REQUIRED COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR POSTGRADUATE YEAR TWO (PGY2) POPULATION HEALTH MANAGEMENT AND DATA ANALYTICS PHARMACY RESIDENCIES

Introduction

The PGY2 residency in Population Health Management and Data Analytics (PHMDA) builds upon PGY1 residency graduates' competence in the delivery of patient-centered care and support of optimal medication therapy outcomes. The residency trains pharmacists to integrate health information, evidence-based medicine, outcomes measurement, and data analytics to inform decisions surrounding pharmacy services and population health management. Graduates are adept in discovering and optimizing synergy between clinical knowledge, information technology, and pharmaceutical operations, equipping them to function in a multifaceted professional environment and lead change to improve patient outcomes.

Graduates of this program will become skilled in concepts of population health management, applied pharmacoeconomic principles, and data analytics, thereby enabling them to create, implement, and optimize population health care initiatives designed to improve health outcomes of patients covered by government, managed care, or public/private health care systems, agencies, companies, and organizations.

Definitions

Competency Areas: Categories of the residency graduates' capabilities.

Competency areas are classified into one of three categories:

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

Additional (for program): Competency area(s) that residency programs may choose to use (in addition to the five required areas) to meet program-specific program needs.

Elective (for specific residents): Competency area(s) selected optionally for specific resident(s).

Educational Goals (Goal): Broad statement of abilities.

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

Criteria: Examples that describe competent performance of educational objectives. Since the criteria are examples, they are not all required but are intended to be used to give feedback to residents on how well

they are doing and how they can improve on the skill described in educational objectives while they engage in an activity.

Activities: The *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs* requires that learning activities be specified for each educational objective in learning experience descriptions. Activities are what residents will do to learn and practice the skills described in objectives. Activities are the answer to the question, "What can residents do in the context of this learning experience that will provide the kind of experiences necessary to achieve the educational objective?" (Compare and contrast activities with criteria by referring to the definition of criteria immediately above.) Specified activities should match the Bloom's Taxonomy learning level stated in parentheses before each objective.

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

Learning activity: Provide education to patients regarding proper medication use and administration, adherence, and possible adverse drug effects for all new medications initiated during clinic appointments.

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

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

Competency Area R1: Population-Based Health Care

Goal R1.1: Demonstrate understanding of basic population-based health principles, standards, and best practices.

Objective R1.1.1: (Understanding) Describe the concept of population health and the basic framework that relates healthcare policy and health factors to overall population health.
Criteria:
- Describes the concept of population versus individual patient health management.
- Understands the concepts of health disparities, health equity, social determinants of health (SDOH), and population health and their relationship to each other.
- Discusses the pharmacist's role in population health management.
- Reviews the organization's process for designing and/or participating in population health management programs.

Objective R1.1.2: (Understanding) Identify standards and standard-setting bodies governing the use of data, information and knowledge in population-based health and best practices.
Criteria:
- Identifies standards and key external governing bodies that influence implementation and ongoing management of information systems in population-based healthcare (e.g., CMS, NCQA, PQA, URAC, NCPDP).
- Identifies appropriate internal stakeholders that influence population health management (e.g., employer groups, clinical leadership, and medical practice groups).
- Reviews evidence-based, patient-centered practice guidelines that may be used in the development of a population health program or initiative.
- Explains how changes to laws and regulations (e.g., value-based purchasing, consumer driven healthcare, reimbursement models) relate to medication use, pharmacy practice, and patient outcomes impact the practice and services provided.
- States current legal and regulatory requirements relevant to organization's operations (e.g., prescription drug benefits).
- Explains the purpose of external quality metrics (e.g., CMS Five Stars, HEDIS, PQA, and URAC) and how they are developed, abstracted, reported, and used in the context of a value-based health care system.
- Identifies appropriate resources (e.g., pipeline information, clinical trials, practice guidelines) to keep updated on trends and changes within pharmacy and health care.

Goal R1.2: Collect and analyze patient population data for the health system or organization.

Objective R1.2.1: (Applying) Identify the targeted patient population(s) that meets the needs of the organization.
Criteria:
- Reviews pharmacy and/or health-system strategic plan and short/long-term goals to align target population with organizational priorities.
- Discusses recently completed or planned pharmacy projects to discover target populations of recent interest to the department.
- Meets with pharmacy/organizational leaders to identify target population(s) of interest to leadership.

Objective R1.2.2: (Applying) Identify targeted patient population(s) using analytical tools such as dashboards or reports to prioritize the delivery of pharmaceutical care.
Criteria:
- Effectively develops queries which identify appropriate patients needing clinical intervention.
- Displays patient lists and data in dashboards or reports which are easily utilized by the end user.
- Conducts quality checks of processes to ensure capture of correct patients and determines the validity and reliability of the tool.

Objective R1.2.3: (Analyzing) Assess patient data against evidence-based medical literature to make decisions at the individual patient and/or population-based level, to assess/resolve a medication-related problem and to make patient-centered, medication and/or non-medication, health improvement, wellness, and/or disease prevention recommendations.
Criteria:
- Accurately assesses a patient and/or population-based medication regimen to ensure it is concordant with best evidence-based medical literature available.
- Assesses gaps in medication and/or non-medication therapies.
- Accesses patient data to improve medication and/or non-medication based care at the individual patient and/or population-based level.

Objective R1.2.4: (Understanding) Demonstrate understanding of analytic tools utilized in the evaluation of patient care improvement projects.
Criteria:
- Identifies a variety of analytic tools utilized in healthcare informatics.
- Articulates the pros and cons of the analytic tools identified.

Objective R1.2.5: (Analyzing) Prioritize the development of analytic tools based on the potential for improvement of patient care.
Criteria:
- Identifies relevant factors when determining priority for patient care improvement initiatives.
- Demonstrates the change to the urgency of tool development or reordering of current priorities based on the complexity or severity of patient problems.
- Ensures time and effort is productively focused on organizational priorities.

Goal R1.3: Collaborate with departmental and/or interdisciplinary teams in the design, implementation, and/or enhancement of the organization's criteria for appropriate medication use management.

Objective R1.3.1: (Creating) Collaborate with a team to write, revise, or provide input to a health plan and/or health system on an existing guideline/protocol.
Criteria:
- Collaborates effectively with peers to create/revise a guideline/protocol.
- Assures guideline/protocol is able to be practically implemented by all affected parties.
- Uses appropriate evidence-based, peer reviewed, literature.
- Ensures that guideline/protocol adheres to all applicable rules and regulations of the organization.

