the relevance of membership or participation in various professional associations associated with infectious diseases or pharmacy practice.*
    - IO Explain the importance of contributing to the work of infectious diseases professional organizations in advancing the visibility of the pharmacist's role in the care of individuals with an infectious disease.*
- Goal R6.2 Contribute to the leadership and management activities within the infectious diseases pharmacy practice area.
- OBJ R6.2.1 (Application) Use effective negotiation skills to resolve conflicts.
  - OBJ R6.2.2 (Synthesis) Use group participation skills when leading or working as a member of a formal or informal work group.
- Goal R6.3 Exercise practice leadership.
- OBJ R6.3.1 (Characterization) Demonstrate a commitment to advocacy for the optimal care of individuals with an infectious disease through the assertive and persuasive presentation of patient care issues to members of the health care team, the patient, and/or the patient's representative(s).
  - OBJ R6.3.2 (Comprehension) Explain the nature of mentoring in pharmacy, its potential connection with achievement, and the importance of being willing to serve as a mentor to appropriate individuals.
  - OBJ R6.3.3 (Comprehension) Explain the general processes of establishing and maintaining an infectious diseases pharmacy residency program.
  - OBJ R6.3.4 (Comprehension) Explain the potential benefits, to the practitioner and the profession, of contributing to the infectious diseases pharmacy literature.
  - OBJ R6.3.5 (Evaluation) Perform peer review of a pharmacy professional's article submitted for publication or presentation.

- IO Explain sources of information on the components of a peer review.*
- OBJ R6.3.6 (Synthesis) Capitalize on personal skills and interests to offer community service.
  - IO List several community service organizations in one's area.*
  - IO Explain for a couple of the above organizations the potential match between skills and knowledge needs of the organization and one's skills and knowledge.*
- OBJ R6.3.7 (Synthesis) Capitalize on personal skills and interests to offer public service.
  - IO Explain the specialist's role in the development of health care laws and regulations.*
  - IO Explain how to identify laws and regulations currently under consideration that may have impact on the care of individuals with infectious diseases.*

**Outcome R7: Conduct infectious diseases pharmacy practice research.**

- Goal R7.1 Conduct an infectious diseases practice research project using effective project management skills.
  - OBJ R7.1.1 (Synthesis) Formulate a hypothesis to test a topic of significance for an infectious diseases pharmacy research project.
    - IO Explain the types of resident projects (e.g., prospective, retrospective, clinical trials) that will meet residency program project requirements and timeframe.*
    - IO Explain how one determines if a potential project topic is of significance in one's particular practice setting.*
    - IO Explain how to conduct an efficient and effective literature search for the background analysis.*
    - IO Explain how to generate research objectives that will address the hypothesis.*
  - OBJ R7.1.2 (Synthesis) Formulate a feasible design for an infectious diseases pharmacy research project.
    - IO Explain the elements of a project proposal.*
    - IO Explain how to identify those individuals who will be affected by the conduct of the project and strategies for gaining their cooperation.*
    - IO Explain how to determine a timeline with suitable milestones that will result in project completion by an agreed upon date.*
    - IO Explain the ethics of research on human subjects and the role of the IRB.*
    - IO Explain various methods for constructing data collection tools.*
  - OBJ R7.1.3 (Synthesis) Secure any necessary approvals, including IRB, for one's design of a project.
    - IO Explain how to identify those stakeholders who must approve a particular project.*
    - IO Explain the components that make up a budget for a project.*
    - IO Explain strategies for seeking funding for a research project.*
    - IO Explain the role of the organization's IRB in the approval process.*



pharmacists advancing healthcare

OBJ R7.1.4 (Synthesis) Implement an infectious diseases pharmacy research project as specified in its design.

- IO Explain strategies for keeping one's work on a project at a pace that matches with the projected timeline.*
- IO When given a particular approved residency project, explain methods for organizing and maintaining project materials and documentation of the project's ongoing implementation.*
- IO Explain methods for data analysis.*
- IO Explain issues surrounding confidentiality of patient information accessed for a research study.*
- IO Explain the particular sensitivity of patient information when the patient has HIV.*

OBJ R7.1.5 (Synthesis) Effectively present the results of an infectious diseases pharmacy research project.

- IO Explain the biomedical literature guidelines for authorship of research.*

OBJ R7.1.6 (Synthesis) Successfully employ accepted manuscript style to prepare a final report of an infectious diseases pharmacy research project.

