

## REQUIRED COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR POSTGRADUATE YEAR TWO (PGY2) PEDIATRIC PHARMACY and PEDIATRIC SPECIALTY PATHWAY RESIDENCIES

Prepared in collaboration with the Pediatric Pharmacy Association

### Introduction

ASHP and the Commission on Credentialing (COC) strongly support the stated mission of the Pediatric Pharmacy Association which is to *“advance pediatric pharmacy practice, support the health and wellbeing of children, and promote safe and effective medication use in children through Collaboration, Advocacy, Research, and Education (CARE)”*.

The COC supports the education of pharmacists in pediatric pharmacy practice and advocates for residency training of advanced level practitioners to sustain and support the complex pharmaceutical care needs of the pediatric population. The PPA supports the COC in the development of the *Appendices of Learning* for the PGY2 Pediatric Specialty Pathway (PSP) areas as outlined at the end of this document for pediatric institutions that can conduct this advanced level of post graduate education.

### Overview

The competency areas, goals, and objectives are for use with the *ASHP Accreditation Standard for Postgraduate Residency Programs (effective July 1, 2023)*. The first five competency areas described herein are required, and the others are elective.

The required competency areas and all of the goals and objectives they encompass must be included in all programs. Programs may add one or more additional competency areas. Programs selecting an additional competency area are not required to include all of the goals and objectives in that competency area. In addition to the potential additional competency areas described in this document, programs are free to create their own additional competency areas with associated goals and objectives. Each of the goals encompassed by the program’s selected program competency areas (required and additional) must be evaluated at least once during the residency year. In addition, elective competency areas may be selected for specific residents only.

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

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<sup>1</sup> 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 areas for PGY1 pharmacy residencies are available on the ASHP website. PGY2 competency areas, goals, and objectives in pediatric pharmacy are differentiated from those from PGY1 by specialization and the expectation of PGY2 residents for greater work competence and proficiency. Residents come into PGY2 pediatric residencies from adult or pediatric settings. Their individual learning needs are addressed in their resident development plans.

## **Definitions**

Competency Areas: Categories of the residency graduates' capabilities.

Competency areas are classified into one of three categories:

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

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

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

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 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.

## **Competency Area R1: Patient Care**

(See appendix for additional specific requirements.)

**Goal R1.1: In collaboration with the health care team, provide comprehensive medication management to pediatric patients following a consistent patient care process.**

**Objective R1.1.1: (Applying) Interact effectively with health care teams to manage pediatric patients' medication therapy.**

Criteria:

- Interactions are cooperative, collaborative, communicative, and respectful.
- Demonstrates skills in negotiation, conflict management, and consensus building.
- Demonstrates advocacy for the patient.
- Effectively contributes pharmacotherapy knowledge and patient care skills as an essential member of the healthcare team.

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

Criteria:

- Interactions are respectful and collaborative.
- Maintains accuracy and confidentiality of patients' protected health information.
- Uses effective communication skills.
- Shows empathy.
- Empowers patients to take responsibility for their health.
- Demonstrates cultural competence.
- Communicates with family members to obtain patient information when patients are unable to provide the information.
- Interactions are appropriate for the patient's developmental level.
- Ensures understanding of, and consensus with, care plans.
- Utilizes effective motivational interviewing techniques, such as goal setting and identification of barriers for improved health.
- Demonstrates advocacy for caregivers.

**Objective R1.1.3: (Analyzing) Collect information on which to base safe and effective medication therapy for pediatric patients.**

Criteria:

- Collection/organization methods are efficient and effective.
- Collects relevant information about medication therapy, including:
  - Birth and maternal history, as applicable.
  - History of present illness.
  - Relevant health data that may include past medical history, health and wellness information, biometric test results, and physical assessment findings.
  - Social history.
  - Medication history, including prescription, non-prescription, illicit, recreational, and non-traditional therapies; other dietary supplements; immunizations; and allergies.
  - Patient assessment (examples include, but are not limited to, physiologic monitoring, laboratory values, microbiology results, diagnostic imaging, procedural results, and scoring systems)
  - Pharmacogenomics and pharmacogenetic information, if available.
  - Adverse drug reactions.

- Medication adherence and persistence.
- Patient lifestyle habits, preferences and beliefs, health and functional goals, and socioeconomic factors that affect access to medications and other aspects of care.
- Sources of information are the most reliable available, including electronic, face-to-face, and others.
- Recording system is functional for subsequent problem solving and decision making.
- Clarifies information as needed.
- Displays understanding of limitations of information in health records.
- Poses appropriate questions as needed.

**Objective R1.1.4: (Analyzing) Analyze and assess information on which to base safe and effective medication therapy for pediatric patients.**

Criteria:

- Includes accurate assessment of patient's and caregiver's:
  - Health and functional status.
  - Risk factors.
  - Health data.
  - Cultural factors.
  - Health literacy.
  - Access to medications.
  - Immunization status.
  - Need for preventive care and other services, when appropriate.
  - Drug delivery preference (e.g., ability to take tablets or liquid formulations).
  - Patient progression to self-care.
  - Other aspects of care, as applicable.
- Identifies age-appropriate medication therapy problems, including:
  - Lack of indication for medication.
  - Medical conditions for which there is no medication prescribed.
  - Medication prescribed or continued inappropriately for a particular medical condition.
  - Suboptimal medication regimen (e.g., dose, dosage form, duration, schedule, route of administration, method of administration).
  - Medication toxicity requiring medication therapy modifications.
  - Abnormal lab values requiring medication therapy modifications.
  - Therapeutic duplication.
  - Adverse drug or device-related events or the potential for such events.
  - Clinically significant drug–drug, drug–disease, drug–nutrient, drug–DNA test interaction, drug–laboratory test interaction, or the potential for such interactions.
  - Use of harmful social, recreational, nonprescription, nontraditional, or other medication therapies.
  - Patient not receiving full benefit of prescribed medication therapy.
  - Problems arising from the financial impact of medication therapy on the patient.
  - Patient lacks understanding of medication therapy.
  - Patient not adhering to medication regimen and root cause (e.g., knowledge, recall, motivation, financial, system).
  - Patient assessment needed.
  - Discrepancy between prescribed medications and established care plan for the patient.
  - Level of evidence-based support in the literature.