Objective R1.3.2: (Creating) Create a measure/metric of population health outcome(s) collaborating with peers as appropriate.
Criteria:

- Effectively compiles suggestions from peers to create/revise a measure/metric(s).
- Constructs measurable measure/metric(s).
- Uses existing guideline-based external quality metric sources where appropriate.

Goal R1.4: Ensure 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 all end users.

Objective R1.4.1: (Creating) Develop an evidenced-based resource/tool.
Criteria:
- Creates/updates/maximizes a new resource/tool using appropriate evidence-based literature to optimize medication related decisions at the population, patient, and provider level.
- Identifies gaps between current literature and/or clinical guidelines and how information is presented in an existing population management tool.
- Identifies essential data to include in the tool that will maximize efficiency and capability of drawing conclusions about patient care.
- Outlines presentation of data within the tool that optimizes understanding and feasibility of implementation by the end user.
- Proposes updates to an existing tool or framework for a new tool to clinical leaders and other stakeholders for approval.

Competency Area R2: Clinical Data Management and Analytics

Goal R2.1: Demonstrate knowledge of data generation, flow and capture, storage, and use in business and clinical decision-making. (See Figure A. as a reference in the Appendix)

Objective R2.1.1: (Understanding) Explain available technology for medication prescribing, order processing and verification, preparation, distribution, dispensing, monitoring, safe and efficient administration and documentation of these activities.
Criteria:
- Describes the technology for prescribing, order processing, distribution/dispensing, monitoring, safe/efficient administration and documentation.
- Describes the interconnectivity of technology systems/processes.
- Explains current literature with regard to patient safety related to technology and automation systems for the medication ordering life cycle.
- Explains the benefits of and challenges to the positive identification of medication and the patient during medication administration and documentation.
- Explains the "seven rights" of medication administration and documentation.
- Describes the function and pros and cons of synchronous versus asynchronous decision support.
- Explains the components of a rule-based order alerts.
- Explains the impact of rule-based order alerts on clinical pharmacy practice.

Objective R2.1.2: (Understanding) Explain the concept of data warehousing, capture of documented healthcare data in a primary system and translation to a data warehouse, and its use in querying data for clinical and operational decision-making.
Criteria:

- Explains what a data warehouse is.
- Explains the data flow from primary systems into a data warehouse.
- Explains the roles of data aggregation and data integration in population health.
- Explains some of the challenges of data aggregation and data integration in population health. Explains examples of use cases, using data from a data warehouse for population health decision-making.

Objective R2.1.3: (Creating) Construct a workflow process diagram(s) using knowledge of data flow, workflows, and identification of appropriate team members.
Criteria:
- Explains how data flow and workflow process diagrams integrate into clear identification of current processes and stakeholders.
- Develops a workflow process diagram(s) for a project.
- Plans for a project that includes appropriate reviews and approvals required by stakeholders.

Goal R2.2: Demonstrate and apply understanding of basic analytics principles, standards, and best practices.

Objective R2.2.1: (Understanding) Utilize best practice strategies to maximize code performance and data management.
Criteria:
- Explains the principles and uses of databases in the management of large volumes of data to facilitate decision making, including effective use of dashboards and reports.
- Explains the difference between transactional and analytic database design.
- Explains how to develop analysis tools that are sufficiently detailed to support desired user goals.
- Understands strategies for efficient programming (e.g., indexing, dimensional modeling, limiting data retrieval to only necessary information, data consistency, and best practices for data warehouse architecture).

Objective R2.2.2: (Applying) Collaborate with information technology staff 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.
Criteria:
- Demonstrates understanding of the organization's regulatory policies for maintaining security of patient information.
- Explains accepted criteria for system security.
- Demonstrates understanding of current HIPAA regulations and the application of those regulations to pharmacy technology and automation systems.
- Articulates ethical considerations related to management of protected health information.
- Identifies specific steps to guard patient data.
- Applies accepted criteria for system security during assessments.
- Understands various risks and security issues with regard to all potential vectors, for example, email, external software systems, electronic health records.
- Articulates the following data issues: De-identification, encryption, HIPAA, PHI, and understanding proper approvals.

Objective R2.2.3: (Creating) Demonstrate proficiency in the use of databases and data analysis software to successfully construct reports and dashboards.

Criteria:
- Applies strategies for efficient programming (e.g., indexing, dimensional modeling, limiting data retrieval to only necessary information, data consistency, and best practices for data warehouse architecture).
- Follows/interprets data process flow chart and identify appropriate tables to extract data for clinical and operational tools in response to internal queries.
- Demonstrates the ability to refactor queries to improve performance.
- Evaluates the effectiveness, utilization, and quality of the tools requested by providers within the organization.
- Performs statistical analyses for the purpose of evaluating the data.
- Draws accurate conclusions regarding significance of information.

Goal R2.3: Establish oneself as an expert for data retrieval, evidence-based medication information, and outcomes-related resources within the organization.

Objective R2.3.1: (Applying) Implement a strategy for earning credibility within the organization as an authoritative expert on the creation of analytic tools, measurement of outcomes, and overall evidence-based medication-related care of patients.
Criteria:
- Explains the business reason behind a data request and the clinical impact of the results.
- Raises awareness within the organization of role and services offered, serving as a resource for reliable data and information for other providers.
- Fulfills requests for provider-requested data, reports, or outcomes in an accurate and efficient manner.
- Participates in committees and/or collaborates with team members on organizational activities.
- Provides consultation to limit or expand the scope of a request, enhances use across all care team members, and tailors to specific end user types to ensure highest value to the organization.
- Engages in continuing education activities related to role as applicable.

Objective R2.3.2: (Applying) Contribute clinical perspective and expertise regarding the development, implementation, utilization, and revision of outcomes measures and metrics, and analysis tools in interactions with information technology staff, clinicians and end users.
Criteria:
- Engages with information technology staff, clinicians and end users to ensure that the appropriate clinical perspective is incorporated into the data extraction, outcomes measures and metrics, and analysis tools.
- Effectively bridges knowledge gaps, utilizing clinical and technical knowledge in collecting and analyzing population health data, to efficiently address operational and clinical aims of the organization.
- Presents the resource/tool to the end user(s) and explains the benefits of the resource/tool.
- Prepares an effective communication for presentation to the end user(s).
- Assesses the benefits and risks associated with use of the resource/tool.
- Discusses the implementation and evaluation plans.
- Appropriately responds to questions regarding the resource/tool.
- Reports outcome of change accurately to appropriate stakeholders(s) and policy-making bodies according to departmental or organizational processes.
- Uses effective communication skills to accommodate the target audience.

