



## Michelle Whirl-Carrillo

Principal Investigator and Director, PharmGKB, Biomedical Data Science

 NIH Biosketch available Online

### Bio

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#### CURRENT ROLE AT STANFORD

Principal Investigator and Director, PharmGKB

#### EDUCATION AND CERTIFICATIONS

- PhD, Stanford University , Biophysics
- SB, Massachusetts Institute of Technology , Biology

#### PROJECTS

- Pharmacogenomics Knowledge Base (PharmGKB) - Stanford University
- Clinical Pharmacogenetics Implementation Consortium (CPIC) - Stanford/St. Jude Children's Research Hospital
- Pharmacogenomics Clinical Annotation Tool (PharmCAT) - Stanford/UPenn
- Clinical Genome Resource (ClinGen) - Stanford University

#### LINKS

- PharmGKB: <https://www.pharmgkb.org>
- CPIC: <https://cpicpgx.org>
- PharmCAT: <https://pharmcat.org>

### Teaching

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#### COURSES

##### 2023-24

- Principles of Pharmacogenomics: BIOMEDIN 224, GENE 224 (Aut, Spr)

##### 2022-23

- Principles of Pharmacogenomics: BIOMEDIN 224, GENE 224 (Aut, Win, Spr, Sum)

##### 2021-22

- Principles of Pharmacogenomics: BIOMEDIN 224, GENE 224 (Aut, Win, Spr, Sum)

##### 2020-21

- Principles of Pharmacogenomics: BIOMEDIN 224, GENE 224 (Win, Spr, Sum)

## Professional

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### PROFESSIONAL INTERESTS

My work focuses on pharmacogenomics, the study of the impact of genetics on drug response, and its application to personalized medicine and personal genomics. My interests range from basic research studying gene-variant-drug associations to translation of pharmacogenomics information into the clinical setting, including reducing barriers to implementing PGx prescribing guidelines in the clinical electronic environment (CDS/EHR). I am particularly interested in translation of human genome sequencing data to pharmacogenomic-based therapeutic recommendations that are actionable in the clinic.

### PROFESSIONAL AFFILIATIONS AND ACTIVITIES

- Member, International Society for Biocuration
- Member, American Society of Clinical Pharmacology and Therapeutics
- Member, American Society of Human Genetics

## Publications

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### PUBLICATIONS

- **Advancing Precision Medicine Through the New Pharmacogenomics Global Research Network** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Giacomini, K. M., Karnes, J. H., Crews, K. R., Monte, A. A., Murphy, W. A., Oni-Orisan, A., Ramsey, L. B., Yang, J. J., Whirl-Carrillo, M.  
2021
- **An evidence-based framework for evaluating pharmacogenomics knowledge for personalized medicine.** *Clinical pharmacology and therapeutics*  
Whirl-Carrillo, M., Huddart, R., Gong, L., Sangkuhl, K., Thorn, C. F., Whaley, R., Klein, T. E.  
2021
- **Pharmacogenomics Clinical Annotation Tool (PharmCAT).** *Clinical pharmacology and therapeutics*  
Sangkuhl, K., Whirl-Carrillo, M., Whaley, R. M., Woon, M., Lavertu, A., Altman, R. B., Carter, L., Verma, A., Ritchie, M. D., Klein, T. E.  
2019
- **Standardizing terms for clinical pharmacogenetic test results: consensus terms from the Clinical Pharmacogenetics Implementation Consortium (CPIC).** *Genetics in medicine*  
Caudle, K. E., Dunnenberger, H. M., Freimuth, R. R., Peterson, J. F., Burlison, J. D., Whirl-Carrillo, M., Scott, S. A., Rehm, H. L., Williams, M. S., Klein, T. E., Relling, M. V., Hoffman, J. M.  
2016
- **Pharmacogenomics Knowledge for Personalized Medicine** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Whirl-Carrillo, M., MCDONAGH, E. M., Hebert, J. M., Gong, L., Sangkuhl, K., Thorn, C. F., Altman, R. B., Klein, T. E.  
2012; 92 (4): 414-417
- **An XML-based interchange format for genotype-phenotype data** *HUMAN MUTATION*  
Whirl-Carrillo, M., Woon, M., Thorn, C. E., Klein, T. E., Altman, R. B.  
2008; 29 (2): 212-219
- **Mining biochemical information: Lessons taught by the ribosome** *RNA-A PUBLICATION OF THE RNA SOCIETY*  
Whirl-Carrillo, M., Gabashvili, I. S., Bada, M., Banatao, D. R., Altman, R. B.  
2002; 8 (3): 279-289
- **From sample to star alleles: a long-read pharmacogenomics pipeline powered by Twist target enrichment and PacBio HiFi sequencing**  
Holt, S., Harting, J., Han, T., Arbiza, L., Kingan, S., Soupe, A., Zhang, S., Baybayan, P., Lambert, C., Ferrao, H., Li, B., Sangkuhl, K., Woon, et al  
SPRINGERNATURE.2024: 701-702
- **Highly Scalable Pharmacogenomic Panel Testing with Hybrid Capture and Long-Read Sequencing**  
Gonzaludo, N., Kingan, S., Harting, J., Baybayan, P., Han, T., Arbiza, L., Li, B., Sangkuhl, K., Woon, M., Whaley, R., Whirl-Carrillo, M., Yang, Y., Klein, et al  
LIPPINCOTT WILLIAMS & WILKINS.2023: 183

