



American Society of  
Health-System Pharmacists®

## **Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Outcomes & Healthcare Analytics Residency Programs**

### **Overview of PGY2 Pharmacy Outcomes & Healthcare Analytics Residencies**

The PGY2 residency in pharmacy outcomes and healthcare analytics builds upon PGY1 residency graduates' patient-care competence, clinical foundation, and overall knowledge of pharmacy operations to prepare residents to assume high level, multifaceted careers in a variety of healthcare settings. The residency promotes the integration of evidence-based medicine, outcomes measurement, and process improvement with information technology, informatics, and data analysis to inform decisions surrounding pharmaceutical products and services. Throughout the program, residents will develop proficiency in applied pharmacoeconomics, data analytics, and population level health improvement. Residents enjoy frequent collaboration with staff VISN-wide, such as pharmacoeconomic pharmacists, clinical program coordinators, clinical pharmacy specialists, PACT teams, and specialty providers who provide evidence-based care to our veterans. They will assist in establishing multi-facility metrics/monitors and will lead, facilitate, and collaborate with active taskforces, committees, and regional health care teams comprised of interdisciplinary experts.

Graduates of this program will achieve mastery in population health, application of best evidence, and pharmacy informatics, enabling them to apply robust methodologies to optimize quality and outcomes within government or private health care systems and pharmacy benefits management organizations. They will be adept in the language and concepts of information technology and programming (e.g. SQL), software programs (e.g. Visual Studio, Performance Point, Microsoft Office, Reporting Services) and applied pharmacoeconomic principles, while also possessing enhanced leadership and managerial skills. The graduate will be fully capable of creating pharmacoeconomic proposals, searching data warehouses to create reports and dashboard tools, managing formularies and developing and applying drug use criteria to populations.

Upon completion of the residency graduates are prepared for a practice position in a multitude of healthcare environments. They are prepared to practice as a pharmacy benefit manager for a single pharmacy department, healthcare network, or national program, assume a role in a sub-specialty of pharmacy informatics, and design and conduct pharmacy outcomes research. Graduates from similar VA programs have entered careers in pharmacy benefits management, informatics, technical decision support design, outcomes research, and health policy legislation within both government and private managed care health systems and PBMs.

## **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 the program. The elective outcomes are provided as options to include in the program. Should an elective outcome be selected for a program year, the program is not required to include all of the goals and objectives falling under that outcome. 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.

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<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.

<p><b>Required Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Pharmacy Outcomes and Healthcare Analytics</b></p>
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***Outcome R1: Demonstrate effective leadership and practice management skills in the areas of administration, analytics, informatics, and outcomes.***

**Goal R1.1:** Exhibit ongoing development of the essential personal skills of a practice leader.

- OBJ R1.1.1** (Characterization) Practice self-managed continuing professional development with the goal of improving the quality of one's own performance through self-assessment and 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 pharmacy professional organization meetings in the ongoing development of expertise in pharmacy outcomes and healthcare analytics*
  - IO Explain the importance of continuing to remain current and grow in both clinical and management skills.*
  - IO Explain the role of board certification in the development and maintenance of expertise in drug information practice.*
  - IO Explain the importance of staying current with pertinent biomedical literature.*
  - IO Explain the importance of staying current with health news in popular media and within the organization.*
  - IO Explain the leadership role of a data manager, pharmacoeconomic pharmacist, and healthcare analyst within the organization*
- OBJ R1.1.2** (Characterization) Demonstrate commitment to the professional practice of pharmacy through active participation in the activities of local, state, and/or national pharmacy professional
- IO Explain the importance of contributing to the work of pharmacy professional organizations in advancing the visibility of the pharmacist's role in the overall care of patients.*
- OBJ R1.1.3** (Application) Devise an effective plan for balancing professional and personal life and use time management skills effectively to fulfill practice responsibilities.
- IO Explain the importance of balancing professional and personal life.*
  - IO Explain an effective system for the management of one's time in professional practice.*
  - IO Explain the importance of prioritizing according to the level of importance and rapidly adapting to change.*
  - IO Explain how to develop a reasonable timeline for a project.*
  - IO Explain strategies for satisfactorily making progress on several projects simultaneously.*
- OBJ R1.1.4** (Synthesis) Initiate and maintain a systematic approach to documenting professional activities and accomplishments.