Objective R2.3.3: (Analyzing) Analyze feedback from the end user(s) on usability and efficacy of the resource/tool and revise accordingly.
Criteria:
- Effectively prepares methods to collect feedback from end user(s).
- Analyzes data/feedback from end user(s) on the resource/tool.
- Uses end user data/feedback to revise resource/tool to meet the needs of the end user(s).

Goal R2.4: Evaluate opportunities for improving patient outcomes, clinical and operational efficiencies, safety and quality of the medication-use process through the application of Continuous Quality Improvement (CQI) strategies.

Objective R2.4.1: (Understanding) Demonstrate knowledge of the formal structure of a CQI initiative.
Criteria:
- Identifies the basic components of a CQI initiative (Plan-Do-Study-Act).
- Articulates the purpose of each step of the PDSA cycle.
- Reviews the Institute for Healthcare Improvement (IHI) Model.
- Describes the quality measures in healthcare and how they relate to population health as well as economic incentives and reimbursement.
- Describes the process of health technology assessment and healthcare decision making.

Objective R2.4.2: (Applying): Design and/or deliver processes and/or initiatives that support quality measures to improve population health outcomes of medication therapy.
Criteria:
- Participates in the organization's process for designing and aligning with population health management initiatives.
- Applies an understanding of evidence-based, patient-centered medication therapy to identify practice guidelines to be used in the development of population health management initiatives.
- Applies an understanding of evidence-based, patient-centered medication therapy to establish process and outcome measures used to implement and evaluate population health management initiatives.
- Uses appropriate outcome measurements to measure and evaluate the success of population health management programs and initiatives.

Objective R2.4.3: (Evaluating) Use data collection tools and/or methodologies to identify opportunities to improve medication-use processes.
Criteria:
- Demonstrates understanding of the process of direct observation of the human/technology interface for the purpose of analysis.
- Effectively uses interviewing skills for the purpose of understanding the human/technology interface.
- Recognizes and articulates limitations of identification techniques.
- Utilizes subjective direct observation, survey and interview techniques.
- Incorporates objective data collection techniques to confirm subjective root cause analysis.
- Determines the appropriate tool and/or methodologies for data collection, including, but not limited to: fish bone diagrams, Five Whys, Pareto, 80/20 rule, other reports, root cause analysis.
- Develops a basic financial model for developing and reviewing a program, including key quality and safety metrics.

Objective R2.4.4: (Applying) Participate in a CQI initiative and lead a component of a technology or automation system.
Criteria:
- Develops group leadership skills through team based engagement with population health concepts.
- Organizes an appropriate team to evaluate a technology or automation system and identify areas for improvement.
- Identifies a specific aim for the CQI initiative.
- Establishes outcome measures for the CQI initiative.
- Agrees on changes that will address the aim of the CQI initiative.
- Tests changes.
- Implements changes.
- Evaluates results.

Competency Area R3: Quality Improvement or Research Project

Goal R3.1: Demonstrate the ability to conduct a population health, data analytics, quality improvement, or research project using effective project management skills.

Objective R3.1.1: (Understanding) Explain the principles and methodology of study design (i.e., clinical, humanistic, and economic outcomes analysis).
Criteria:
- Explains the different types of clinical, humanistic or economic outcomes analysis, along with the pros and cons of each (prospective versus retrospective).
- Explains the purpose of a clinical, humanistic or economic outcomes analysis.
- Explains study designs appropriate for a clinical, humanistic and economic outcomes analysis.
- Explains the technique and application of modeling.
- Explains the types of data that must be collected in a clinical, humanistic and economic outcomes analysis.
- Explains possible reliable sources of data for a clinical, humanistic and economic outcomes analysis.
- Explains methods for analyzing data in a clinical, humanistic and economic outcomes analysis.
- Explains how results of an outcomes analysis can be applied to internal business decisions and modifications to a customer's formulary or benefit design.

Objective R3.1.2: (Analyzing) Identify and/or demonstrate understanding of specific project topic related to population health management, data analytics, or advancing the pharmacy profession.
Criteria:
- Appropriately identifies or understands problems and opportunities for improvement or research projects.
- Conducts a comprehensive literature search and draws appropriate conclusions.
- Determines an appropriate research question or topic for a practice-related project of significance to patient care that can realistically be addressed in the desired time frame.
- Uses best practices or evidence-based principles to identify opportunities for improvements.
- Accurately evaluates or assists in the evaluation of data generated by health information technology or automated systems to identify opportunities for improvement.

Objective R3.1.3: (Creating) Develop a plan or research protocol for a quality improvement or research project related to the care of a specified population of patients or for advancing the pharmacy profession in population health management.

Criteria:

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

Objective R3.1.4: (Evaluating) Collect and evaluate data for a quality improvement or research project related to the care of a specified population of patients or advancing the pharmacy profession in population health management.

Criteria:

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

Objective R3.1.5: (Applying) Implement quality improvement or research project related to the care of a specified population of patients or advancing the pharmacy profession related to population health management.

Criteria:

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

Objective R3.1.6: (Evaluating) Assess changes or need to make changes to improve care of a specified population of patients or advancing the pharmacy profession related to population health management.

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

Competency Area R4: Leadership and Management

Goal R4.1: Demonstrate leadership skills for successful self-development in the provision of population health management and data analytics.

Objective R4.1.1: (Applying) Demonstrate personal, interpersonal, and teamwork skills critical for effective leadership.

Criteria:
- Demonstrates efficient time management.
- Manages conflict effectively.
- Demonstrates effective negotiation skills.
- Demonstrates ability to lead interprofessional teams.
- Uses effective communication skills and styles.
- Demonstrates understanding of perspectives of various health care professionals.
- Effectively expresses benefits of personal profession-wide leadership and advocacy.

Objective R4.1.2: (Applying) Apply a process of ongoing self-evaluation and personal performance improvement in the provision of population health management and data analytics.

Criteria:
- Accurately summarizes own strengths and areas for improvement (in knowledge, values, qualities, skills, and behaviors).
- Effectively uses a self-evaluation process for developing professional direction, goals, and plans.
- Effectively engages in self-evaluation of progress on specified goals and plans.
- Demonstrates ability to use and incorporate constructive feedback from others.