**Objective R1.1.5: (Creating) Design and/or redesign safe and effective patient-centered therapeutic regimens and monitoring plans (care plans) for pediatric patients.**

Criteria:

- Specifies evidence-based, measurable, achievable therapeutic goals that include consideration of:
    - Relevant patient-specific information, including culture and preferences.
    - The goals of other interprofessional team members.
    - The patient's disease state(s).
    - Medication-specific information.
    - Best evidence, including clinical guidelines and the most recent literature.
    - Effectively interprets new literature for application to patient care.
    - Ethical issues involved in the patient's care.
    - Quality-of-life issues specific to the patient.
    - End of life issues, when needed.
    - Integration of all the above factors influencing the setting of goals.
  - Designs/redesigns regimens that:
    - Are appropriate for the disease states being treated.
    - Reflect:
      - Clinical experience.
      - The therapeutic goals established for the patient.
      - The patient's and caregiver's specific needs.
      - Consideration of:
        - Any pertinent pharmacogenomic or pharmacogenetic factors.
        - Best evidence.
        - Pertinent ethical issues.
        - Pharmacoeconomic components (patient, medical, and systems resources).
        - Patient preferences, culture, and/or language differences.
        - Patient-specific factors, including physical, mental, emotional, and financial factors that might impact adherence to the regimen.
        - Drug shortages.
    - Adhere to the health system's medication-use policies.
    - Follow applicable ethical standards.
    - Address wellness promotion and lifestyle modification.
    - Support the organization's or patient's insurance formulary.
    - Address medication-related problems and optimize medication therapy.
    - Engage the patient through education, empowerment, and promotion of self-management.
  - Designs/redesigns monitoring plans that:
    - Effectively evaluate achievement of therapeutic goals.
    - Ensure adequate, appropriate, and timely follow-up.
    - Establish parameters that are appropriate measures of therapeutic goal achievement.
    - Reflect consideration of best evidence.
    - Select the most reliable source for each parameter measurement.
    - Have appropriate value ranges selected for the patient.
    - Have parameters that measure efficacy.
    - Have parameters that measure potential adverse drug events.
    - Have parameters that are cost-effective.
    - Have obtainable measurements of the parameters specified.
    - Reflects consideration of compliance.
    - If for an ambulatory patient, includes strategy for ensuring patient returns for needed follow-up visit(s).
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- When applicable, reflects preferences and needs of the patient.

**Objective R1.1.6: (Applying) Ensure implementation of therapeutic regimens and monitoring plans (care plans) for pediatric patients by taking appropriate follow-up actions.**

Criteria:

- Effectively recommends or communicates patients' regimens and associated monitoring plans to relevant members of the health care team.
  - Poses appropriate questions as needed.
  - Recommendation is persuasive.
  - Presentation of recommendation accords patient's right to refuse treatment.
  - If patient or family refuses treatment, pharmacist exhibits responsible professional behavior.
  - Creates an atmosphere of collaboration.
  - Skillfully defuses negative reactions.
  - Communication conveys expertise.
  - Communication is assertive but not aggressive.
  - Where the patient has been directly involved in the design of the plans, communication reflects previous collaboration appropriately.
- Ensures recommended plan is implemented effectively for the patient, including ensuring that the:
  - Recommendation is persuasive.
  - Therapy corresponds with the recommended regimen.
  - Regimen is initiated at the appropriate time.
  - Patient receives their medication as directed.
  - Medications in situations requiring immediacy are effectively facilitated.
  - Medication orders are clear and concise.
  - Activity complies with the health system's policies and procedures.
  - Tests correspond with the recommended monitoring plan.
  - Tests are ordered and performed at the appropriate time.
- Takes appropriate action based on analysis of monitoring results (redesign regimen and/or monitoring plan if needed).
- Appropriately initiates, modifies, discontinues, or administers medication therapy as authorized.
- Responds appropriately to notifications and alerts in electronic medical records and other information systems that support medication ordering processes (based on factors such as patient weight, age, gender, comorbid conditions, drug interactions, renal function, and hepatic function).
- Provides thorough and accurate developmentally appropriate education to patients and caregivers, when appropriate, including information on medication therapy, adverse effects, compliance, appropriate use, handling, and medication administration.
- Addresses medication- and health-related problems and engages in preventive care strategies, including vaccine administration.
- Schedules follow-up care as needed to achieve goals of therapy.

**Objective R1.1.7: (Applying) For pediatric patients, document direct patient care activities appropriately in the medical record or where appropriate.**

Criteria:

- Accurately and concisely communicates drug therapy recommendations to healthcare professionals representing different disciplines.
- Selects appropriate direct patient care activities for documentation.
- Documentation is clear.
- Documentation is written in time to be useful.

- Documentation follows the health system’s policies and procedures, including requirements that entries be signed, dated, timed, legible, and concise.
- Appropriately documents patient/caregiver communication and all relevant direct patient care activities in a timely manner.

**Objective R1.1.8: (Applying) Demonstrate responsibility to pediatric patients.**

Criteria:

- Gives priority to patient care activities.
- Plans prospectively.
- Routinely completes all steps of the medication management process.
- Assumes responsibility for medication therapy outcomes.
- Actively works to identify the potential for significant medication-related problems.
- Actively pursues all significant existing and potential medication-related problems until satisfactory resolution is obtained.
- Ensures appropriate transitions of care.
- Helps patients and caregivers learn to navigate the health care system, as appropriate.
- Informs patients and caregivers how to obtain their medications in a safe, efficient, and cost-effective manner.
- Determines barriers to patient compliance and makes appropriate adjustments, including caregiver-related barriers.

**Goal R1.2: Ensure continuity of care during transitions of pediatric patients between care settings.**

**Objective R1.2.1: (Applying) Manage transitions of care effectively for pediatric patients.**

Criteria:

- Effectively participates in obtaining or validating a thorough and accurate medication history.
- Conducts thorough medication reconciliation when necessary.
- Follows up on all identified drug-related problems.
- Participates effectively in medication education.
- Provides accurate and timely follow-up information when patients transfer to another facility, level of care, pharmacist, or provider, as appropriate.
- Follows up with patient and caregivers in a timely and caring manner.
- Provides additional effective monitoring and education, as appropriate.
- Takes appropriate and effective steps to help avoid unnecessary hospital admissions and/or readmissions.
- Facilitates medication access, as needed.

**Goal R1.3: Manage and facilitate delivery of medications to support safe and effective drug therapy for pediatric patients.**

**Objective R1.3.1: (Applying) Prepare and dispense medications for pediatric patients following best practices and the organization’s policies and procedures.**

Criteria:

- Correctly interprets appropriateness of a medication order before preparing or permitting the distribution of the first dose, including:
  - Identifying, clarifying, verifying, and correcting any medication order errors.
  - Considering complete patient-specific information.

- Identifying existing or potential drug therapy problems.
- Determining an appropriate solution to an identified problem.
- Securing consensus from the prescriber for modifications to therapy.
- Ensuring that the solution is implemented.
- Ensuring age- and weight-appropriate formulations are selected.
- Prepares medication using appropriate techniques and following the organization's policies and procedures and applicable professional standards, including:
  - When required, accurately calibrating equipment.
  - Ensuring that solutions are appropriately concentrated, without incompatibilities; stable; and appropriately stored.
  - Adhering to appropriate safety and quality assurance practices.
  - Preparing labels that conform to the health system's policies and procedures.
  - Ensuring that medication has all necessary and appropriate ancillary labels.
  - Inspecting the final medication before dispensing.
- When dispensing medication products:
  - Ensures dispensing in the safest delivery device.
  - Follows the organization's policies and procedures.
  - Ensures the patient receives the medication(s) as ordered.
  - Ensures the integrity of medication dispensed.
  - Provides any necessary written and/or verbal counseling.
  - Ensures the patient receives medication on time.
- Maintains accuracy and confidentiality of patients' protected health information.
- Checks the accuracy of the work of pharmacy technicians, clerical personnel, pharmacy students, and others according to applicable laws and institutional policies.

