Integrating Pharmacogenomics into Clinical Practice: Certificate Program

Activity Description

Pharmacogenomics (PGx), the study of how one's genes may affect an individual's response to medication, is an emerging field within patient care. This course aims to prepare today's multi-disciplinary health care team with the fundamentals of pharmacogenomics. This certificate course includes practical education and guidance to prepare you to interpret and apply pharmacogenomics results. Leaders in the implementation of pharmacogenomics, Mayo Clinic staff use case studies and lectures on a range of topics to provide 16 hours of engaging content.

Target Audience

This activity is appropriate for nurses, physicians, physician assistant, allied health professionals, resident fellow, and students.

Learning Objectives*

Upon conclusion of this activity, participants should be able to:

- Recognize foundational pharmacogenomics principles.
- Identify what to consider when implementing pharmacogenomics in clinical practice.
- Recognize pharmacogenomics test results to make recommendations for an individualized medication management plan.
- Identify barriers and challenges of considering pharmacogenomics in patient care.

Attendance at this Mayo Clinic course does not indicate nor guarantee competence or proficiency in the performance of any procedures which may be discussed or taught in this course.

Accreditation Statement*

In support of improving patient care, Mayo Clinic College of Medicine and Science is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.

Credit Statement(s)*

AMA

Mayo Clinic College of Medicine and Science designates this enduring material for a maximum of 16.00 *AMA PRA Category 1 Credits™.* Physicians should claim only the credit commensurate with the extent of their participation in the activity.

ANCC

Mayo Clinic College of Medicine and Science designates this enduring material for a maximum of 16.00 *ANCC* contact hours. Nurses should claim only the credit commensurate with the extent of their participation in the activity.

® Mayo Clinic College of Medicine and Science designates this educational activity for a maximum of 16.00 ACPE Knowledge based contact hours. Participants should claim only the credit commensurate with the extent of their participation in the activity. UAN Number: JA0000238-0000-25-118-H04-P

Other Healthcare Professionals
A record of attendance will be provided to all registrants for requesting credits in accordance with state nursing boards, specialty societies or other professional associations.

For disclosure information regarding Mayo Clinic School of Continuous Professional Development accreditation review committee member(s) and staff, please go here to review disclosures.

Disclosure Summary*

As a provider accredited by Joint Accreditation for Interprofessional Continuing Education, Mayo Clinic College of Medicine and Science must ensure balance, independence, objectivity and scientific rigor in its educational activities. All who are in a position to control the content are required to disclose all financial relationships with any ineligible company. Faculty will also identify any off-label and/or investigational use of pharmaceuticals or instruments discussed in their content for FDA compliance.

Listed below are individuals with control of the content of this program who have disclosed…

Relevant Financial relationship(s) with ineligible companies:

Name	Nature of Relationship	Company
Nabila Bennani, MD	Consultant	Curio Sciences LLC
John Black, MD	Intellectual Property	Comprehensive Pharmacogenomics Algorithms (Know-How and Patent) Pharmacogenomic Screening for Selection of Psychotropic Medication
John Black, MD	Stock Shareholder	Oneome
Darryl Chutka, MD	Stock Shareholder	Exact Sciences Corp
Timothy Curry, MD, PhD	Intellectual Property	Advanced Hemodynamic Monitoring Database
Robert Diasio, MD	Consultant	Calgent Biotechnology Co., Ltd. Sagittrax LLC
Matthew Ferber, PhD	Intellectual Property	Know-How Related to Improving Clinical Reports Delivering Whole Genome Sequencing Data Clinical Consultant Desktop for Next Generation Sequencing Testing
Christopher Grilli, Pharm.D., BCACP, R.Ph.	Intellectual Property	Rx Mapper, LLC
Matthew Goetz, MD	Intellectual Property	Know-How for SimBioSys
Matthew Goetz, MD	Consultant	Curio Science LLC
Mira Keddis, MD	Consultant	Allena Pharmaceuticals

Teresa Kruisselbrink, M.S., CGC, LCGC	Intellectual Property	Know-How Related to Improving Clinical Reports Delivering Whole Genome Sequencing Data
Edward Loftus, Jr., MD	Consultant	Allergan; Amgen, Inc.; Arena Pharmaceuticals; Boehringer Ingelheim Pharmaceuticals, Inc.; Iterative Scopes, Inc.; Lilly USA, LLC; Morphic Therapeutics, Inc.; Ono Pharmaceutical Co. Ltd.; Protagonist Therapeutics, Inc.; Scipher Medicine Corporation; Sun Pharma Global FZE; Surrozen, Inc.; AbbVie Inc.; Janssen Research & Development, LLC: Takeda Pharmaceuticals, Inc.
Edward Loftus, Jr., MD	Grant or Research Support	Takeda; Pfizer; Janssen; UCB; Gilead; Theravance; Genentech/Roche; Gossamer Bio; AbbVie; Celgene/Receptors; Bristol-Myers-Squibb
Lance Oyen, Pharm.D., R.Ph.	Consultant	Leiters
Michael Schuh, Pharm.D., R.Ph.	New Business Venture (Outside Mayo)	Medlyticsai, LLC – advisory board member
Michael Schuh, Pharm.D., R.Ph.	Full/Part-time Employee	Medication and Health Experts, LLC
Liewei Wang, MD, PhD	Intellectual Property	Prostate Cancer Medically Optimized Genome Enhances Therapy (PROMOTE) Comprehensive Pharmacogenomic Algorithms (Know-How) Genetic Polymorphisms in the Human Cytochrome P450, Family 19, Subfamily A, Polypeptide 1 (CYP19A1) gene in Caucasian, African American, Han Chinese and Mexican American Populations
Richard Weinshilboum, MD	Stock Shareholder	OneOme LLC
Richard Weinshilboum, MD	Intellectual Property	Champions Oncology, OneOme, LLC; Thermo Fisher Scientific, and Laboratory Corporation of America Holdings
John Zeuli, Pharm.D., R.Ph.	Consultant	Theratechnologies ViiV Healthcare
Wayne Nicholson, M.D., Pharm.D.	Intellectual Property	Anivive Lifescience, Inc.