- Effectively uses principles of continuous professional development (CPD) planning (reflect, plan, act, evaluate, record/review).

Goal R4.2: Demonstrate management skills in the provision of population health management and data analytics.

Objective R4.2.1: (Applying) Contribute to departmental management of population health management and data analytics.
Criteria:
- Helps identify and define significant departmental needs, including:
  o Manpower/staffing.
  o Staff scheduling and contingencies.
  o Staff qualifications.
  o Assesses and develops educational opportunities regarding population health management for service line staff.
- Helps develop plans that address departmental needs, including:
  o Orientation.
  o Training and supervision.
  o Effectively participates in, or evaluates, strategic plan.
- Participates effectively on committees or informal work groups to complete group projects, tasks, or goals.
- Participates effectively in implementing changes, using change management and quality improvement best practices and tools, consistent with team, departmental, and organizational goals.

Objective R4.2.2: (Applying) Manage one's own advanced practice effectively.
Criteria:
- Reviews and interprets the most recent primary literature.
- Evaluates clinical practice activities for potential contributions to scholarship.
- Accurately assesses successes and areas for improvement (e.g., a need for staffing projects or education) in managing one's own practice.
- Makes accurate, criteria-based assessments of one's own ability to perform practice tasks.
- Regularly integrates new learning into subsequent performances of a task until expectations are met.
- Routinely seeks applicable learning opportunities when performance does not meet expectations.
- Demonstrates effective workload and time-management skills.
- Assumes responsibility for personal work quality and improvement.
- Is well prepared to fulfill responsibilities (e.g., patient care, projects, management, and meetings).
- Sets and meets realistic goals and timelines.
- Demonstrates awareness of own values, motivations, and emotions.
- Demonstrates enthusiasm, self-motivation, and a "can-do" approach.
- Strives to maintain a healthy work–life balance.
- Works collaboratively within the organization's political and decision-making structure.
- Demonstrates pride in and commitment to the profession through appearance, personal conduct, planning to pursue board certification.
- Demonstrates pride in and commitment to population health management and data analytics through membership in professional organizations related to the pharmacy practice.

- Demonstrates personal commitment and adheres to organizational and departmental policies and procedures.

Goal R4.3: Assist the organization in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the use of medications (e.g., appropriate accrediting bodies and related professional organization standards, statements, and/or guidelines; state and federal laws regulating pharmacy practice).

Objective R4.3.1: (Analyzing) Determine appropriate activities and documentation needed to meet accreditation, legal, regulatory, and safety requirements for pharmacy.
Criteria:
- Accurately interprets legal (e.g., Medicaid/Medicare, State, Federal), regulatory (e.g., CMS), and accreditation requirements (e.g., TJC, HEDIS, NCQA, URAC).
- Reviews current organizational documentation related to compliance.
- Articulates implications associated with non-compliance.

Objective R4.3.2: (Applying) Participate in the organizational compliance processes for accreditation, legal, regulatory, and safety requirements related to data, medications, and pharmacy practice.
Criteria:
- Accurately assesses organizational current practice to requirements.
- Identifies gaps in compliance.
- Develops proposed strategies to close gaps in compliance.
- Actively participates in organizational committees which oversee organizational compliance.

Competency Area R5: Teaching, Education, and Dissemination of Knowledge

Goal R5.1: Provide effective medication and practice-related education to health care professionals in population health management and data analytics.

Objective R5.1.1: (Creating) Design effective educational activities related to population health management and data analytics.
Criteria:
- Accurately defines educational needs, including learning styles, with regard to target audience (e.g., individual versus group) and learning level (e.g., health care professional versus patient, student versus PGY1 resident).
- Selects topics of significance.
- Defines educational objectives that are specific, measurable, at a relevant learning level (e.g., applying, creating, evaluating), and address the audiences' defined learning needs.
- Plans use of teaching strategies that match learner needs, including active learning (e.g., patient cases, polling).
- Selects content that is relevant, thorough, evidence based (using primary literature where appropriate), timely and reflects best practices.
- Includes accurate citations and relevant references and adheres to applicable copyright laws.

Objective R5.1.2: (Applying) Use effective presentation and teaching skills to deliver education related to population health management and data analytics.

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

Objective R5.1.3: (Applying) Use effective written communication to disseminate knowledge related to population health management and data analytics.
Criteria:
- Writes in a manner that is easily understandable and free of errors.
- Demonstrates thorough understanding of the topic.
- Notes appropriate citations and references.
- Includes critical evaluation of the literature and knowledge advancements or a summary of what is currently known on the topic.
- Develops and uses tables, graphs, and figures to enhance reader's understanding of the topic when appropriate.
- Writes at a level appropriate for the target readership (e.g., physicians, pharmacists, other health care professionals, patients, and the public).
- Creates one's own work and does not engage in plagiarism.

Objective R5.1.4: (Evaluating) Assess effectiveness of education related to population health management and data analytics.
Criteria:
- Selects assessment method (e.g., written or verbal assessment or self-assessment questions, case with case-based questions, and learner demonstration of new skill) that matches activity.
- Provides timely, constructive, and criteria-based feedback to learner.
- If used, assessment questions are written in a clear, concise format that reflects best practices for test item construction.
- Determines how well learning objectives were met.
- Plans for follow-up educational activities to enhance or support learning and (if applicable) ensure that goals were met.
- Identifies ways to improve education-related skills.
- Obtains, reviews, and applies feedback from learners and others to improve effectiveness as an educator.

Goal R5.2: Effectively employ appropriate preceptor roles when engaged in teaching students, pharmacy technicians, or fellow health care professionals.

Objective R5.2.1: (Analyzing) When engaged in teaching, select a preceptor role that meets learners' educational needs.
Criteria:

- Identifies which preceptor role is applicable for the situation (direct instruction, modeling, coaching, facilitating).
  - o Selects direct instruction when learners need background content.
  - o Selects modeling when learners have sufficient background knowledge to understand the skill being modeled.
  - o Selects coaching when learners are prepared to perform a skill under supervision.
  - o Selects facilitating when learners have performed a skill satisfactorily under supervision.

Objective R5.2.2: (Applying) Employ preceptor roles, as appropriate, when instructing, modeling, coaching, or facilitating skills.
Criteria:
- Accurately assesses the learner's skill level to determine the appropriate preceptor role for providing practice-based teaching.
- Instructs students, technicians, or others as appropriate.
- Models skills, including "thinking out loud," so learners can "observe" critical-thinking skills.
- Coaches, including effective use of verbal guidance, feedback, and questioning, as needed.
- Facilitates, when appropriate, by allowing learner independence and uses indirect monitoring of performance.