**Objective R1.3.2: (Applying) Manage aspects of the medication-use process related to formulary management for pediatric patients.**

Criteria:

- Follows appropriate procedures regarding exceptions to the formulary, if applicable, in compliance with policy.
- Ensures non-formulary medications are dispensed, administered, and monitored in a manner that ensures patient safety.

**Objective R1.3.3: (Applying) Facilitate aspects of the medication-use process for pediatric patients.**

Criteria:

- When appropriate, follows the organization's established protocols.
- Makes effective use of relevant technology to aid in decision-making and increase safety.
- Demonstrates commitment to medication safety in medication-use processes.
- Effectively prioritizes workload and organizes workflow.
- Checks accuracy of medications dispensed, including correct patient identification, medication, dosage form, label, dose, number of doses, and expiration dates; and proper repackaging and relabeling of medications, including compounded medications (sterile and nonsterile).
- Reviews processes for medications dispensed, including determining correct patient identification, medication, dosage form, label, dose, number of doses, and expiration dates.
- When needed, checks for proper repackaging and relabeling of medications, including compounded medications (sterile and nonsterile).
- Promotes safe and effective drug use on a day-to-day basis.



## Competency Area R2: Advancing Practice and Improving Patient Care

**Goal R2.1: Demonstrate ability to manage formulary and medication-use processes for pediatric patients, as applicable to the organization.**

**Objective R2.1.1: (Creating) Prepare or revise a drug class review, monograph, treatment guideline, or protocol related to care of pediatric patients including proposals for medication-safety technology improvements.**

Criteria:

- Displays objectivity.
- Effectively synthesizes information from the available literature.
- Applies evidenced-based principles.
- Consults relevant sources.
- Considers medication-use safety and resource utilization.
- Uses the appropriate format.
- Effectively communicates any changes in medication formulary, medication usage, or other procedures to appropriate parties.
- Demonstrates appropriate assertiveness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- When appropriate, may include proposals for medication-safety technology improvements.

**Objective 2.1.2: (Evaluating) Participate in a medication-use evaluation or quality improvement audit related to care for pediatric patients.** (Guidance: This should not be the major project but may be part of the project.)

Criteria:

- Uses evidence-based principles to develop criteria for use.
- Demonstrates a systematic approach to gathering data.
- Accurately analyzes data gathered.
- Demonstrates appropriate confidence and assertiveness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- Implements approved changes, as applicable.

**Objective 2.1.3: (Applying) Participate in the review of medication event reporting and monitoring related to care for pediatric patients.**

Criteria:

- Effectively uses currently available technology and automation that supports a safe medication-use process.
- Appropriately and accurately determines, investigates, reports, tracks, and trends adverse drug events, medication errors, and efficacy concerns using accepted institutional resources and programs.

**Objective 2.1.4: (Analyzing) Identify opportunities for improvement of the medication-use system related to care for pediatric patients.**

Criteria:

- Appropriately identifies problems and opportunities for improvement and analyzes relevant background data.
- Accurately evaluates or assists in the evaluation of data generated by health information technology or automated systems to identify opportunities for improvement.

- Uses best practices to identify opportunities for improvements.
- When needed, makes medication-use policy recommendations based on a review of practice standards, guidelines, and other evidence [e.g., National Quality Measures, Institute for Safe Medication Practices alerts, Joint Commission sentinel alerts, Children’s Oncology Group, PPAG, ASHP].

**Goal R2.2: Demonstrate ability to conduct a quality improvement or research project.**

Ideally, objectives R2.2.1-R2.2.6 will be addressed through residents working on one quality improvement or research project; however, if this is not possible, all objectives must be addressed by the end of the residency year and can be addressed through work on more than one initiative.

**Objective R2.2.1: (Analyzing) Identify and/or demonstrate understanding of a specific project topic to improve care of pediatric patients or a topic for advancing the pharmacy profession or pediatric pharmacy.**

Criteria:

- Appropriately identifies problems and opportunities for improvement and analyzes relevant background data.
- Determines an appropriate topic for a practice-related project of significance to patient care.
- 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.
- 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.
- Appropriately identifies problems and opportunities for improvement and analyzes relevant background data.
- Accurately evaluates or assists in the evaluation of data generated by health information technology or automated systems to identify opportunities for improvement.
- Uses best practices to identify opportunities for improvements.
- When needed, makes medication-use policy recommendations based on a review of practice standards and other evidence (e.g., National Quality Measures, Institute for Safe Medication Practices alerts, Joint Commission sentinel alerts).
- Demonstrates appropriate assertiveness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.

**Objective R2.2.2: (Creating) Develop a plan or research protocol for a practice quality improvement or research project for the care of pediatric patients or a topic for advancing the pharmacy profession or pediatric pharmacy.**

Criteria:

- Steps in plan are defined clearly.
- Applies safety design practices (e.g., standardization, simplification, human factors training, lean principles, FOCUS-PDCA, other process improvement or research methodologies) appropriately and accurately.
- Plan for improvement includes appropriate reviews and approvals required by department or organization and addresses the concerns of all stakeholders.
- Applies evidence-based principles, if needed.
- Develops a feasible design for a project that considers who or what will be affected by the project.
- Identifies and obtains necessary approvals, (e.g., IRB, funding) for a practice-related project.

- Acts in accordance with the ethics of research on human subjects, if applicable.
- Plan design is practical to implement and is expected to remedy or minimize the identified challenge or deficiency.

**Objective 2.2.3: (Evaluating) Collect and evaluate data for a practice quality improvement or research project for the care of pediatric patients or a topic for advancing the pharmacy profession or pediatric pharmacy.**

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.
- Accurately assesses the impact of the project, including its sustainability, using operational, clinical, economic, and/or humanistic outcomes of patient care.
- 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 plan to address opportunities for additional changes.

**Objective R2.2.4 (Applying) Implement a quality improvement or research project to improve care of pediatric patients or for a topic for advancing the pharmacy profession or pediatric pharmacy.**

Criteria:

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

**Objective R2.2.5: (Evaluating) Assess changes made to improve care of pediatric patients or for a topic for advancing the pharmacy profession or pediatric pharmacy.**

Criteria:

- Outcome of change is evaluated accurately and fully.
- Includes operational, clinical, economic, and humanistic outcomes of patient care.

- Uses continuous quality improvement (CQI) principles to assess the success of the implemented change, if applicable.
- Correctly identifies need for additional modifications or changes.
- Accurately assesses the impact of the project, including its sustainability (if applicable).
- Accurately and appropriately develops plan to address opportunities for additional changes.

**Objective R2.2.6: (Creating) Effectively develop and present, orally and in writing, a final project report suitable for publication related to care for pediatric patients or for a topic for advancing the pharmacy profession or pediatric pharmacy at a local, regional, or national conference.** (The presentation can be virtual.)

Criteria:

- Outcome of change is reported accurately to appropriate stakeholders(s) and policy-making bodies according to departmental or organizational processes.
- Report includes implications for changes to or improvement in pharmacy practice.
- Report uses an accepted manuscript style suitable for publication in the professional literature.
- Oral or written presentations to appropriate audiences within the department and organization or to external audiences use effective communication and presentation skills and tools (e.g., handouts, slides, poster) to convey points successfully.