- OBJ R1.1.5 (Characterization) Display integrity in professional relationships and actions and use sound ethical reasoning to guide practice decisions.
- IO *Explain ethical dilemmas that may confront a clinician working as a data manager, pharmacoeconomic pharmacist, or other related profession under the pharmacy outcomes and healthcare analytics umbrella.*
  - IO *Explain ethical principles embodied in the American Pharmacists Association Code of Ethics for Pharmacists<sup>2</sup>.*
  - IO *Explain the implications of the Belmont Report<sup>3</sup> for ethical decision-making in pharmacy.*
- OBJ R1.1.6 (Analysis) Identify potential conflict-of-interest situations in the fields of pharmacoeconomics, healthcare analytics, and pharmacy outcomes
- IO *Explain the concept of perceived conflict-of-interest versus actual conflict-of-interest.*
  - IO *Explain the types of conflict-of-interest that may arise in research, purchasing, formulary decision-making, publishing, and professional practice.*
- OBJ R1.1.7 (Application) Adhere to the requirements of the organization's policy in all interactions with pharmaceutical industry representatives.
- IO *Explain the potential conflicts inherent in the objectives of one's health care organization and the objectives of a pharmaceutical industry representative.*
  - IO *Appraise current policies governing relations between the organization and the pharmaceutical industry to ensure that ethical practices are observed.*
  - IO *Explain why pharmaceutical industry representatives regard PBM staff members and pharmacy outcomes specialists as influential individuals in their organization.*
  - IO *Explain the appropriate relationship between the drug information specialist and a pharmaceutical industry representative.*

Goal R1.2: Contribute to the leadership and management activities within the pharmacy outcomes and healthcare analytics field by exercising superior communication and political skills.

- OBJ R1.2.1 (Analysis) When confronted with a barrier to the accomplishment of a particular project, analyze the organizational environment, including its structure, network of resources, and politics, to determine a strategy for achieving success.
- IO *Explain the organization's structure including the function of each of its departments and key individuals.*

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<sup>2</sup> Adopted by the membership of the American Pharmaceutical Association on October 27, 1994. Endorsed by the American Society of Health-System Pharmacists House of Delegates on June 3, 1996 (ASHP Policy 9607). Proceedings of the 47th annual session of the ASHP House of Delegates. *Am J Health-Syst Pharm.* 1996; 53:1805. ASHP Reports.

<sup>3</sup>The Belmont Report.: Ethical Principles for the Protection of Human Subjects of Research. Report from the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (resource on the World Wide Web). URL: <http://ohsr.od.nih.gov/guidelines/guidelines.html>. Office of Human Subjects Research, National Institutes of Health. 1979 April 18, Available from Internet. Accessed 2007 April 2.

- IO *Explain the importance of effective networking in removing barriers.*
- IO *Explain how to identify key stakeholders of a given project.*
- IO *Explain the importance of persuasion as a skill of effective leaders.*
- IO *Compare and contrast the types of persuasive arguments that are potentially effective.*
- IO *Identify formal and informal medical staff leaders and how they can help achieve the desired goal.*
- OBJ R1.2.2 (Synthesis) Create an effective professional network.
  - IO *Explain formal and informal techniques for networking.*
- Goal R1.3: Exercise practice leadership.
  - OBJ R1.3.1 (Characterization) Demonstrate enthusiasm and passion for the profession of pharmacy.
  - OBJ R1.3.2 (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 R1.3.3 (Comprehension) Explain the general processes of establishing and maintaining an ASHP-accredited PGY-2 residency program.