ELECTIVE COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR POSTGRADUATE YEAR TWO (PGY2) POPULATION HEALTH MANAGEMENT AND DATA ANALYTICS PHARMACY RESIDENCIES

Competency Area E1: Pharmacy Benefit Design and Formulary Management

Goal E1.1: Explain the interrelationship of the pharmacy benefit design elements and the organization's health care systems.

Objective E1.1.1: (Analyzing) Examine elements of pharmacy benefit design and management such as co-pay, formulary, medication utilization management, prior authorization procedures, consults, access to pharmacy networks, and contract negotiations (medication acquisition and/or network pharmacies).
Criteria:
- Compares and contrasts government (e.g., VA, DoD, Medicare) PBM roles and functions to private sector PBM roles and functions.
- Differentiates patient eligibility requirements and benefits for various plans.
- Appraises the methods for pharmaceutical procurement (e.g., prime vendor, open market, contract, use of inventory management systems).

Objective E1.1.2: (Analyzing) Research literature, business publications, websites and other relevant resources to assemble a list of factors that will influence sites' budget projections for the organization's funding period.
Criteria:
- Reviews resources for identifying pipeline drugs.
- Analyzes factors considered when determining whether a particular drug would be used by the covered population.
- Analyzes the influence of specialty drugs on the pharmacy budget.

Objective E1.1.3: (Creating) Assist the organization in planning and managing pharmacy drug spend.
Criteria:
- Designs models to predict drug spend, taking into account various plausible scenarios that could influence spend trajectory over the projected time frame.
- Generates cost savings plans that use formulary management techniques to achieve cost savings or cost avoidance.
- Constructs monitoring tools to track drug spend and savings.
- Produces financial reports that are meaningful and tailored to various customers (e.g., organizational leadership, clients, pharmacy directors, and formulary management staff).
- Applies clinical perspective and expertise to devise metrics to track and trend drug spend.

Goal E1.2: Manage aspects of the medication-use process related to formulary management through use of pharmacoeconomic proposals, medication use criteria, and organizational policies and procedures affecting the care of patients.

Objective E1.2.1: (Applying) Communicate formulary changes and/or outcomes to the organization.
Criteria:
- Accurately evaluates the effectiveness of channels of communication throughout the organization.

- Proposes communicating through an existing channel or suggests the development of a new/revised channel.
- Develops clear and concise communication messages.
- Assesses communication effectiveness.

Objective E1.2.2: (Creating) Prepare written medication use policy, applying clinical expertise, literature evaluation and appropriate pharmacoeconomic analyses.
Criteria:
- Explains the principles and methodology of basic pharmacoeconomic analyses.
- Appraises published and unpublished literature and other clinical information in the development of prior authorization/drug use criteria.
- Prepares succinct, comprehensive written products that address technical, operational and clinical perspectives and are considerate of workload/staff impact.
- Conducts a pharmacoeconomic analysis to support a medication policy and/or process recommendation or decision (e.g., Decision Analysis, Cost-Effectiveness Analysis, Cost-Benefit Analysis, Cost-Minimization Analysis, and Cost-Utility Analysis).
- Gains consensus for the approval of the written criteria or policy through the organization's governing bodies.
- Uses evidence-based principles to develop criteria for use.

Objective E1.2.3: (Applying) Present the medication use policy to an interdisciplinary organizational committee and gain consensus for approval.
Criteria:
- Demonstrates appropriate assertiveness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- Presentations reflect understanding of the composition and responsibilities of the organization's committee.
- Presentations reflect understanding of the pharmacist's responsibilities when participating in committee decision-making.
- Presentations use appropriate style of presentation for committee meetings.

Objective E1.2.4: (Evaluating) Assess the impact of a policy or process recommendation on patient safety and quality of care.
Criteria:
- Demonstrates a systematic approach to gathering data.
- Accurately analyzes data gathered.
- Presents finding to key stakeholders.
- Implements approved changes, as applicable.

Competency Area E2: Academia

Goal E2.1: Demonstrate understanding of key elements of the academic environment and faculty roles within it.

Objective E2.1.1: (Understanding) Demonstrates understanding of key elements of the academic environment and faculty roles within it.

Criteria:

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

Goal E2.2: Exercise case-based and other teaching skills essential to pharmacy faculty.

Objective E2.2.1: (Applying) Develop and deliver cases for workshops and exercises for laboratory experiences.
Criteria:

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

Objective E2.2.2: (Evaluating) Compare and contrast methods to prevent and respond to academic and profession dishonesty and adhere to copyright laws.
Criteria:

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

Goal E2.3: Develops and practices a philosophy of teaching.

Objective E2.3.1: (Creating) Develop or update a teaching philosophy statement.

Criteria:

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

Objective E2.3.2: (Creating) Prepare a practice-based teaching activity.

Criteria:

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

Objective E2.3.3: (Applying) Deliver a practice-based educational activity, including didactic or experiential teaching, or facilitation.

Criteria:

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

Objective E2.3.4: (Creating) Document one's teaching philosophy, skills, and experiences in a teaching portfolio.

Criteria:

- Portfolio includes:
  - A statement describing one's teaching philosophy.
  - Curriculum vitae.
  - Teaching materials including slides and other handouts for each teaching experience.
  - Documented self-reflections on one's teaching experiences and skills, including strengths, areas for improvement, and plans for working on the areas for improvement.
  - Peer/faculty evaluations.
  - Student/learner evaluations.

Competency Area E3: Advanced Skills with Technology or Automation Systems

Goal E3.1: Serve as an expert resource for the management of a specific technology or system.

Objective E3.1.1: (Understanding) Demonstrate understanding in the operation of the technology or system.

Criteria:
- Demonstrates understanding of the user view of the technology or automation system.
- Demonstrates understanding of the technical view of the technology or automation system.
- Demonstrate the operation of the technology or system.

Objective E3.1.2: (Applying) Formulate effective explanations, geared for a variety of interested audiences, of the functions of the technology or system.

Criteria:
- Adjusts communications appropriately when interacting with a technical audience versus a non-technical audience.
- Uses effective communication strategies with information technology vendors.

Objective E3.1.3: (Creating) Contribute to a change or improvement utilizing the technology or system.

Criteria:
- When presented with a non-standard problem, apply lateral (out-of-box) thinking to its solution.
- Engages with or develops a plan to implement a change in the technology or system.
- Participates in the change or implementation plan.