- IO When given a particular residency project ready for presentation, explain the type of manuscript style appropriate to the project and criteria to be met when using that style.*

<b>Elective Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases</b>
--

***Outcome E1: Demonstrate added skills for managing and improving anti-infective-use processes.***

- Goal E1.1 Lead the review of existing, or the development and implementation of, anti-infective guidelines/protocols.
  - OBJ E1.1.1 (Evaluation) Assess the results of implementing a medication-related guideline/protocol for the care of individuals with an infectious disease.
- Goal E1.2 Identify opportunities for improvement of aspects of the organization's medication-use system affecting individuals with an infectious disease.
  - OBJ E1.2.1 (Analysis) Analyze the structure and process and measure outcomes of the medication-use system in the infectious disease environment.
- Goal E1.3 Design and implement quality improvement changes to the organization's use of anti-infectives.
  - OBJ E1.3.1 (Synthesis) Design and implement pilot interventions to change problematic or potentially problematic aspects of the organization's use of anti-infectives.
- Goal E1.4 Provide infectious diseases pharmacy specialist input to the organization's medication-use safety policy.
  - OBJ E1.4.1 (Synthesis) Formulate a strategy for assuring that medication-use safety decisions related to the use of anti-infectives involve the contribution of the infectious diseases pharmacy specialist.
  - OBJ E1.4.2 (Synthesis) Contribute evidence-based pharmacy support for organizational medication-use safety activities.

***Outcome E2: Demonstrate skills required to function in an academic setting.***

- Goal E2.1 Understand faculty roles and responsibilities.
  - OBJ E2.1.1 (Comprehension) Explain variations in the expectations of different colleges/schools of pharmacy for teaching, practice, research, and service.
    - IO Discuss how the different missions of public versus private colleges/schools of pharmacy can impact the role of faculty members.*
    - IO Discuss maintaining a balance between teaching, practice, research and service.*
    - IO Discuss the relationships between scholarly activity and teaching, practice, research and service.*
  - OBJ E2.1.2 (Analysis) Explain the role and influence of faculty in the academic environment.
    - IO Explain the responsibilities of faculty in governance structure (e.g. the faculty senate, committee service).*
    - IO Describe the responsibilities of faculty (e.g. curriculum development and committee service) related to teaching, practice, research, and service roles.*
  - OBJ E2.1.3 (Comprehension) Describe the academic environment.



pharmacists advancing healthcare

- IO Describe how the decisions by university and college administration impact the faculty.*
- IO Discuss outside forces (e.g. change in the profession, funding source, accreditation requirements) that impact administrator and faculty roles.*
- OBJ E2.1.4 (Comprehension) Describe the types and ranks of faculty appointments.
  - IO Explain the various types of appointments (e.g. non-tenure, tenure-track, and tenured faculty).*
  - IO Differentiate among the various ranks of faculty (e.g. instructor, assistant professor, associate professor, full professor).*
  - IO Discuss the role and implications of part-time and adjunct faculty as schools continue to expand and faculty shortages occur.*
- OBJ E2.1.5 (Comprehension) Discuss the promotion and tenure process for each type of appointment.
  - IO Identify the types of activities that are considered in the promotion process.*
  - IO Identify the types of activities that are considered for tenure.*
- OBJ E2.1.6 (Application) Identify resources available to help develop academic skills.
  - IO Explain the role of academic-related professional organizations (e.g. AACP) in faculty professional development.*
  - IO Identify resources to help develop teaching skills and a teaching philosophy.*
- OBJ E2.1.7 (Comprehension) Explain the characteristics of a typical affiliation agreement between a college of pharmacy and a practice site (e.g., health system, hospital, clinic, retail pharmacy).
  - IO Explain how the political environments of either a college or a practice site may affect the other.*
- Goal E2.2 Exercise teaching skills essential to pharmacy faculty.
  - OBJ E2.2.1 (Synthesis) Develop an instructional design for a class session, module, or course.
    - IO Construct a student-centered syllabus.*
    - IO Construct educational objectives for a class session, module, or course that is appropriate to the audience.*
    - IO Identify appropriate instructional strategies for the class session, module, or course to achieve the objectives.*
    - IO Consider assessment tools that measure student achievement of the educational objectives.*
  - OBJ E2.2.2 (Synthesis) Prepare and deliver didactic instruction on a topic relevant to the specialized area of pharmacy residency training.
    - IO Identify educational technology that could be used for a class session, module, or course (e.g., streaming media, course management software, audience response systems).*
    - IO Create instructional materials appropriate for the topic and audience.*
    - IO Identify strategies to deal with difficult learners.*
    - IO Given feedback from teaching evaluations (e.g. student and or peer), devise a plan to incorporate improvements in future instruction.*