***Outcome R2: Optimize patient outcomes through the provision of evidence-based<sup>2</sup>, patient-centered information and recommendations and foster effective decision support as an integral part of interdisciplinary healthcare teams.***

- Goal R2.1: Develop collaborative professional relationships with members of the PBM staff, various health care teams, taskforces, and workgroups.
  - OBJ R2.1.1 (Synthesis) Use group participation skills when leading or working as a member of a formal or informal work group or taskforce to establish openly communicative and collaborative working relationships.
    - IO *Explain the value of good peer relationships in the achievement of informatics projects.*
    - IO *Explain methods for achieving consensus.*
    - IO *Explain how to create an agenda for a meeting.*
    - IO *Explain methods for assuring participation by all members of a group.*
    - IO *Explain methods for effective group leadership.*
    - IO *Explain the roles and responsibilities of the facilitator of a meeting.*
    - IO *Explain effective strategies for facilitating meetings.*
  - OBJ R2.1.2 (Analysis) Determine the appropriate type of communication, and the medium and organization for it, using an understanding of the target

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<sup>2</sup> Evidence-based medicine -- the integration of best research evidence, clinical expertise, and patient values in making decisions about the care of individual patients (Institute of medicine, 2001; Straus and Sackett, 1998). *Best research evidence* includes evidence that can be quantified, such as that from randomized controlled trials, laboratory experiments, clinical trials, epidemiological research, and outcomes research and evidence derived from the practice knowledge of experts, including inductive reasoning (Guyatt et al., Higgs et al., 2001). *Clinical expertise* is derived from the knowledge and experience developed over time from practice, including inductive reasoning. *Patient values and circumstances* are the unique preferences, concerns, expectations, financial resources, and social supports that are brought by each patient to a clinical encounter. (Institute of Medicine. Health professions education: a bridge to quality. Washington, DC: The National Academies Press; 2001.)

audience, the characteristics of the information to be communicated, effectiveness, efficiency, customary practice and the recipient's preferences.

- IO Accurately identify the primary theme or purpose of one's written, oral, or virtual communication.*
- IO Accurately determine what information will provide credible background to support or justify the primary theme of one's communication.*
- IO Logically sequence ideas in written and oral communication.*
- IO Accurately determine the depth of communication appropriate to one's audience.*
- IO Accurately determine words and terms that are appropriate to one's audience.*
- IO Accurately determine one's audience's needs.*
- IO Accurately identify the length of communication that is appropriate to the situation.*
- IO Explain the importance of assessing the receiver's understanding of the message conveyed.*
- IO Explain techniques for persuasive communication.*
- IO Explain the value of consulting with administrators and key decision-makers when choosing route(s) for communication of information.*
- IO Explain issues, including confidentiality, surrounding the choice of media to communicate information.*
- IO Explain the differences in language (e.g., jargon, acronyms) used to communicate among the various disciplines involved in pharmacy outcomes and healthcare analytics.*
- IO Explain the importance of adjusting one's communications for the specific category of health professional (e.g., nurses, physicians, respiratory therapist, etc.).*

Goal R2.2: Lead departmental and/or interdisciplinary teams in the design, implementation, and/or enhancement of the organization's criteria for medication use, monitoring, and outcomes measurement.

OBJ R2.2.1 (Synthesis) Collaborate with an interdisciplinary team to write or revise an existing guideline, measure/metric, policy, or protocol.

- IO Appraise current policies and procedures for congruence with the organization's mission, goals, and needs.*

Goal R2.3: Prioritize development of analytic tools that improve and assist clinicians in patient care.

OBJ R2.3.1 (Evaluation) Appropriately prioritize development of analytic tools based on potential for improvement of patient care if given limited time and multiple responsibilities.

- IO Explain factors to consider when determining priority for patient-care improvement projects.*

*IO Explain how the complexity or severity of patient problems may mandate urgency of tool development and reordering of current priorities.*

Goal R2.4: Assure that all patient-specific, medication-specific, and evidence-based pharmacotherapy information required to support effective medication-related decisions is readily available in a useful format to members of interdisciplinary, patient-centered teams.

OBJ 2.4.1 (Synthesis) Effectively present the benefits of functionally integrated evidence-based and other knowledge resources, analysis tools, and medication information systems.

*IO Demonstrate utilization of analysis tools to members of interdisciplinary teams who will be using them in their daily practice.*

Goal R2.5: Guard the confidentiality and security of health data stored in the health care organization's database.