## **Competency Area R3: Leadership and Management**

**Goal R3.1: Demonstrate leadership skills for successful self-development in the provision of care for pediatric patients.**

**Objective R3.1.1: (Applying) Demonstrate personal, interpersonal, and teamwork skills critical for effective leadership in the provision of care for pediatric patients.**

Criteria:

- Demonstrates effective 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 R3.1.2: (Applying) Apply a process of ongoing self-evaluation and personal performance improvement in the provision of care for pediatric patients.**

Criteria:

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

**Goal R3.2: Demonstrate management skills in the provision of care for pediatric patients.**

**Objective R3.2.1: (Applying) Contribute to pediatric pharmacy departmental management.**

Criteria:

- Helps identify and define significant departmental needs.
- Helps develop plans that address departmental needs.
- Participates effectively on committees or informal work groups to complete group projects, tasks, or goals.
- Participates effectively in implementing changes, using change management and quality improvement best practices and tools, consistent with team, departmental, and organizational goals.

**Objective R3.2.2: (Applying) Contribute the pediatric pharmacist's perspective to technology and automation systems decisions.**

Criteria:

- Effectively contributes to the organization's design of its technology and automation systems, when appropriate, (e.g., CPOE, PDAs, software, smart pumps).
- Effectively contributes to the organization's implementation of its technology and automation systems, when appropriate.
- Effectively contributes to the organization's maintenance of its technology and automation systems, when appropriate.

**Objective R3.2.3: (Applying) Manage one's own pediatric pharmacy practice effectively.**

Criteria:

- Review and interpret the most recent primary literature.
- Evaluate 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, 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, and pharmacy association membership activities.
- Demonstrates personal commitment to and adheres to organizational and departmental policies and procedures.

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

**Goal R4.1: Provide effective medication and practice-related education to pediatric patients, caregivers, health care professionals, students, and the public (individuals and groups).**

**Objective R4.1.1: (Applying) Establish oneself as an organizational expert for pediatric pharmacy-related information and resources.**

Criteria:

- Identifies, and overcomes, barriers to the pediatric pharmacist for earning credibility with members of the pediatric multi-disciplinary team.
- Identifies, and overcomes, barriers to the pediatric pharmacist for earning credibility within the organization.
- Integrates drug information resources with clinical expertise and experiences to provide optimal recommendations for patient care to health care professionals.

**Objective R4.1.2: (Applying) Ensure appropriate pediatric pharmacy resources are available.**

Criteria:

- Assesses current available pediatric pharmacy resources.
- Identifies resources that the specialist should have available when establishing a new pediatric pharmacy practice.
- Selects core primary, secondary, and tertiary biomedical literature resources appropriate for pediatric pharmacy practice.
- Uses effective negotiation strategies, if applicable.

**Objective R4.1.3: (Applying) Design effective educational activities related to the care of pediatric patients.**

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).
- 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., teachback strategies, patient cases, polling).
- Selects content that is relevant, thorough, evidence based (using primary literature where appropriate), timely and reflects best practices.
- Includes accurate citations and relevant references and adheres to applicable copyright laws.

**Objective R4.1.4: (Applying) Use effective presentation and teaching skills to deliver education related to pediatric pharmacy.**

Criteria:

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

- Effectively uses audio-visual aids and handouts to support learning activities.

**Objective R4.1.5: (Applying) Use effective written communication to disseminate knowledge related to pediatric pharmacy.**

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, the public).
- Creates one's own work and does not engage in plagiarism.

**Objective R4.1.6: (Applying) Appropriately assess effectiveness of education related to pediatric pharmacy.**

Criteria:

- Selects assessment method (e.g., written or verbal assessment or self-assessment questions, case with case-based questions, 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 and reviews feedback from learners and others to improve effectiveness as an educator.

**Objective R4.1.7: (Applying) Provides effective patient and caregiver education.**

Criteria:

- Accurately identifies educational needs of patients and caregivers.
- Defines educational objectives that are specific, measurable, and address patient/caregiver learning needs.
- Includes content that is relevant, thorough, up-to-date, and reflects best practices.
- Selects or designs teaching activities appropriate for patients' and caregivers' developmental level, health-literacy level, and other learning needs.
- Effectively uses selected teaching strategies to meet patient and caregiver learning needs (e.g., teachback method, age-appropriate games for patients).
- Uses written communications that are age- and literacy-appropriate.
- Assesses patient and/or caregiver understanding of education activities.

**Goal R4.2: Effectively employ appropriate preceptor roles when engaged in teaching students, pharmacy technicians, or fellow health care professionals about the care of pediatric patients.**

**Objective R4.2.1: (Analyzing) When engaged in teaching about the care of pediatric patients, select a preceptor role that meets learners' educational needs.**

Criteria:

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

**Objective R4.2.2: (Applying) Effectively employ preceptor roles, as appropriate, when instructing, modeling, coaching, or facilitating skills related to care of pediatric patients.**

Criteria:

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

## **Competency Area R5: Management of Medical Emergencies**

**Goal R5.1: Demonstrate understanding of the management of pediatric medical emergencies.**

**Objective R5.1.1: (Applying) Demonstrate understanding of the management of pediatric medical emergencies according to the organization's policies and procedures.**

Criteria:

- Compares and contrasts differences between management of medical emergencies in children versus adults.
- Acts in accordance with the organization's policies and procedures for medical emergencies.
- Applies appropriate medication therapy in medical emergency situations.
- Accurately prepares medications and calculates doses during a medical emergency.
- Effectively anticipates needs during a medical emergency.
- Obtains certification in the Pediatric Advanced Life Support (PALS).

# **ELECTIVE COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR POSTGRADUATE YEAR TWO (PGY2) PEDIATRIC PHARMACY RESIDENCIES**

## **Competency Area E1: Academia**



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

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

Criteria:

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

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

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

Criteria:

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

### **Objective E1.2.2: (Evaluating) Compare and contrast methods to prevent and respond to academic and 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 E1.3: Develops and practices a philosophy of teaching.**

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

Criteria:

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

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

Criteria:

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

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

Criteria:

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

#### **Objective E1.3.4: (Creating) Effectively 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 E2: Initiating a Pediatric Pharmacy-Related Service**

### **Goal E2.1: Develop a proposal for a new pediatric pharmacy-related service.**

#### **Objective E2.1.1: (Creating) Write a proposal for a pediatric pharmacy-related service.**

Criteria:

- Proposal meets a perceived need of the health system and its patients.
- Accurately identifies the need for a new service or program, or improvements to an existing service or program.
- Goals are realistic and clear.
- Outcomes are stated in measurable terms.
- Proposal is clear and persuasive.
- The proposal uses the organization's format.
- Marketability of new or enhanced service is clearly outlined.
- Uses appropriate methods (e.g., modeling) to predict the financial outcome(s) of implementing a proposed new or enhanced service or program.
- Uses appropriate methods to predict the intended clinical outcomes of new or enhanced service or program.
- Proposal includes the necessary components of a new service or program (e.g., disease state management program).
- Proposal considers the role of other health care providers in meeting the needs of patients involved in a new service or program (e.g., disease state management programs).
- Proposal considers how potential shifts in market share should be factored into decisions on the marketability of a service or program.
- Proposal is clear and persuasive.

