PGY2 Clinical Pharmacogenomics Pharmacy Residency
William S. Middleton Memorial Veterans Hospital, Madison, WI

Pharmacogenomics encompasses germline (heritable) and somatic (tumor) DNA variation and is evolving to include improved technology in addition to established roles in cellular therapies, gene editing, and genetic testing. Pharmacogenomics is a specialty that branches into multiple disease states, requiring the clinician to have both a solid foundation in general pharmacy practice, and the ability to recognize evidence-based practices that should be incorporated.

The Madison VA PGY2 Clinical Pharmacogenomics Pharmacy Residency Program is designed to develop a healthcare practitioner with advanced skills to support a specialized pharmacy practice that incorporates pharmacogenomics. The Veterans Health Administration National Pharmacogenomics Program is the largest implementation effort nationally for precision medicine. Our physicians and pharmacists across specialties routinely integrate precision medicine into patient care. The role of the Clinical Pharmacist Practitioner is to design, implement, and monitor therapeutic drug plans to improve patient outcomes through direct interactions with Veterans and interdisciplinary healthcare team members. Through this residency program, the trainee will develop the skills to incorporate pharmacogenomics testing across a variety of ambulatory care specialties to improve Veteran care.

This residency program will build upon the competencies and experience acquired in a PGY1 pharmacy residency and promote the development of proficient, independent clinicians with an expertise in pharmacogenomic pharmacotherapy, and management of genomic workflow implementation. Graduates of the program will develop in-depth knowledge of pharmacogenomics, precision medicine, and how to incorporate novel biomarkers into the patient care process.

By the end of the residency program the trainee will be able to:

1. *Optimize outcomes of patients through evidence-based, patient-centered medication therapy as an integral part of an interprofessional team*
2. *Serve and establish oneself as an authoritative resource on the optimal use of clinical pharmacogenetic tests to individualize medication therapy for patients*
3. *Demonstrate leadership in the field of clinical pharmacogenetics and practice management skills*
4. *Excel in precision medicine related training and educational activities for healthcare professionals, healthcare professionals in training, and patients*
5. *Conduct research related to the clinical implementation of pharmacogenetics, that contributes to the clinical pharmacogenetics body of knowledge*

Program Director

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Our Commitment to Diversity, Equity, and Inclusion

At the William S. Middleton Memorial Veterans Hospital, we are committed to fostering and sustaining an environment which celebrates diversity, provides equitable opportunities for employment and promotion, and supports inclusiveness in pharmacy culture. We embrace our differences as individuals and unite as a pharmacy team toward a common goal: to deliver optimal, patient-centered care for our nation's Veterans.

Pharmacogenomics Application Process

Applicants must be a graduate of an ACPE accredited school of pharmacy with a PharmD degree, must be a US citizen, and must participate in a formalized standardized interview. They must have completed or be currently completing a PGY1 residency program (ASHP accredited or in accreditation process) or a training experience deemed equivalent by ASHP and be in good standing. Applicants must hold a pharmacy license in any state or US territory prior to the expected start of the PGY2 program.

Desired applicant characteristics include an aptitude and strong interest in pharmacogenomics, knowledge of professional practice, good communication skills, the ability to apply theory to practice, leadership ability, alignment with the goals and experiences of our program, confidence, and personal and professional maturity. Application deadlines can be found in the ASHP Residency Directory listing (program code 45923).

Applicants are required to complete their application through PhORCAS and include the below materials:

- Personal letter of intent
- Three (3) PhORCAS References
- Curriculum vitae
- Official copy of pharmacy school transcript(s)
- VA form 10-2850D (Application for Health Professions Trainees)

Learning Experiences

Learning experiences will be structured so that each competency area can be trained and assessed across learning disciplines, to accommodate learning style preferences and growth assessment. The goals listed below in the learning experience descriptions will have the related ASHP required objectives assessed at appropriate intervals per learning experience. Please see table at the end of the document for assessed goals and objectives for each learning experience.