OBJ R2.5.1 (Comprehension) Explain the organization's regulatory policies for maintaining security of patient information.

OBJ R2.5.2 (Synthesis) Collaborate with information technology and other professionals to assess analysis tool security and patient protections for conformance with accepted standards including access control, data security, data encryption, HIPAA privacy regulations, and ethical and legal issues.

*IO Explain accepted criteria for system security.*

*IO Explain current HIPPA regulations and the application of those regulations to pharmacy technology and automation systems.*

***Outcome R3: Serve as an authoritative resource on the optimal use and development of analysis tools, formulary management resources, and pharmacy outcomes evaluation.***

Goal R3.1: Establish oneself as an expert for data retrieval, evidence-based medication information, and outcomes-related resources within the organization.

OBJ R3.1.1 (Synthesis) Implement a successful strategy for earning credibility within the organization to be an authoritative expert on the creation of analytic tools, measurement of outcomes, and overall evidence-based medication-related care of patients.

*IO Identify opportunities for the pharmacy outcomes and healthcare analytic specialist to earn credibility with members of the various interdisciplinary taskforces.*

*IO Identify opportunities for the specialist to earn credibility within the PBM and various providers within the organization.*

OBJ R3.1.2 (Synthesis) Fulfill requests for provider-requested data, reports, or outcomes in an accurate and efficient manner.

OBJ R3.1.3 (Comprehension) Answer questions and troubleshoot issues from users of the organization's analysis tools, criteria, or policies and procedures.

Goal R3.2: Contribute pharmacist perspective and expertise regarding the development, implementation, utilization, and revision of outcomes measures and metrics, and

analysis tools in interactions with information technology staff, PBM staff, clinicians and end users

OBJ R3.2.1 (Application) Participate in the development of project timelines, financial projections, and outcomes measurement

*IO Explain the potential contributions of the following to the achievement of a safe and effective system:*

1. *Formulary systems*
2. *Medication-use guidelines*
3. *Medication-use restrictions*
4. *Evidence-based protocols*
5. *Care paths*
6. *Disease state management*
7. *Wellness management*
8. *Provider education including academic detailing*
9. *Patient education*
10. *Outcomes studies*
11. *Benchmarking*
12. *Technology and automated systems*
13. *Medication distribution systems and control*
14. *Analytics tools and software*

OBJ R3.2.2 (Synthesis) When presented with a non-standard problem, apply lateral (out-of-box) thinking to its solution

*IO Troubleshoot dashboards/reports with error in the code*

Goal R3.3: Critically evaluate and employ advanced analysis skills to relevant biomedical literature in preparing analysis tools, drug information responses, pharmaco-economic proposals, and drug use criteria.

OBJ R3.3.1 (Evaluation) Determine if the study design and/or methodology are appropriate to accomplish the objectives of a piece of biomedical literature.

OBJ R3.3.2 (Evaluation) Accurately interpret statistical information presented in a piece of biomedical literature.

*IO Explain the application and interpretation of advanced statistical methods.*

*IO Determine instances in which a study conclusion is erroneously supported by data display.*

OBJ R3.3.3 (Analysis) Identify potential sources of bias in a piece of biomedical literature.

OBJ R3.3.4 (Evaluation) Determine the internal and external validity of a piece of biomedical literature and if a study's results have applicability for hypothesizing future research or for directing patient care decisions.

OBJ R3.3.5 (Evaluation) When presented with conflicting biomedical literature, determine the validity and applicability for organizational need.