#### **Objective E2.1.2: (Creating) Present a proposal for a new pediatric pharmacy-related service.**

Criteria:

- Identifies appropriate concerned entities as audience for presentation.
- Uses effective presentation skills.

#### **Objective E2.1.3: (Applying) Implement a new pediatric pharmacy-related service.**

Criteria:

- Identifies appropriate strategies for implementing the new service.
- Effectively employs selected strategies for implementing the new service.

#### **Objective E2.1.4: (Applying) Appraise a new pediatric pharmacy-related service.**

Criteria:

- Accurately evaluates adequacy of the new service in meeting the stated goals.

## **Competency Area E3: Outcomes Research**

### **Goal E3.1: Contribute to pediatric clinical, humanistic and economic outcomes analyses.**

#### **Objective E3.1.1: (Evaluating) Contribute to a pediatric prospective clinical, humanistic and/or economic outcomes analysis.**

Criteria:

- Follows, or explains, principles and methodology of basic pharmacoeconomic analyses.
- Selects, or explains, appropriate study design appropriate for their research (prospective clinical, humanistic or economic outcomes analysis).
- Appropriately uses modeling, if appropriate, or explains how modeling is used.
- Effectively collects data for their research or explains the types of data that must be collected in a prospective clinical, humanistic and economic outcomes analysis.
- Uses, or explains, reliable sources of data for a clinical, humanistic and economic outcomes analysis.
- Effectively analyzes, or explains how to analyze, collected data in a prospective clinical, humanistic and economic outcomes analysis.
- Applies, or explain how research results can be applied, to internal business decisions and modifications to a customer's formulary or benefit design.

**Objective E3.1.2: (Evaluating) Contribute to a pediatric retrospective clinical, humanistic, and/or economic outcomes analysis.**

Criteria:

- Accurately explains the purpose of a retrospective clinical, humanistic or economic outcomes analysis.
- Accurately uses or explains study designs appropriate for a retrospective clinical, humanistic and economic outcomes analysis.
- Collects appropriate data, or accurately explains the types of data that must be collected, in a retrospective clinical, humanistic and economic outcomes analysis, as applicable.
- Utilizes appropriate report and audit information, or accurately explains the content and utilization of reports and audits, produced by the pharmacy department, as applicable.
- Accurately uses or explains the types of data that must be collected in a retrospective clinical, humanistic and economic outcomes analysis.
- Accurately uses or explains the content and utilization of reports and audits produced by the pharmacy department.
- Accurately uses or explains possible reliable sources of data for a retrospective clinical, humanistic and economic outcomes analysis.
- Accurately uses or explains methods for analyzing data in a retrospective clinical, humanistic and economic outcomes analysis.
- Accurately explains the impact of limitations of retrospective data on the interpretation of results.
- Effectively applies, or explains 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, as applicable.

**Competency Area E4: Added Skills for the Pediatric Pharmacy Scholarship**

**Goal E4.1: Contribute to the presentation and publication of pediatric pharmacy research.**

**Objective E4.1.1: (Creating) Design an effective poster for the presentation of a specific topic.**

Criteria:

- Includes appropriate types of content in the poster.
- Effectively applies rules for visual presentation of poster material.
- Effectively uses resources for generating poster materials.

**Objective E4.1.2: (Creating) Exercise skill in responding to questions occurring during the presentation of a poster.**

Criteria:

- Response demonstrates understanding of questioners concerns.
- Content of response is correct.
- Response is clearly communicated.

**Objective E4.1.3: (Applying) Submit completed project for publication.**

Criteria:

- Selects an appropriate peer-reviewed publication.
- Follows submission requirements.

**Objective E4.1.4: (Evaluating) Contribute to the peer review of a pediatric pharmacy professional's article submitted for publication or presentation.**

Criteria:

- Peer review input demonstrates understanding of article or presentation content.
- Peer review input demonstrates understanding of the article or presentation format and processes.

Approved by the ASHP Commission on Credentialing on August 15, 2016. Endorsed by the ASHP Board of Directors on September 23, 2016.

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# Appendices

## PGY2 Pediatric Residency Training and Pediatric Specialty Pathway Options

### Introduction

PGY2 pediatric residency programs must utilize the appropriate Pediatric Specialty Pathway (PSP) Appendix approved by ASHP and the COC:

- **PGY2 Pediatrics** (Appendix A)
- **PGY2 Pediatrics with added Critical Care PSP designation status** (Appendix B)
- **PGY2 Pediatrics with added Oncology PSP designation status** (Appendix C)

Programs seeking to conduct PGY2 Pediatric residency programs with added PSP designation(s) (*e.g., PGY2 Pediatrics Residency Program with Pediatric Specialty Pathway in Critical Care*) must provide ASHP with a completed request form (specific to type) located on the website prior to initial recruitment in the Match. The request form indicates specific criteria an institution must meet in order to qualify to provide PSP residency training. ASHP Accreditation Services Office, along with the COC, will determine approval of this added designation status (and any future areas) to an existing or accreditation pending status PGY2 pediatric residency program. Programs must be authorized by ASHP in order to receive a Match code for recruitment under the designated status.

### Training Principles

In all instances and options, Pediatric Specialty Pathways have incorporated an essential foundation in PGY2 pediatric pharmacy practice requirements. The resident will demonstrate an understanding of the 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 demonstrate an understanding of 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.

**“Required patient experience”** identify those disorders/topic areas where the resident must have direct patient care experience. Topics in the **“Required case-based or topic discussion”** column indicate areas where the resident must have EITHER direct patient care experience OR demonstrate knowledge through a case-based or topic discussion. Topics in the **“Elective patient experience and/or case-based or topic discussion”** column are suggested for discussion, but can be considered optional.

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

## PGY2 Pediatric Pharmacy Pathway: Appendix A (REVISED March 2023)

Topic Areas	Required Patient Experience	Required Case-based or Topic Discussion Approach Acceptable	Elective Case-based or Topic Discussion
Cardiovascular	Hypertension	Arrhythmias Congenital heart disease Kawasaki disease Patent ductus arteriosus Pulmonary hypertension	Heart failure
Critical Care	Acute respiratory distress Fluid and electrolyte disorders Sedation and analgesia Shock (cardiogenic, septic) Status asthmaticus Status epilepticus	Extracorporeal membrane oxygenation Iatrogenic withdrawal syndrome ICU delirium Neuromuscular blockade Pediatric advanced life support Trauma Traumatic brain injury	Acid-base disturbances Burns Hyperglycemia of critical illness Near drowning Palliative care Pharmacokinetics/pharmacodynamics alterations in critical illness Rapid sequence intubation Sleep management in critical illness Toxicological emergencies
Endocrine / Metabolic	Diabetes mellitus – Type 1 and Type 2 diabetic ketoacidosis	Adrenocortical insufficiency Diabetes insipidus Inborn errors of metabolism Syndrome of inappropriate antidiuretic hormone	Growth hormone deficiency Hyperosmolar hyperglycemic state Pituitary disorders (e.g., panhypopituitarism) Thyroid disease
Gastrointestinal / Hepatology	Constipation Diarrhea Gastroesophageal reflux Nausea/vomiting	Appendicitis Cholestatic jaundice Hemorrhage Hepatic dose adjustment Hepatitis Liver failure Short bowel syndrome Ulcers	Inflammatory bowel syndrome
General Pediatrics	Immunizations Maintenance fluids Pain management Parenteral nutrition (neonates, infants, children) Pharmacokinetics (general and developmental / age-related differences)	Dehydration Enteral nutrition Infant formulas Nutritional supplements Oral rehydration Pharmacogenomics	