The effective date for implementation of these educational outcomes, goals and objectives is July 1, 2020. The mandatory date for implementation of these educational outcomes, goals and objectives is July 1, 2021.

APPENDIX

Statement on Rationale for No Appendix: Due to the highly dynamic nature of the field of Population Health Management and Data Analytics (PHMDA), intense development in healthcare information technology, and diversity and growth of healthcare software systems, an Appendix of specific scenarios would quickly become outdated and not applicable for the life of the document. Therefore, the Competency Areas, Goals, and Objectives (CAGOs) for Postgraduate Year Two (PGY2) PHMDA pharmacy residencies do not include an Appendix. The level of knowledge, understanding, and experience in all core areas or relevant issues in the field of population health management and data analytics expected of graduates of PGY2 PHMDA programs has been incorporated into the CAGOs listed above. Provided below is an optional list of related topics to this field of study.

Key Pharmacy Population Health Management and Data Analytics
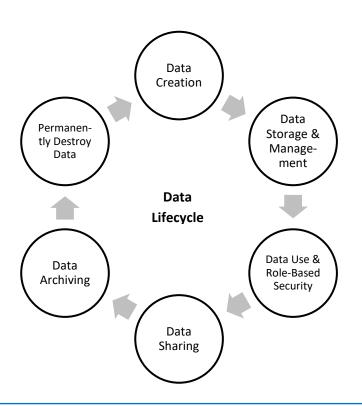## Topic References

The topics listed below may be incorporated into the program content in order to develop a well-rounded PGY2 PHMDA pharmacy resident. Any of these topics, beyond what is required in the Competency Areas, Goals and Objectives for the PGY2 PHMDA residency are not required, however, you may want to include them in your program design in order to provide comprehensive training for the residents across a spectrum of PHMDA concepts, regulatory requirements, performance measures, information technology, and pharmacoeconomic principles.

Concepts in Managed Care Pharmacy	Pharmacy and Health Plan Quality	Federal Programs and Regulations
• Disease Management • Drug Utilization Review • Electronic Prescribing • Formulary Management • Maintaining Affordability of the Prescription Drug Benefit • Medication Errors • Medication Stockpiling • Outcomes Research • Patient Confidentiality • Population Health Management • Prior Authorization • Specialty Pharmaceuticals	• Performance Measures and PQA (Pharmacy Quality Alliance) • Performance Measure Implementation and Evaluation • Quality Measures (including CMS Star Ratings) • NCQA (National Committee for Quality Assurance) Accreditation and HEDIS (Healthcare Effectiveness Data and Information Set) • URAC Accreditation	• Medicare • Medicare Part D • Medicaid • ACA (Affordable Care Act)/Healthcare Reform • ACA and the Pharmacist • FDA Drug Approval Process • FDA Approved Drug Products • 340 B Drug Pricing Program
Evaluating Evidence and Drug Information • Drug Information and Literature Evaluation • Study Design and Statistical Terms • Statistics	**Pharmacy and Therapeutics Committees** • Pharmacy and Therapeutics (P&T) Committees • Compendia and Knowledge bases	**Pharmacy Benefit Design** • Pharmacy Benefit Design • Utilization Management • Cost Containment Strategies

Managed Care Pharmacy Interventions	Pharmacoeconomics and Pharmacoepidemiology	Pharmaceutical Payments and Pricing
• AMCP Format for Formulary Submissions • Formulary Monographs		
Managed Care Pharmacy Interventions • Educational Interventions • Monitoring and Feedback • Disease Management • Managed Care Pharmacy Interventions	**Pharmacoeconomics and Pharmacoepidemiology** • Comparative Effective Research • Pharmacoeconomic Evaluation Techniques • Cost-Effective Analysis (CEA) • Pharmacoeconomics • Patient Reported Outcomes • Research Project	**Pharmaceutical Payments and Pricing** • Payment Methods • Pricing and Reimbursement • Rebates • Value Based-Contracts
Specialty Pharmacy • Specialty Drugs • Biosimilars and Follow-On • Biologics • Managing Specialty Drugs • Medical Benefit Specialty • Management	**Personalized Medicine** • Precision Medicine	**Information Technology (IT)** • Health IT • Mobile Health • Pharmacy Health Information Technology Collaborative • NCPDP • Common NCPDP reject codes • National Drug Code • Drug databases • RxNorm • ICD-10 • SNOMED/LOINC

Reference:
Figure A.

Key Population Health Management and Data Analytics Pharmacy Topic References

These topics may be incorporated into the program content in order to develop a well-rounded PGY2 Population Health Management and Data Analytics (PHMDA) pharmacy resident. Any of these topics, beyond what is required in the Competency Areas, Goals and Objectives for the PGY2 PHMDA residency are not required, however, you may want to include them in your program design in order to provide comprehensive training for the residents across a spectrum of PHMDA concepts, regulatory requirements, performance measures, information technology and pharmacoeconomic principles.

Topic	Name of Reference	Location of Reference	Date & Fees
AJHP Article	Meghan Swarthout, Martin A. Bishop, Population health management: Review of concepts and definitions, *American Journal of Health-System Pharmacy*	https://doi.org/10.2146/ajhp170025	Volume 74, Issue 18, 15 September 2017, Pages 1405–1411
AJHP Article	Kenneth M. Shermock, Population health management: Challenges and opportunities for pharmacy, *American Journal of Health-System Pharmacy*	https://doi.org/10.2146/ajhp170530	Volume 74, Issue 18, 15 September 2017, Pages 1398–1399
AJHP Article	Michael D. Sanborn, Population health management and the pharmacist's role, *American Journal of Health-System Pharmacy*	https://doi.org/10.2146/ajhp170157	Volume 74, Issue 18, 15 September 2017, Pages 1400–1401
AJHP Article	Felicity A. E. Homsted, Chelsea E. Magee, Noah Nesin, Population health management in a small health system: Impact of controlled substance stewardship in a patient-centered medical	https://doi.org/10.2146/ajhp161032	Volume 74, Issue 18, 15 September 2017, Pages 1468–1475

	home, *American Journal of Health-System Pharmacy*		
AJHP Article	Sheila R. Botts, Michael T. Gee, Christopher C. Chang, Iris Young, Logan Saito, Alfred E. Lyman, Design and implementation of population-based specialty care programs, *American Journal of Health-System Pharmacy*	https://doi.org/10.2146/ajhp161016	Volume 74, Issue 18, 15 September 2017, Pages 1437–1445
Managed Care Fundamentals	Fundamentals of Managed Care Pharmacy Certificate Program-Professional Version	http://amcplearn.org/products/1088/fundamentals-of-managed-care-pharmacy-certificate-program-professional-version	2016 $399
Managed Care Pharmacy	AMCP Managed Care Pharmacy Brochure	http://www.amcp.org/WorkArea/DownloadAsset.aspx?id=22111	2017 None
Concepts in Managed Care Pharmacy	Concepts in Managed Care Pharmacy • Disease Management • Drug Utilization Review • Electronic Prescribing • Formulary Management • Maintaining Affordability of the Prescription Drug Benefit • Medication Errors • Medication Stockpiling • Outcomes Research • Patient Confidentiality • Population Health Management • Prior Authorization	http://www.amcp.org/ConceptsInManagedCarePharmacy/	Accessed February 2018