*IO Compare and contrast the reputations and peer-review procedures of biomedical journals.*



- OBJ R3.3.6 (Evaluation) When presented with limited evidence-based biomedical literature, synthesize a reasonable proposal for the specific information need in collaboration with members of relevant taskforces or workgroups.
- OBJ R3.3.7 (Evaluation) Appraise information provided by a pharmaceutical manufacturer.
- OBJ R3.3.8 (Synthesis) Design tools and measures that perform patient-centered, evidenced-based monitoring for a therapeutic regimen or disease state that effectively evaluates achievement of the specified therapeutic goals.
  - IO Identify monitoring tools utilized and discuss monitoring parameters for the analyzed diseases and conditions.*
  - IO Identify customary monitoring parameters for medications commonly prescribed for diseases and conditions being analyzed.*
- OBJ R3.3.9 (Analysis) Conduct a pharmacoeconomic analysis to support a medication policy and/or process recommendation or decision (decision analysis, CEA, CBA, CMA, CUA).
  - IO Explain the principles and methodology of pharmacoeconomic analysis.*
  - IO Explain reliable sources of data.*
- Goal R3.4: Identify opportunities for improving the safety of aspects of the organization's medication-use system through analysis tools, measures, metrics, guidelines and policies.
  - OBJ R3.4.1 (Application) Assist in the organization's reporting and preventing medication errors and adverse drug reactions (ADEs) through development/maintenance of analysis tools, updating drug use criteria, reporting alerts at meetings, or other means as necessary.
- Goal R3.5: Assist the organization in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the use of medications (e.g., Joint Commission requirements; ASHP standards, statements, and guidelines; state and federal laws regulating pharmacy practice; OSHA regulations).
  - OBJ R3.5.1 (Evaluation) Determine appropriate activities and documentation needed to meet accreditation, legal, regulatory, and safety requirements for pharmacy.
    - IO Explain the influence of accreditation, legal, regulatory, and safety requirements on clinical practice.*

***Outcome R4: Demonstrate excellence in the provision of training and educational activities for health care professionals, health care professionals in training, and the public.***

- Goal R4.1: Provide effective education and training on pharmacoeconomic proposals, analysis tools/software utilization, academic detailing goals, or general drug therapy topics to health care professionals and health care professionals in training.
  - OBJ R4.1.1 (Application) Use effective educational techniques in the design of all educational activities.
    - IO Identify emerging issues in securing and integrating evidence-based information suitable for educational sessions.*

- IO *Identify changes in medication-use or newly developed analysis tools that require training of staff within the organization.*
- 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 how different instructional delivery systems (e.g., demonstration, written materials, web-based) foster different types of learning.*
- IO *Design instruction that employs strategies, methods, and techniques congruent with the objectives for an education or training program.*
- OBJ R4.1.2 (Application) Use advanced public speaking skills to communicate 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*
  - IO *Explain speaker habits that distract the audience.*
  - IO *Explain the importance of developing excellence in public speaking for fulfillment of the role as a pharmacoeconomic pharmacist or data manager/analyst.*
  - IO *Explain a systematic method for ongoing improvement in one's own public speaking skills.*
- Goal R4.2: Design and deliver education programs to the public that center on health improvement, wellness, and disease prevention.
  - OBJ R4.2.1 (Synthesis) Use appropriate educational techniques to deliver an educational program to the public that centers on health improvement, wellness, or disease prevention.
- Goal R4.3: Design and present Academic Detailing education programs to healthcare providers and patients in order to improve patient outcomes.
  - OBJ R4.3.1 (Synthesis) Contribute to the design of evidence-based, non-commercial educational programs for outreach to healthcare providers and patients that centers on health improvement, wellness, or disease prevention.
    - IO *Explain appropriate medication-related educational topics for health care support groups.*
    - IO *Explain appropriate medication-related educational topics for the general public.*
  - OBJ R4.3.2 (Synthesis) Contribute to Academic Detailing programs by training participating providers on the use of analysis tools which measure outcomes that coincide with the program's desired goals.
    - IO *Explain how to use analysis tools via virtual training sessions.*
    - IO *Explain how available analysis tools can assist academic detailers*

***Outcome R5: Demonstrate the technical skills essential to the role of a pharmacist specializing in pharmacy outcomes and healthcare analytics.***

Goal R5.1: Demonstrate a working knowledge of available technology for prescribing, order processing, distribution/dispensing, monitoring, safe and efficient administration, administration documentation

OBJ R5.1.1 (Comprehension) Demonstrate a working knowledge of available technology for prescribing, order processing, distribution/dispensing, monitoring, safe and efficient administration, administration documentation

Goal R5.2: Demonstrate and apply understanding of basic analytics principles, standards, and best practices.