Hematology	Anemia Anticoagulation	Acute thromboembolism (stroke, PE) Disseminated intravascular coagulopathy Hemophilia Idiopathic thrombocytopenic purpura Sickle cell disease	Acute chest syndrome Blood loss and blood component replacement Drug-induced thrombocytopenia Hemophagic lymphohistiocytosis
Infectious Disease	Antibiotic prophylaxis Antimicrobial stewardship Catheter-related infection Cellulitis Fever Meningitis Otitis media Pneumonia Sepsis Surgical site infections Urinary tract infection	Acquired immune deficiency syndrome / human immunodeficiency virus Clostridium difficile-associated diarrhea Conjunctivitis Croup Endocarditis Fungal infections Impetigo Osteomyelitis Septic arthritis Sexually transmitted diseases Shunt infections Strep throat Tuberculosis Viral encephalitis	Complicated intra-abdominal infections Epiglottitis Pandemic infections Parasitic infections Wound infections
Neonatology	Apnea with bradycardia Bronchopulmonary dysplasia (chronic lung disease) Hyperbilirubinemia Initial fluid management/fluid requirements in neonates (within first 48 hours of life) Neonatal abstinence syndrome (NAS) Neonatal opioid withdrawal syndrome (NOWS) Neonatal sepsis Respiratory distress syndrome	Drugs in pregnancy and lactation Hypoglycemia Intraventricular hemorrhage Necrotizing enterocolitis Neonatal seizures Ophthalmia neonatorum Persistent pulmonary hypertension Retinopathy of prematurity	Hyperinsulinemia Newborn screening Osteopenia of prematurity and rickets
Nephrology	Renal dose adjustment	Dialysis [continuous renal replacement therapy (CRRT), intermittent hemodialysis (iHD), peritoneal dialysis (PD)] Drug dosing in dialysis (CRRT, iHD, iPD)	Contrast-induced nephropathy Interstitial nephritis Rhabdomyolysis



		Hemolytic uremic syndrome Renal failure Renal tubular acidosis	
Neurology / Psychiatry		Attention deficit disorder Autism Depression Enuresis Epilepsy Febrile seizures Infantile spasm Ketogenic diets	Bipolar disorder Critical illness polyneuropathy Headache Medicinal Marijuana Paroxysmal sympathetic hyperactivity (PSH) Subarachnoid/intracerebral hemorrhage Ventriculostomies
Obstetrics		Gestational diabetes Intrauterine infections Pre-eclampsia / eclampsia Premature labor Premature rupture of membranes Prenatal care / nutrition	Maternal fetal medicine TORCH screening
Oncology		Central nervous system malignancies Ewing sarcoma Febrile neutropenia Hodgkin's disease Leukemia (ALL, AML) Lymphoma Neuroblastoma Oncologic emergencies Osteosarcoma Retinoblastoma Rhabdomyosarcoma Tumor lysis syndrome Wilm's tumor	Cytokine storm associated with CAR-T receptor therapy Oncologic Emergencies (i.e., spinal cord, compression, superior, vena cava syndrome, hypercalcemia of malignancy, typhlitis)
Pulmonary	Asthma Bronchiolitis Respiratory Syncytial Virus	Cystic fibrosis and associated complications Tracheitis	Obstructive sleep apnea
Rheumatology		Juvenile rheumatoid arthritis Lupus	
Transplant		Bone marrow transplant Immunocompromised host Kidney Liver Post-transplant lymphoproliferative disease (PTLD)	Acute rejection in solid organ transplantation Heart Lung Small bowel

**Additional Consideration and Training Topics**

Medication Administration Considerations	Alternate routes for enteral administration (e.g., J-tube, G-tube,) Communication skills with pediatric patients and families Medication adherence	Extravasation management Intravascular devices (e.g., arterial line, umbilical artery catheter, intrajugular line, peripherally inserted central catheter)	Aerosolized medications
Medication Safety	IV smart pump technology KIDs List	ASHP-PPA guidelines for providing pediatric pharmacy services NCPDP recommendations and guidance for standardizing the dosing designations on prescription container labels of oral liquid medications	

## PGY2 Pediatric Specialty Pathway Appendix B: Critical Care

Topic Areas	Required Patient Experience	Required Case-based or Topic Discussion Approach Acceptable	Elective Case-based or Topic Discussion
Cardiovascular	Arrhythmias Congenital heart disease (expanded exposure and discussion) Heart failure Hypertension Patent ductus arteriosus Post-op cardiac surgical management Pulmonary hypertension	Kawasaki disease Ventricular assist devices	Advanced arrhythmias Vasoplegic shock
Critical Care	Acute respiratory distress Acid-base disturbances Extracorporeal membrane oxygenation Fluid and electrolyte disorders Hyperglycemia of critical illness Neuromuscular blockade Pediatric advanced life support Pharmacokinetics/pharmacodynamic alterations in critical illness Rapid sequence intubation Sedation and analgesia Shock (cardiogenic, septic) Sleep management in critical illness Status asthmaticus Status epilepticus Trauma Traumatic brain injury Withdrawal [e.g., neonatal opioid withdrawal syndrome (NOWS) and iatrogenic withdrawal syndrome (IWS)]	Burns Medically-induced coma for TBI or status epilepticus Near drowning Toxicologic emergencies	Organ donor management Palliative care

Endocrine / Metabolic	Adrenocortical insufficiency Diabetes insipidus Diabetes mellitus – Type 1 and Type 2 diabetic ketoacidosis Pituitary disorders (e.g., panhypopituitarism) Syndrome of inappropriate antidiuretic hormone	Growth hormone deficiency Thyroid disease	Metabolic disorders
Gastrointestinal / Hepatology	Constipation Diarrhea Gastroesophageal reflux Nausea/vomiting Ulcers	Abdominal compartment syndrome Acute pancreatitis Appendicitis Cholestatic jaundice Hemorrhage Hepatic dose adjustment Hepatitis Ileus Inflammatory bowel syndrome Liver failure Short bowel syndrome	Venocclusive management
General Pediatrics	Dehydration Enteral nutrition Immunizations Maintenance fluids Pain management Parenteral nutrition (neonates, infants, children) Pharmacokinetics (general and developmental / age-related differences)	Infant formulas Nutritional Supplements Oral rehydration Pharmacogenomics	
Hematology	Anemia Anticoagulation Disseminated intravascular coagulopathy	Anemia of critical illness Hemophagitic lymphohistiocytosis Hemophilia Idiopathic thrombocytopenic purpura Methemoglobinemia Sickle cell disease	Acute chest syndrome Blood loss and blood component replacement Drug-induced thrombocytopenia Exchange transfusion Splenic sequestration