All relevant financial relationships listed for these individuals have been mitigated.

No relevant financial relationship(s) with ineligible companies:

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Imad Absah	Tammy McAllister
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Jennifer Bold	Naveen L. Pereira
Sheena Crosby	Heather Randles
Denise Dupras	Paul Takahashi
Ashley D. Ebenhoh	Jessica Wright
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Caren Hughes	Jeremy Zacher
Adrijana Kekic	Sharon Zehe
Christopher Kohler	Carrie Bartsh
Jyothsna Kumpf	Julie Cunningham
Eric Matey	Michelle Cooper
Sady Lanza	Corinne Irish

References to off-label and/or investigational usage(s) of pharmaceuticals or instruments in their presentation:

Name	Manufacturer/Provider	Product/Device/Medication
Edward Loftus, Jr., MD	Azathioprine	Mercaptopurine

For disclosure information regarding Mayo Clinic School of Continuous Professional Development accreditation review committee member(s) please visit: https://ce.mayo.edu/content/disclosures.

Disclaimer

Participation in this Mayo Clinic educational activity does not indicate nor guarantee competence or proficiency in the performance of any procedures which may be discussed or taught in this course. You should be aware that substantive developments in the medical field covered by this recording may have occurred since the date of original release.

Prerequisites for Participation

There are no prerequisites needed prior to participating in this education activity.

Method of Participation*

Participation in this activity consists of reviewing the educational material, completing the learner assessment and evaluation.

How to Obtain Credit*

To obtain credit, complete the assessment, evaluation and submit.

Release and Expiration Dates*

Release Date: 11/01/2022
Renewal Date: 11/3/2025

Expiration Date: 11/2/2026

Acknowledgement of Commercial Support*

No commercial support was received in the production of this activity.

Faculty and Course Director Listing and Credentials

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Bibliographic Resources*

Provide one of the following:

- Cooper-DeHoff RM, Niemi M, Ramsey LB, et al. The Clinical Pharmacogenetics Implementation Consortium (CPIC) guideline for SLCO1B1, ABCG2, and CYP2C9 and statin-associated musculoskeletal symptoms [published online ahead of print, 2022 Feb 12]. Clin Pharmacol Ther.

- McDermott JH, Wolf J, Hoshitsuki K, et al. Clinical Pharmacogenetics Implementation Consortium Guideline for the Use of Aminoglycosides Based on MT-RNR1 Genotype. Clin Pharmacol Ther. 2022;111(2):366-372. doi:10.1002/cpt.2309

- Lee CR, Luzum JA, Sangkuhl K, et al. Clinical Pharmacogenetics Implementation Consortium Guideline for CYP2C19 Genotype and Clopidogrel Therapy: 2022 Update [published online ahead of print, 2022 Jan 16]. Clin Pharmacol Ther. 2022;10.1002/cpt.2526. doi:10.1002/cpt.2526

- Crews KR, Monte AA, Huddart R, et al. Clinical Pharmacogenetics Implementation Consortium Guideline for CYP2D6, OPRM1, and COMT Genotypes and Select Opioid Therapy. Clin Pharmacol Ther. 2021;110(4):888-896. doi:10.1002/cpt.2149

- Theken KN, Lee CR, Gong L, et al. Clinical Pharmacogenetics Implementation Consortium Guideline (CPIC) for CYP2C9 and Nonsteroidal Anti-Inflammatory Drugs. Clin Pharmacol Ther. 2020;108(2):191-200. doi:10.1002/cpt.1830

- Lima JJ, Thomas CD, Barbarino J, et al. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C19 and Proton Pump Inhibitor Dosing. Clin Pharmacol Ther. 2021;109(6):1417-1423. doi:10.1002/cpt.2015

- Karnes JH, Rettie AE, Somogyi AA, et al. Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C9 and HLA-B Genotypes and Phenytoin Dosing: 2020 Update. Clin Pharmacol Ther. 2021;109(2):302-309. doi:10.1002/cpt.2008

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