*IO Explain research findings on the limitations of using warnings, including warning labels and alarms, in the medication-use process.*

*IO Explain the advantages of dashboards and reports*

*IO Describe best practices to effectively design dashboards and report tools*

OBJ R5.2.1 (Application) Utilize best practice strategies to maximize code performance.

*IO Explain the need for efficient programming.*

*IO Explain the function of indexes in SQL programming and the proper utilization of clustered indexes.*

*IO Demonstrate the ability to reorganize queries to improve performance.*

OBJ R5.2.2 (Comprehension) Express understanding of the functions and purposes of SQL Server, Reporting Services, ProClarity, MS Office Programs, and SharePoint from the perspective of a pharmacist working in outcomes and healthcare analytics.

OBJ R5.2.3 (Evaluation) Exercise proficiency in the use of databases and data analysis software to successfully construct reports and dashboards.

*IO Explain the concept of dimensional modeling.*

*IO Explain how the design of the data warehouse facilitates decision making.*

*IO Explain the difference between transactional and analytic database design.*

*IO Explain how to develop analysis tools that are sufficiently detailed to support desired user goals.*

*IO Evaluate the effectiveness, utilization, and quality of the tools requested by providers within the organization.*

*IO Explain the principles and uses of databases in the management of large volumes of data.*

*IO Draw upon appropriate databases to answer posed questions*

*IO Perform statistical analyses for the purpose of evaluating the data.*

*IO Draw accurate conclusions regarding significance of information*

OBJ R5.2.4 (Comprehension) Explain the concept of data warehousing and its uses in clinical and operational decision-making.

OBJ R5.2.5 (Synthesis) Apply an understanding of evidence-based medication therapy management to contribute to the establishment of process and outcomes

measurements that would be used to manage and evaluate the implementation and success of a disease management and/or medication therapy management program.

*IO Explain the concept of process measurements.*

*IO Explain the concept of outcomes measurements.*

*IO Explain commonly used process measurements.*

*IO Explain commonly used outcomes measurements.*

***Outcome R6: Understand a pharmacy benefits management structure and contribute to the organization's formulary management.***

**Goal R6.1:** Understand the interrelationship of the pharmacy benefit management function, and the network health care systems.

OBJ R6.1.1 (Comprehension) Explain the elements of managed care, including benefit design and management, co-pay, formulary, utilization management, prior authorization, consults, access, and contract negotiations (medication acquisition and/or network pharmacies).

*IO Compare VA PBM function against private sector PBMs*

*IO Explain patient eligibility requirements.*

*IO Describe the methods for pharmaceutical procurement.*

OBJ R6.1.2 (Comprehension) Explain the principles of the financial management of the organizational unit.

*IO Describe elements of the organization's financial plan*

*IO Describe the data elements of productivity measures (e.g. operational activities, budgets, FTE, etc.)*

*IO Explain the factors that influence projection of a pharmacy budget.*

OBJ R6.1.3 (Analysis) Research literature, business publications, websites and other relevant resources to assemble a list of factors that will influence sites' budget projections for the upcoming fiscal year.

*IO Review resources for identifying pipeline drugs*

*IO Explain factors to consider when determining whether a particular pipeline drug would be used by the agency's covered population*

*IO Describe the influence of specialty drugs on the pharmacy budget.*

OBJ R6.1.3 (Synthesis) Provide analytic tool(s) to assist pharmacy executives in projecting the monetary result of influencing factors.

*IO Explain importance of customizing analysis tools to be applicable to various customers.*

**Goal R6.2:** Provide pharmacy expertise to the organization in the area of managed care by contributing to the ongoing development of the organization's formulary through review of existing, development of new, and implementation of pharmacoeconomic proposals, drug use criteria, and organizational policies and procedures affecting the care of patients.

OBJ R6.2.1 (Analysis) Create a written drug use criteria or pharmacoeconomic proposal for a medication, class, or disease state that is to be considered by the organization's P&T committee for approval.