<p>Infectious Disease</p>	<p>Antimicrobial stewardship Antibiotic prophylaxis Catheter-related infection Clostridium difficile associated diarrhea Fever Fungal infections Meningitis Osteomyelitis Pneumonia Sepsis Shunt infections Surgical site infections Urinary tract infection Viral encephalitis</p>	<p>Acquired immune deficiency syndrome / human immunodeficiency virus Cellulitis Complicated intra-abdominal infections Conjunctivitis Croup Endocarditis Epiglottitis Impetigo Otitis media Parasitic infections Septic arthritis Sexually transmitted diseases Strep throat Tuberculosis Wound infections</p>	<p>Pandemic diseases</p>
<p>Neonatology</p>	<p>Apnea with bradycardia Bronchopulmonary dysplasia (chronic lung disease) Hyperbilirubinemia Hypoglycemia Intraventricular hemorrhage Necrotizing enterocolitis Neonatal abstinence syndrome (NAS) Neonatal resuscitation Neonatal seizures Neonatal sepsis Nutrition Persistent pulmonary hypertension Respiratory distress syndrome</p>	<p>Drugs in pregnancy and lactation Hypoxic ischemic encephalopathy (HIE) Initial fluid management / fluid requirements in neonates (within first 48 hours of life) Ophthalmia neonatorum Retinopathy of prematurity</p>	<p>Hyperinsulinemia Newborn screening Osteopenia of prematurity and rickets</p>
<p>Nephrology</p>	<p>Continuous renal replacement therapy / hemodialysis / peritoneal dialysis Drug dosing in dialysis (hemodialysis, peritoneal, CRRT) Renal dose adjustment Renal failure (acute kidney injury)</p>	<p>Drug-induced kidney diseases Contrast-induced nephropathy Hemolytic uremic syndrome Interstitial nephritis Renal tubular acidosis Rhabdomyolysis</p>	

Neurology / Psychiatry	Critical illness polyneuropathy Delirium Targeted temperature management / induced hypothermia	Attention deficit disorder Autism Bipolar disorder Depression EEG or bispectral monitoring for level of sedation Enuresis Epilepsy Febrile seizures Headache Infantile spasm Ketogenic diets Spinal cord injury Subarachnoid/intracerebral hemorrhage Ventriculostomies	Non-infectious encephalitis (e.g. NMDA) Medicinal Marijuana Paroxysmal sympathetic hyperactivity (PSH)
Obstetrics		Diabetes Intrauterine infections Pre-eclampsia / eclampsia Premature labor Premature rupture of membranes Prenatal care / nutrition Maternal fetal medicine	TORCH screening
Oncology		Central nervous system malignancies Ewing sarcoma Febrile neutropenia Hodgkin's disease Leukemia (ALL, AML) Lymphoma Neuroblastoma Oncologic emergencies (i.e., spinal cord compression, superior vena cava syndrome, hypercalcemia of malignancy, typhlitis) Osteosarcoma Retinoblastoma Rhabdomyosarcoma Tumor lysis syndrome Wilm's tumor	Cytokine Storm associated with CAR-T receptor therapy Pheochromocytoma

Pulmonary	Asthma Bronchiolitis Non-invasive mechanical ventilation Respiratory Syncytial Virus Tracheitis Ventilators	Cystic fibrosis and associated complications Obstructive sleep apnea Pneumothorax and hemothorax	Acute pulmonary embolism Diffuse alveolar hemorrhage
Rheumatology / Immunology		Interstitial arthritis Juvenile rheumatoid arthritis Lupus	Multisystem inflammatory disease (MISC)
Transplant	Immunocompromised host	Acute rejection in solid organ transplantation Bone marrow transplant Graft versus host disease (GVHD) Heart Kidney Liver Lung Post-transplant lymphoproliferative disease (PTLD) Small bowel	
<b>Additional Consideration and Training Topics</b>			
Medication Administration Considerations	Alternate routes for enteral administration (e.g., J-tube, G-tube) Communication skills with pediatric patients and families Medication adherence	Extravasation management Intravascular devices (e.g., arterial line, umbilical artery catheter, intrajugular line, peripherally inserted central catheter)	Aerosolized medications
Medication Safety	KIDs List IV smart pump technology	ASHP-PPA guidelines for providing pediatric pharmacy services NCPDP recommendations and guidance for standardizing the dosing designations on prescription container labels of oral liquid medications	

## PGY2 Pediatric Specialty Pathway Appendix C: Oncology

Topic Areas	Required Patient Experience	Required Case-based or Topic Discussion Approach Acceptable	Elective Case-based or Topic Discussion
Cardiovascular	Hypertension	Arrhythmias Congenital heart disease Heart failure Kawasaki disease Patent ductus arteriosus Pulmonary hypertension	
Critical Care	Acute respiratory distress Fluid and electrolyte disorders Oncologic Emergencies (i.e., spinal cord compression, superior vena cava syndrome, hypercalcemia of malignancy, typhlitis) Sedation and analgesia Shock (cardiogenic, septic) Status epilepticus Status asthmaticus	Continuous renal replacement therapy Extracorporeal membrane oxygenation Near drowning Pediatric advanced life support Trauma Traumatic brain injury	
Endocrine / Metabolic	Diabetes mellitus – Type 1 and Type 2, or steroid induced diabetic ketoacidosis	Adrenocortical insufficiency Diabetes insipidus Growth hormone deficiency Syndrome of inappropriate antidiuretic hormone Thyroid disease	
Gastrointestinal / Hepatology	Constipation Diarrhea Gastroesophageal reflux Nausea / vomiting	Appendicitis Cholestatic jaundice Hemorrhage Hepatic dose adjustment Hepatitis Inflammatory bowel syndrome Liver failure Short bowel syndrome Ulcers	



General Pediatrics	Immunizations Maintenance fluids Pain management Pharmacokinetics (general and developmental / age-related differences)	Dehydration Enteral nutrition Infant formulas Nutritional Supplements Oral rehydration Parenteral nutrition (neonates, infants, children) Pharmacogenomics	
Genetic Disorders		Genetic causes of cancer predisposition in children	Congenital amegakaryocytic thrombocytopenia Diamond blackfan anemia Dyskeratosis congenita Fanconi anemia Hereditary spherocytosis Hurler Syndrome Paroxysmal nocturnal hemoglobinuria (PNH) Schwachman diamond syndrome Severe congenital neutropenia X-Linked adrenoleukodystrophy
Hematological Disorders	Anemia Anticoagulation Blood component replacement Immune thrombocytopenic purpura (ITP) Sickle cell disease	Aplastic anemia Disseminated intravascular coagulopathy Hemolytic anemia Hemophilia A Hemophilia B Iron deficiency anemia Thrombotic thrombocytopenic purpura (TTP)	Beta and alpha thalassemia Von Willebrand's disease
Hematology Malignancies	Acute lymphoblastic leukemia (ALL) Acute myelogenous leukemia (AML) Hodgkin lymphoma Non-Hodgkin lymphoma	Juvenile myelomonocytic leukemia Myelodysplastic syndromes Myeloproliferative disorders Relapsed ALL Relapsed AML	Chronic myelogenous leukemia (CML) Chronic lymphocytic leukemia (CLL) Multiple myeloma amyloidosis Primary CNS lymphoma Waldenström's macroglobulinemia