pharmacists advancing healthcare

- OBJ E2.2.3 (Application) Develop and deliver cases for workshops and exercises for laboratory experiences.
- IO Identify the appropriate level of case-based teachings for small group instruction.*
  - IO Identify appropriate exercises for laboratory experiences.*
  - IO Provide appropriate and timely feedback to improve performance.*
- OBJ E2.2.4 (Application) Serve as a preceptor or co-preceptor utilizing the four roles employed in practice-based teaching (direct instruction, modeling, coaching and facilitation).
- IO Assess the learner's skill level to determine the appropriate preceptor strategy for providing practice-based teaching.*
  - IO Given performance-based criteria, identify ways to provide constructive feedback to learners.*
  - IO Develop strategies to promote professional behavior.*
  - IO Identify strategies to deal with difficult learners in the practice setting.*
  - IO Given a diverse learner population, identify strategies to interact with all groups with equity and respect.*
- OBJ E2.2.5 (Analysis) Develop a teaching experience for a practice setting (e.g., introductory or advanced pharmacy experience).
- IO Create educational goals and objectives to be achieved.*
  - IO Develop activities that will allow achievement of identified educational goals and objectives.*
  - IO Identify how and when feedback should be provided.*
  - IO Identify other preceptors for the experience, if appropriate.*
  - IO Determine training that might be needed for the preceptors to deliver student education.*
  - IO Identify potential challenges of precepting and providing patient care services simultaneously.*
- OBJ E2.2.6 (Synthesis) Design an assessment strategy that appropriately measures the specified educational objectives for the class session, module, course, or rotation.
- IO Identify appropriate techniques for assessing learning outcomes in various educational settings [e.g., written examinations, oral examinations, practical examinations, Objective Structured Clinical Examination (OSCE)].*
  - IO Develop examination questions to assess the knowledge, skills, attitudes and behaviors that are appropriate to the learner's level and topic.*
  - IO Discuss the various methods for administering examination questions (e.g., computerized testing, paper testing).*
- OBJ E2.2.7 (Evaluation) Create a teaching portfolio.
- IO Define the concept of a teaching portfolio and describe its primary purpose*
  - IO Outline the steps in building a teaching portfolio.*
  - IO Develop a personal teaching philosophy to guide one's teaching efforts and facilitate student learning.*



pharmacists advancing healthcare

- OBJ E2.2.8 (Evaluation) Compare and contrast methods to prevent and respond to academic and profession dishonesty.
- IO Evaluate physical and attitudinal methods to prevent academic dishonesty.*
  - IO Discuss methods of responding to incidents of academic dishonesty.*
  - IO Discuss the role of academic honor committees in cases of academic dishonesty.*
  - IO Identify examples and methods to address unprofessional behavior in learners.*
- OBJ E2.2.9 (Comprehension) Explain the relevance of copyright laws to developing teaching materials.
- IO Discuss copyright regulations as related to reproducing materials for teaching purposes.*
  - IO Discuss copyright regulations as related to linking and citing on-line materials.*

**Outcome E.3: Conduct outcomes research.**

Goal E3.1 Contribute to clinical, humanistic and economic outcomes analyses.

- OBJ E3.1.1 (Evaluation) Contribute to a prospective clinical, humanistic and/or economic outcomes analysis.
- IO Explain the principles and methodology of basic pharmacoeconomic analyses.*
  - IO Explain the purpose of a prospective clinical, humanistic or economic outcomes analysis.*
  - IO Explain study designs appropriate for a prospective clinical, humanistic and economic outcomes analysis.*
  - IO Explain the technique and application of modeling.*
  - IO Explain the types of data that must be collected in a prospective clinical, humanistic and economic outcomes analysis.*
  - IO Explain possible reliable sources of data for a clinical, humanistic and economic outcomes analysis.*
  - IO Explain methods for analyzing data in a prospective clinical, humanistic and economic outcomes analysis.*
  - IO Explain how results of a prospective clinical, humanistic and economic outcomes analysis can be applied to internal business decisions and modifications to a customer's formulary or benefit design.*
- OBJ E3.1.2 (Evaluation) Contribute to a retrospective clinical, humanistic, and/or economic outcomes analysis.
- IO Explain the purpose of a retrospective clinical, humanistic or economic outcomes analysis.*
  - IO Explain study designs appropriate for a retrospective clinical, humanistic and economic outcomes analysis.*
  - IO Explain the types of data that must be collected in a retrospective clinical, humanistic and economic outcomes analysis.*
  - IO Explain the content and utilization of reports and audits produced by the pharmacy department.*