*IO Explain signs and symptoms, epidemiology, risk factors, pathogenesis, natural history of disease, pathophysiology, clinical*

*course, etiology, of the disease(s) to be treated by the drug under consideration.*

*IO Explain the mechanism of action, pharmacokinetics, pharmacodynamics, pharmacoeconomics, usual regimen (dose, schedule, form, route, and method of administration), indications, contraindications, interactions, adverse reactions, and therapeutics of the drug under consideration.*

*IO Explain the structure and types of information supplied by pharmaceutical manufacturers using the organization's template format.*

*IO Explain likely sources of relevant information not contained in the materials supplied by the pharmaceutical manufacturer.*

*IO Explain the characteristics of scientific writing.*

*IO Explain factors to consider when judging the safety, the efficacy, or the pharmacoeconomics of a specific medication.*

OBJ R6.2.2 (Synthesis) When appropriate, present the recommendations contained in a proposal to members of the P&T Committee.

*IO Explain the composition and responsibilities of the organization's P&T committee.*

*IO Explain an appropriate style of presentation for P&T committee meetings.*

OBJ R6.2.3 (Synthesis) Participate in the communication of information regarding formulary design and/or changes.

Goal R6.3: Understand the organization's process for contracting with pharmaceutical manufacturers.

OBJ R6.3.1 (Knowledge) State the types of contracts possible with pharmaceutical companies.

*IO Describe the purchasing hierarchy*

OBJ R6.3.2 (Comprehension) Explain what affects drug pricing in the marketplace.

OBJ R6.3.3 (Comprehension) Explain the organization's process for negotiating the price of medications with a manufacturer.

***Outcome R8: Contribute to the body of pharmacotherapy knowledge by conducting outcomes-based research or quality improvement projects with the assistance of analysis tools.***

Goal R8.1: Conduct a pharmacy outcomes and/or health analytics-related research or QI project using effective research and project management skills.

OBJ R8.1.1 (Synthesis) Identify a topic of significance for a pharmacy-related research project that requires institutional review board (IRB) review or approval through a quality improvement (QI) process.

*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 a research question(s) to be answered by an investigation.*
- OBJ R8.1.2 (Synthesis) Formulate a feasible design for a pharmacy-related research project.
  - IO *Explain the elements of a project proposal.*
  - IO *Explain how to identify health care personnel 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 various methods for constructing data collection tools.*
- OBJ R8.1.3 (Synthesis) Secure any necessary approvals, including IRB, for a pharmacy-related research project.
  - IO *Explain how to identify 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 IRB in the approval process.*
- OBJ R8.1.4 (Synthesis) Implement a pharmacy-related research project as specified in its design.
  - IO *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 of data analysis.*
  - IO *Explain issues surrounding confidentiality of patient information accessed for a research study.*
- Goal R8.2: Engage in the publication process.
  - OBJ R8.2.1 (Comprehension) Explain the benefits, to the practitioner and the profession, of contributing to the pharmacy literature.
  - OBJ R8.2.2 (Synthesis) Write a research article, review, or case report that is suitable for publication.
    - IO *Use a standard style for biomedical journals in the preparation of research articles, reviews, or case reports submitted for publication.*
    - IO *Given a specific article, identify appropriate journals to which that article might be submitted for publication.*
    - IO *Given an identified topic related to pharmacy practice, appraise the potential to publish an article on that topic.*
    - IO *Explain the rules governing who may declare authorship of a given work.*
  - OBJ R8.2.3 (Synthesis) Use correct grammar, punctuation, spelling, style, and formatting conventions to prepare a written summary of a pharmacy-related research project.

OBJ R8.2.4 (Application) Follow the submission requirements of an appropriate peer-reviewed publication to submit a manuscript for publication.

OBJ R8.2.5 (Synthesis) Successfully employ accepted manuscript style to prepare a final report of a pharmacy-related 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.*

OBJ R8.2.6 (Evaluation) Participate in the 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.*

*IO Explain the characteristics of an effective peer review.*

Goal R8.3: Prepare and deliver an effective poster presentation.

OBJ R.8.3.1 (Synthesis) Design an effective poster for the presentation of a topic.