Hematopoietic Cell Transplantation	Acute Graft versus host disease (GVHD) Allogeneic transplantation Autologous transplantation Chronic GVHD Immunizations following autologous / allogeneic / cord blood transplantation Immunosuppression Opportunistic infection prophylaxis Preparative regimens Sinusoidal obstruction syndrome (SOS)	Cytokine release syndrome Fungal infections Idiopathic pneumonia syndrome Immune effector cell therapy Management of graft failure Transplant associated-thrombotic microangiopathy Viral reactivation	
Histiocyte Disorders		Hemophagocytic lymphohistiocytosis (HLH)	Langerhans cell histiocytosis Rosai-Dorfman disease
Infectious Disease	Antibiotic prophylaxis Antimicrobial stewardship Cellulitis Catheter-related infection Fever Fungal infections Meningitis Otitis media Pneumonia Sepsis Urinary tract infection	Acquired immune deficiency syndrome / human immunodeficiency virus Clostridium difficile Conjunctivitis Croup Endocarditis Epiglottitis Impetigo Osteomyelitis Parasitic infections Septic arthritis Sexually transmitted diseases Shunt infections Strep throat Surgical site infection Tuberculosis Viral encephalitis	

Neonatology	Apnea with bradycardia Bronchopulmonary dysplasia (chronic lung disease) Fluid management Hyperbilirubinemia Neonatal abstinence syndrome (NAS) Neonatal sepsis NOWS Respiratory distress syndrome	Drugs in pregnancy and lactation Hypoglycemia Intraventricular hemorrhage Necrotizing enterocolitis Neonatal seizures Nutrition Ophthalmia neonatorum Persistent pulmonary hypertension Retinopathy of prematurity	
Nephrology	Renal dose adjustment	Dialysis Drug dosing in dialysis (hemodialysis, peritoneal) Hemolytic uremic syndrome Interstitial nephritis Renal failure Renal tubular acidosis	
Neurology / Psychiatry		Attention deficit disorder Autism Bipolar disorder Delirium Depression Enuresis Epilepsy Febrile seizures Headache Infantile spasm Ketogenic diets	Medicinal Marijuana
Obstetrics		Diabetes Intrauterine infections Maternal fetal medicine Pre-eclampsia / eclampsia Premature labor Premature rupture of membranes Prenatal care / nutrition	
Oncology Solid Malignancies	CNS Tumors Ewing sarcoma Neuroblastoma Osteosarcoma Rhabdomyosarcoma Wilms tumor	Hepatoblastoma Radiation therapies (e.g., MIBG) Retinoblastoma	Adrenocortical carcinoma Desmoid tumors Endocrine tumors Germ cell tumors Hepatocellular carcinoma Malignant rhabdoid tumor Melanoma Nasopharyngeal carcinoma Non-rhabdomyosarcoma soft tissue sarcomas

Pulmonary	Asthma Bronchiolitis Respiratory Syncytial Virus	Cystic fibrosis and associated complications Obstructive sleep apnea Tracheitis Ventilators	
Rheumatology / Immunology		Interstitial arthritis Juvenile rheumatoid arthritis Lupus Primary immune regulatory disorders Primary immunodeficiencies Severe combined immunodeficiency	
Solid Organ Transplant		Heart Immunocompromised host Kidney Liver Lung Post-transplant lymphoproliferative disease (PTLD) Small bowel	
Supportive Care / Symptom Management*	Chemotherapy-induced nausea and vomiting Febrile neutropenia Growth factors Mucositis Opportunistic infection prophylaxis Pain Management (Acute and Chronic) Tumor lysis syndrome	Extravasation Hypersensitivity reactions Late effects of cancer /chemotherapy (e.g., infertility, secondary malignancies, etc.) Malignant effusions Palliative care	
<b>Additional Consideration and Training Topics</b>			
Medication Administration Considerations	Alternate routes for enteral administration (e.g., J-tube, G-tube,) Communication skills with pediatric patients and families Medication adherence	Extravasation management Intravascular devices (e.g., arterial line, umbilical artery catheter, intrajugular line, peripherally inserted central catheter)	Aerosolized medications
Medication Safety	KIDs List IV smart pump technology	ASHP-PPA guidelines for providing pediatric pharmacy services NCPDP recommendations and guidance for standardizing the dosing designations on prescription container labels of oral liquid medications	

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Developed by the ASHP Commission on Credentialing in collaboration with the Pediatric Pharmacy Association (PPA). The design group comprised the following pediatric pharmacy practitioners, residency program directors, and ASHP staff: Kelly S. Bobo, PharmD, MBA, BCPS, BCPPS, Clinical Pharmacy Manager and Director, PGY1 and PGY2 Pediatric Pharmacy Residency, LeBonheur Children's Hospital and The University of Tennessee Health Science Center; Jennifer R. Hamner, PharmD, BCPPS, FASHP, Manager of Professional Development and Director, PGY1, PGY2 Pediatric Pharmacy, and PGY2 Medication-Use Safety and Policy Residency Program, Children's Hospital Colorado; Melissa K. Heigham, PharmD, MHA, BCOP, BCPPS, Director of Pharmacy, St. Louis Children's Hospital; Peter N. Johnson, PharmD, BCPPS, FPPA, FCCM, FASHP, Professor of Pharmacy Practice and Director, PGY2 Pediatric Pharmacy Residency, The University of Oklahoma College of Pharmacy, Oklahoma Children's Hospital at OU Health; Sarah Scarpace Lucas, PharmD, BCPS, BCPPS, FCSHP, FPPA, Director of Pharmacy, Clinical Professor and Director, PGY2 Pediatric Pharmacy Residency, UCSF Medical Center at Mission Bay, UCSF Benioff Children's Hospital, UCSF School of Pharmacy; Stephen Ford, PharmD, BCOP, Director Residency Accreditation, Accreditation Services, ASHP; Lisa Lifshin, BS Pharm, Sr. Director, Pharmacy Technician Accreditation and Residency Services, Accreditation Services, ASHP; Katrin Fulginiti, BS Pharm, MGA, Director Operations, Accreditation Services, ASHP; Eric M. Grace, MST, Director Standards Development and Training, Accreditation Services, ASHP

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Pediatric Critical Care

Jeffrey D. Moss, PharmD, BCCCP Lucile Packard Children's Hospital Stanford; Sara P. Rooney, PharmD, BCPPS Children's National Hospital; Michael F. Chicella, PharmD, BCPPS, FPPA Children's Hospital of the King's Daughters; Andrew B. Gainey, PharmD, BCIDP Prisma Health Children's Hospital-Midlands; Lisa Infanti, PharmD, BCCCP Norton Children's Hospital

Pediatric Oncology

Jessica Auten, PharmD, BCOP UNC Health Care; Cameron McKinzie, PharmD, BCPS, BCPPS UNC Health Care; Rodha Rohatgi, PharmD, BCOP Children's National Hospital; Sherry Mathew, PharmD, BCOP Memorial Sloan-Kettering Cancer Center; Debra Determan, PharmD, BCPPS Rady Children's Hospital-San Diego; Jonathan Angus, PharmD, BCOP Seattle Children's Hospital; Tara A. Higgins, PharmD, BCPPS, FPPA, FFSHP LECOM-Bradenton

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