	• Specialty Pharmaceuticals		
Managed Care Pharmacy Practice	Managed Care Pharmacy Practice (Textbook)	Navarro RP, ed. Managed Care Pharmacy Practice. 2nd edition. Jones and Bartlett Publishers: Sudbury, MA; 2009.	2009 $95
Pharmacy and Health Plan Quality			
General Information on Quality	Quality	http://www.amcp.org/quality/	Accessed February 2018
Performance Measures and PQA (Pharmacy Quality Alliance)	Life Cycle of a Performance Measure, Part 1: Conceptualization to Adoption	http://amcplearn.org/products/1301/life-cycle-of-a-performance-measure-part-1-conceptualization-to-adoption	2017 $15
Performance Measure Implementation and Evaluation	Life Cycle of a Performance Measure, Part 2: Implementation and Evaluation	http://amcplearn.org/products/1302/life-cycle-of-a-performance-measure-part-2-implementation-and-evaluation	2017 $15
Quality Measures (including CMS Star Ratings)	Quality Measures for Pharmacies	Pharmacist's Letter, Detail-Document #320101	2016 May require subscription to Pharmacist's Letter
NCQA (National Committee for Quality Assurance) Accreditation and HEDIS (Healthcare Effectiveness Data and Information Set)	NCQA Accreditation Programs HEDIS Measures	https://www.ncqa.org/programs/accreditation http://www.ncqa.org/hedis-quality-measurement	Accessed February 2018
URAC Accreditation	URAC Pharmacy Quality Management Programs	https://www.urac.org/program-area/pharmacy-quality-management-programs	Accessed February 2018
Federal Programs and Regulations			

Medicare	What is Medicare?	https://www.medicareinteractive.org/get-answers/introduction-to-medicare/explaining-medicare/what-is-medicare	
Medicare Part D	Medicare Prescription Drug Benefit Manual: Chapter 6 - Part D Drugs and Formulary Requirements	https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovContra/Downloads/Part-D-Benefits-Manual-Chapter-6.pdf	Accessed February 2018
Medicaid	What is Medicaid?	https://www.medicareinteractive.org/get-answers/programs-for-people-with-limited-income/medicaid-and-medicare/what-is-medicaid	Accessed February 2018
ACA (Affordable Care Act)/Healthcare Reform	Affordable Care Act	https://www.medicaid.gov/affordable-care-act/index.html	Accessed February 2018
ACA and the Pharmacist	The Affordable Care Act and the Pharmacist (US Pharm. 2015;40(10):33-38.)	https://www.uspharmacist.com/article/the-affordable-care-act-and-the-pharmacist	2015
FDA Drug Approval Process	U.S. Food and Drug Administration Process	https://www.fda.gov/downloads/drugs/resourcesforyou/consumers/ucm284393.pdf	Accessed February 2018
FDA Approved Drug Products	Drugs@FDA: FDA Approved Drug Products Search Page	https://www.accessdata.fda.gov/scripts/cder/daf/	Accessed February 2018
340 B Drug Pricing Program	Overview of the 340B Drug Pricing Program	https://www.340bhealth.org/340b-resources/340b-program/overview/	Accessed February 2018
Evaluating Evidence and Drug Information			
Drug Information and Literature Evaluation	Remington Education: Drug Information and Literature Evaluation (Textbook)	Abate MA, Blommel ML. Remington Education: Drug Information and Literature Evaluation. 1st edition. Pharmaceutical Press: 2013.	2013 $35

		http://www.pharmpress.com/product/978085711 0664/remington-education-drug-information-and-literature-evaluation	
Study Design and Statistical Terms	Applying Study Results to Patient Care: Glossary of Study Design and Statistical Terms Applying Study Results to Patient Care: Relative Risk, Absolute Risk, and Number Needed to Treat	Pharmacist's Letter, Detail-Document #210610 Pharmacist's Letter, Detail-Document #210610	2005 May require subscription to Pharmacist's Letter
Statistics	Basic and Clinical Statistics (Textbook)	Dawson B, Trapp RB. Basic and clinical biostatistics. 4th edition. Lange Medical Books-McGraw Hill: 2004.	2004 $87
AMCP Format for Formulary Submissions **Formulary Monographs**	A Format for Submission of Clinical and Economic Evidence in Support of Formulary Consideration See Appendix B for Formulary Monograph Template	http://www.amcp.org/FormatV4/	2016 No fee
Pharmacy and Therapeutics Committees			
Pharmacy and Therapeutics (P&T) Committees	ASHP guidelines on the pharmacy and therapeutics committee and the formulary system (Am J Health-Syst Pharm. 2008;65:1272-83.)	https://www.ashp.org/-/media/assets/policy-guidelines/docs/guidelines/gdl-pharmacy-therapeutics-committee-formulary-system.ashx?la=en&hash=EF1E4214CC91C65097AE EECE91BF6EC985AE3E56	2008
	The Changing Roles of P&T Committees (PT. 2014;39(11):768-772.)	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4 218672/	2014