*IO Explain the types of content that should be included in a poster.*

*IO Explain the rules for visual presentation of poster material.*

*IO Explain resources that can be used to generate poster materials.*

OBJ R8.3.2 (Synthesis) Exercise skill in responding to questions occurring during the presentation of a poster.

OBJ R8.3.3 (Synthesis) Effectively present the results of a pharmacy-related research project.

<p align="center"><b>Elective Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2)</b>  <b>Pharmacy Residencies in Pharmacy Outcomes and Healthcare Analytics</b></p>
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***Outcome E1: Demonstrate advanced skills in working with a specific technology or automation product (such as Cube Building, Clinical Reminders, etc.).***

Goal E1.1: Serve as an expert resource for the management of a specific technology or system.

- OBJ E1.1.1 (Synthesis) Formulate effective explanations, geared for a variety of interested audiences, of the functions of the technology system.
  - IO Explain the differences in communicating with a technical audience versus a non-technical audience.*
  - IO Explain communication strategies with information technology vendors.*
- OBJ E1.1.2 (Application) Demonstrate the operation of the technology or system.
  - IO Explain the user view of the technology or automation system.*
  - IO Explain the technical view of the technology or automation system.*

***Outcome E2: Utilize added knowledge and skills to enable the application of contemporary quality methodology to the management of pharmacy services.***

Goal E2.1: Participate in clinical and economic outcomes analyses.

- OBJ E2.1.1 (Comprehension) Explain the principles and methodology of prospective clinical, humanistic, and 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 E2.1.2 (Comprehension) Explain the principles and methodology of retrospective clinical, humanistic, and 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.*
  - 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.*
- OBJ E2.1.3: (Evaluation) Contribute to a retrospective clinical or economic outcomes analysis.

***Outcome E3: Demonstrate skills required to function in an academic setting.***

Goal E3.1: Understand faculty roles and responsibilities.

- OBJ E3.1.1 (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 E3.1.2 (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 E3.1.3 (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 E3.1.4 (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 E3.1.5 (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 E3.1.6 (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 E3.2 Exercise teaching skills essential to pharmacy faculty.
- OBJ E3.2.1 (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 E3.2.2 (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.*
- OBJ E3.2.3 (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 E3.2.4 (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 E3.2.5 (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 E3.2.6 (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 E3.2.7 (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.*
- OBJ E3.2.8 (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 E3.2.9 (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.*

## Appendix

The resident will explain signs and symptoms, epidemiology, risk factors, pathogenesis, natural history of disease, pathophysiology, clinical course, etiology, and treatment of diseases and conditions listed below.

The resident will explain the mechanism of action, pharmacokinetics, pharmacodynamics, pharmacogenomics, pharmacoeconomics, usual regimen (dose, schedule, form, route, and method of administration), indications, contraindications, interactions, adverse reactions, and therapeutics of medications and non-traditional therapies, where relevant, that are applicable to the diseases and conditions listed below.

The resident will explain various forms of non-medication therapy, including life-style modification and the use of devices for disease prevention and treatment, for diseases and conditions listed below.

Application of knowledge will occur through taskforces, committees, workgroups, and interdisciplinary teams and during the Population Management longitudinal rotation.

- 1) Oncology
  - A. Multiple Myeloma
  - B. Prostate Cancer
  - C. Renal Cell Carcinoma
- 2) Chronic Pain Management
  - A. Chronic Non-Cancer Pain
  - B. Rheumatoid Arthritis
- 3) Infectious Diseases
  - A. Hepatitis C
  - B. Antimicrobial Stewardship
- 4) Anticoagulation
  - A. Atrial Fibrillation
  - B. DVT, PE, other embolic events
- 5) Mental Health
  - A. PTSD
  - B. Schizophrenia
  - C. Depression
- 6) Endocrinology
  - A. Diabetes
- 7) Cardiology
  - A. Hyperlipidemia
- 8) Neurology
  - A. Multiple Sclerosis
- 9) Miscellaneous
  - A. As relevant to current issues and current discussion within the PBM.
  - B. As required for updating drug use criteria, protocols, proposals, or other miscellaneous policies