pharmacists advancing healthcare

- IO Explain possible reliable sources of data for a retrospective clinical, humanistic and economic outcomes analysis.*
- IO Explain methods for analyzing data in a retrospective clinical, humanistic and economic outcomes analysis.*
- IO Explain the impact of limitations of retrospective data on the interpretation of results.*
- IO Explain how results of a retrospective clinical, humanistic and economic outcomes analysis can be applied to internal business decisions and modifications to a customer's formulary or benefit design.*

Approved by the ASHP Commission on Credentialing on August 21, 2007. Endorsed by the ASHP Board of Directors on September 28, 2007. Developed by the ASHP Commission on Credentialing in collaboration with the American College of Clinical Pharmacy (ACCP) and the Society of Infectious Diseases Pharmacists (SIDP). The design group comprised the following infectious diseases pharmacy practitioners, residency program directors, and ASHP staff: John D. Cleary, Pharm.D., FCCP, Professor and Vice-Chairman of Research, Department of Pharmacy Practice, School of Pharmacy, University of Mississippi Medical Center; Daryl D. DePestel, Pharm.D., Clinical Assistant Professor, University of Michigan Health System; Brian A. Potoski, Pharm.D., Assistant Professor, Department of Pharmacy and Therapeutics, University of Pittsburgh School of Pharmacy; Bruce A. Nelson, R.Ph., M.S., Director, Operations, Accreditation Services Division, ASHP; and Christine M. Nimmo, Ph.D., Director, Standards Development and Training, Accreditation Services Division, ASHP. This document replaces the educational goals and learning objectives for infectious diseases pharmacy residencies approved by the ASHP Board of Directors on April 22, 1998. The contribution of reviewers is gratefully acknowledged.

Copyright © Year 2007, American Society of Health-System Pharmacists, Inc. All rights reserved.

The effective date for implementation of these educational outcomes, goals and objectives is commencing with the entering resident class of Year 2008.

**Appendix**  
**PGY2 Pharmacy Residency in Infectious Diseases**

- I. Learning experiences must include care of patients with the following diseases/infections**
- A. Bone and joint infections
  - B. Cardiovascular infections
  - C. Central nervous system infections
  - D. Fungal infections
  - E. Gastrointestinal infections
  - F. HIV-infection and AIDS (including opportunistic infections)
  - G. Infections of reproductive organs
  - H. Intra-abdominal infections
  - I. Lower respiratory tract infections
  - J. Ophthalmologic infections
  - K. Sepsis
  - L. Sexually transmitted diseases
  - M. Skin and soft tissue infections
  - N. Tuberculosis and other mycobacterial Infections
  - O. Upper respiratory tract infections
  - P. Urinary tract infections
  - Q. Viral infections
- II. Learning experiences must include the care of patients using the following anti-infective classes**
- A. Antibacterials
  - B. Antifungals
  - C. Antiretrovirals
  - D. Antivirals
  - E. Antiparasitics
  - F. Immunomodulators

Some examples of learning experiences for a PGY2 residency in infectious diseases pharmacy are described below.

- Foundations of microbiology laboratory,
- Infectious diseases consultation service serving adult patients,
- Ambulatory care clinic with an infectious diseases emphasis, and
- Antimicrobial surveillance/outcomes program(s).
- Ambulatory care AIDS clinic
- Basic or clinical research
- Bone marrow transplantation services
- Drug information



- Infection control
- Infectious diseases consultation service serving pediatric patients
- Inpatient AIDS service
- Inpatient medical service
- Inpatient surgery service
- Medical intensive care
- Medical oncology and/or hematology service
- Pharmacoeconomics/health economics
- Pharmaceutical industry
- Solid organ transplantation services