Compendia and Knowledge bases	Gain a Solid Understanding of Compendia and its Impact on Patient Access (Formulary. 2012;252-256)	http://formularyjournal.modernmedicine.com/formulary-journal/news/clinical/clinical-pharmacology/gain-solid-understanding-compendia-and-its-imp	2012
Pharmacy Benefit Design			
Pharmacy Benefit Design, Utilization Management/Cost Containment Strategies	Pharmacy Benefit Design: Presentation Developed for the Academy of Managed Care Pharmacy (February 2015) An Annotated Bibliography of Managed Care Pharmacy Interventions • Step Therapy • Prior Authorization • Tiered Formularies	http://www.amcp.org/WorkArea/DownloadAsset.aspx?id=19131 http://www.amcp.org/WorkArea/DownloadAsset.aspx?id=9276	2015 2010 Accessed February 2018
Managed Care Pharmacy Interventions			
Pharmacy Interventions	An Annotated Bibliography of Managed Care Pharmacy Interventions • Educational Interventions • Monitoring and Feedback • Disease Management • Review Articles on Managed Care Pharmacy Interventions	http://www.amcp.org/WorkArea/DownloadAsset.aspx?id=9276	2010 Accessed February 2018
Methods for Pharmacoeconomics and Pharmcoepidemiology			
Comparative Effective Research	AMCP Comparative Effectiveness Research Certificate	http://www.amcp.org/CERCertificate	$495

Pharmacoeconomic Evaluation Techniques	Role of the Managed Care Pharmacist in Using Pharmacoeconomic Analyses in Formulary Decision-Making	http://amcplearn.org/products/1160/role-of-the-managed-care-pharmacist-in-using-pharmacoeconomic-analyses-in-formulary-decision-making	2016 No Fee
Cost-Effective Analysis (CEA)	Cost-Effective Analysis and the Formulary Decision-Making Process (J Manag Care Spec Pharm, 2004;10(1):48-59.)	https://www.jmcp.org/doi/abs/10.18553/jmcp.2004.10.1.48	2004
Pharmacoeconomics	Pharmacoeconomics: Presentation Developed for the Academy of Managed Care Pharmacy (February 2015)	http://amcp.org/WorkArea/DownloadAsset.aspx?id=19130	2015
Patient Reported Outcomes	Patient-Reported Outcomes: A Primer for Managed Care Pharmacists	http://amcplearn.org/products/1278/patient-reported-outcomes-a-primer-for-managed-care-pharmacists	2017 $15
Research Project	Conducting Your Pharmacy Practice Research Project (Textbook)	Smith F. Conducting Your Pharmacy Practice Research Project. 2nd edition. Pharmaceutical Press: 2010. http://www.pharmpress.com/product/9780853698692/conducting-your-pharmacy-practice-research-project	2010 $42
Pharmaceutical Payments and Pricing			
Payment Methods	Guide to Pharmaceutical Payment Methods	http://www.amcp.org/pharmaceutical-payment-guide	2013 No fee
Pricing and Reimbursement	Pricing and Reimbursement in U.S. Pharmaceutical Markets. Faculty Research Working Paper	https://research.hks.harvard.edu/publications/getFile.aspx?Id=598	2010

	Series. Harvard Kennedy School. Harvard University		
Rebates	Encore: Approaches to Managed Care Contracting with Pharmaceutical Manufacturers	http://amcplearn.org/products/1271/encore-approaches-to-managed-care-contracting-with-pharmaceutical-manufacturers	2017 $15
Value Based-Contracts	AMCP Partnership Forum: Advancing Value-Based Contracting. (J Manag Care Spec Pharm. 2017;23(11):1096-1102.	https://www.jmcp.org/doi/full/10.18553/jmcp.2017.17342	2017
Specialty Pharmacy			
Specialty Drugs	Specialty Drug Overview	https://www.pcmanet.org/pcma-cardstack/what-is-a-specialty-drug/	Accessed February 2018
Biosimilars and Follow-On Biologics	Biosimilars and Follow-on Biologics: A Pharmacists Opportunity (McShea M, Borns, M, Pollon RD. Specialty Pharmacy Times, September/October 2016.)	https://www.specialtypharmacytimes.com/publications/specialty-pharmacy-times/2016/september-2016/Biosimilars-and-Follow-on-Biologics-A-Pharmacist-Opportunity	2016 Accessed February 2018
Managing Specialty Drugs	The Management of Specialty Drugs	https://www.spcma.org/wp-content/uploads/2016/06/sPCMA_The_Management_of_Specialty_Drugs.pdf	2016 Accessed February 2018
Medical Benefit Specialty Management	Medical Benefit Specialty Drug Management–A Call to Action (Eng KJ, Specialty Pharmacy Times, January/February 2017.)	https://www.specialtypharmacytimes.com/publications/specialty-pharmacy-times/2017/January-2017	2017 Accessed February 2018
Personalized Medicine			

Precision Medicine	Home Study - The Promise and the Challenge of Personalized Medicine for Managed Care	http://amcplearn.org/products/1198/home-study-the-promise-and-the-challenge-of-personalized-medicine-for-managed-care	2016 No fee
Information Technology (IT)			
Health IT	Health IT: Why it Matters to You	http://amcplearn.org/products/1209/health-it-why-it-matters-to-you	2016 $15
Mobile Health	The Basics of Mobile Health (mHealth) and Its Potential Impact	http://amcplearn.org/products/1297/the-basics-of-mobile-health-mhealth-and-its-potential-impact	2017 $15
Pharmacy Health Information Technology Collaborative	Pharmacy Health Information Technology Collaborative Primary Focus and Guiding Principles	http://pharmacyhit.org/	Accessed February 2018
NCPDP	National Council on Prescription Drug Programs (NCPDP)	http://www.ncpdp.org/About-Us/FAQ	Accessed February 2018
Common NCPDP reject codes	NCPDP Reject Codes	https://files.medi-cal.ca.gov/pubsdoco/ncpdp/ncpdp_rejectcd.asp	
National Drug Code	National Drug Codes Explained National Drug Code Database Background Information	https://www.drugs.com/ndc.html https://www.fda.gov/Drugs/DevelopmentApprovalProcess/UCM070829	Accessed February 2018
Drug databases	First Databank (FDB)/ MedKnowledge (formerly NDDF) Medi-Span	http://www.fdbhealth.com http://www.wolterskluwercdi.com/drug-data/medi-span-electronic-drug-file/	Accessed February 2018
RxNorm	RxNorm Overview	https://www.nlm.nih.gov/research/umls/rxnorm/overview.html	Accessed February 2018

ICD-10	International Classification of Disease, (ICD-10-CM/PCS) Background	https://www.cdc.gov/nchs/icd/icd10cm_pcs_background.htm	Accessed February 2018
SNOMED/LOINC	SNOMED (Systematized Nomenclature of Medicine) About LOINC (Logical Observation Indentifiers Names and Codes)	https://www.snomed.org/snomed-ct/what-is-snomed-ct https://loinc.org/about/	Accessed February 2018