I. **Clinical Pharmacogenomics 1**: The learning experience will focus on designing safe and effective patient-centered therapeutic regimens and monitoring plans. The trainee will gain experience with a broad range of clinical scenarios related to genomics and will have hands-on training across relevant disease states. The trainee will complete local clinical pharmacogenomics reviews and VISN12 Interfacility Pharmacogenomics consults with Dr. Piccolo and Dr. Farina. They will also participate in clinic visits with Drs. Piccolo and Farina as part of the Pharmacogenomics Clinic that is conducted out of the Madison VA in conjunction with the National Pharmacogenomics Program (NPP). The resident will participate in patient education, drug information, quality improvement and Madison VA PGY2 Clinical Pharmacogenomics RFP medication-outcomes activities. All topics in the ASHP pharmacogenomics content areas will be covered with direct patient care activities, population health projects or case-based learning as is appropriate.

II. **Clinical Pharmacogenomics II:** This advanced continuation on clinical pharmacogenomics will use the skills built in the first block to focus on practice design, maintenance, and innovation. The resident will be expected to function at an independent level with clinics and consults, while building up disease-state and genotype specific experience. Projects will include creating note templates, patient education plans and implementing pharmacogenomics guided clinical workflows.

III. **Administration and Implementation:** Residents will learn the fundamentals of pharmacogenomics administration and the implementation of novel clinical services. The deliverables include the implementation of a pharmacogenomics workflow in a new service area and evaluation of the measurable impact of pharmacogenomics implementation. The resident will gain an understanding of how laboratory, clinical services and clinical informatics components are essential in providing quality

clinical pharmacogenomic services. As this is an experiential project-based deliverables, most of the learning experience will not be directly clinical, but the resident will gain invaluable experience in management, workflows, and implementation of genomic medicine. The responsibilities are longitudinal, including a protected half day once per week.

IV. **Bimonthly Topic Presentations:** In conjunction with the Durham VA, bimonthly topic discussions will cover ASHP required clinical content areas and principals. Each resident will present once per month during the hour session, and facilitate discussion related to cases. This will complement their exposure to the topics seen on learning experience and give valuable education experience.

V. **Clinical Electives:** Learning description will mirror existing PGY-2 elective experiences for the Madison VA, with pharmacogenomic specific goals and objectives in the inpatient and ambulatory care settings.

VI. **Longitudinal Research Project:** The Madison VA pharmacy residency programs use the inverted research model, or IRM (see Inverted Research Model brochure found on the residency website for more information). In the IRM, incoming residents complete a project that has already progressed through background research, protocol development, and IRB approval (if applicable). During the first half of the year, residents are involved in data collection, data analysis, presentation, and manuscript submission as they finish this project. During the second half of the year, residents start a project to be finished the next residency year, performing the background research, developing the protocol, and obtaining IRB approval (if applicable).
The research project will be designed and carried out by the resident to answer a clinically relevant question in the field of pharmacogenomics. The project may encompass one of the following areas:
    a. Laboratory performance characteristics of genotyping techniques
    b. Creation of automated pharmacogenomic consults and alerts in the electronic health record
    c. Defining a phenotype for a novel observed diplotype
    d. Clinician actions based on point-of-care pharmacogenomic alerts
    e. Patient acceptance of pharmacogenomic information
    f. Generalizability to other clinical settings.
    g. Pharmacogenomics related education
    h. Pharmacogenomics and shared decision making

The resident will work with preceptors and the research team on these projects and present at the Wisconsin Pharmacy Residency Conference in April of each year, which is held in conjunction with the Pharmacy Society of Wisconsin's Educational Conference.

Special features of our program:

Prescriptive authority: Residents will apply for and maintain a facility scope of practice to order non-controlled medications, laboratory and diagnostic tests, and consults to other services.

Education series: Residents present journal clubs, patient cases, and disease state reviews to residents and preceptors. The resident will present minimum of two times throughout the year. Other opportunities for oral and written presentations are available.

Clinical instructor status: This program is associated with the University of Wisconsin—Madison School of Pharmacy and has access to the resources at the University.