- **PharmGKB summary: disulfiram pathway.** *Pharmacogenetics and genomics*  
Gonzalez-Suarez, A. D., Thorn, C. F., Whirl-Carrillo, M., Klein, T. E.  
2023
- **Frequencies of pharmacogenomic alleles across biogeographic groups in a large-scale biobank.** *American journal of human genetics*  
Li, B., Sangkuhl, K., Whaley, R., Woon, M., Keat, K., Whirl-Carrillo, M., Ritchie, M. D., Klein, T. E.  
2023
- **PharmVar Tutorial on CYP2D6 Structural Variation Testing and Recommendations on Reporting.** *Clinical pharmacology and therapeutics*  
Turner, A. J., Nofziger, C., Ramey, B. E., Ly, R. C., Bousman, C. A., Agúndez, J. A., Sangkuhl, K., Whirl-Carrillo, M., Vanoni, S., Dunnenberger, H. M., Ruano, G., Kennedy, M. A., Phillips, et al  
2023
- **CYP3A4 and CYP3A5 Genotyping Recommendations: A Joint Consensus Recommendation of the Association for Molecular Pathology, Clinical Pharmacogenetics Implementation Consortium, College of American Pathologists, Dutch Pharmacogenetics Working Group of the Royal Dutch Pharmacists Association, European Society for Pharmacogenomics and Personalized Therapy, and Pharmacogenomics Knowledgebase.** *The Journal of molecular diagnostics : JMD*  
Pratt, V. M., Cavallari, L. H., Fulmer, M. L., Gaedigk, A., Hachad, H., Ji, Y., Kalman, L. V., Ly, R. C., Moyer, A. M., Scott, S. A., van Schaik, R. H., Whirl-Carrillo, M., Weck, et al  
2023
- **An Introductory Tutorial on Cardiovascular Pharmacogenetics for Healthcare Providers.** *Clinical pharmacology and therapeutics*  
Oni-Orisan, A., Tuteja, S., Hoffecker, G., Smith, D. M., Castrichini, M., Crews, K. R., Murphy, W. A., Nguyen, N. H., Huang, Y., Lteif, C., Friede, K. A., Tantisira, K., Aminkeng, et al  
2023
- **Evaluating the frequency and the impact of pharmacogenetic alleles in an ancestrally diverse Biobank population.** *Journal of translational medicine*  
Verma, S. S., Keat, K., Li, B., Hoffecker, G., Risman, M., Sangkuhl, K., Whirl-Carrillo, M., Dudek, S., Verma, A., Klein, T. E., Ritchie, M. D., Tuteja, S.  
2022; 20 (1): 550
- **How to Run the Pharmacogenomics Clinical Annotation Tool (PharmCAT).** *Clinical pharmacology and therapeutics*  
Li, B., Sangkuhl, K., Keat, K., Whaley, R. M., Woon, M., Verma, S., Dudek, S., Tuteja, S., Verma, A., Whirl-Carrillo, M., Ritchie, M. D., Klein, T. E.  
2022
- **Expanded Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for Medication Use in the Context of G6PD Genotype.** *Clinical pharmacology and therapeutics*  
Gammal, R. S., Pirmohamed, M., Somogyi, A. A., Morris, S. A., Fornea, C. M., Elchynski, A. L., Oshikoya, K. A., McLeod, H. L., Haidar, C. E., Whirl-Carrillo, M., Klein, T. E., Caudle, K. E., Relling, et al  
2022
- **TPMT and NUDT15 Genotyping Recommendations: A Joint Consensus Recommendation of the Association for Molecular Pathology, Clinical Pharmacogenetics Implementation Consortium, College of American Pathologists, Dutch Pharmacogenetics Working Group of the Royal Dutch Pharmacists Association, European Society for Pharmacogenomics and Personalized Therapy, and Pharmacogenomics Knowledgebase.** *The Journal of molecular diagnostics : JMD*  
Pratt, V. M., Cavallari, L. H., Fulmer, M. L., Gaedigk, A., Hachad, H., Ji, Y., Kalman, L. V., Ly, R. C., Moyer, A. M., Scott, S. A., van Schaik, R. H., Whirl-Carrillo, M., Weck, et al  
2022
- **PharmGKB summary: acyclovir/ganciclovir pathway.** *Pharmacogenetics and genomics*  
Maillard, M., Gong, L., Nishii, R., Yang, J. J., Whirl-Carrillo, M., Klein, T. E.  
2022; 32 (5): 201-208
- **PharmGKB summary: heparin-induced thrombocytopenia pathway, adverse drug reaction.** *Pharmacogenetics and genomics*  
Miller, E., Norwood, C., Giles, J. B., Huddart, R., Karnes, J. H., Whirl-Carrillo, M., Klein, T. E.  
1800
- **PharmVar GeneFocus: CYP3A5.** *Clinical pharmacology and therapeutics*  
Rodriguez-Antona, C., Savieo, J. L., Lauschke, V. M., Sangkuhl, K., Drögemöller, B. I., Wang, D., van Schaik, R. H., Gilep, A. A., Peter, A. P., Boone, E. C., Ramey, B. E., Klein, T. E., Whirl-Carrillo, et al  
2022

- **An Investigation of the Knowledge Overlap between Pharmacogenomics and Disease Genetics.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*  
Li, B., Whirl-Carrillo, M., Wright, M. W., Babb, L., Rehm, H. L., Klein, T. E.  
2022; 27: 385-396
- **PharmGKB, an Integrated Resource of Pharmacogenomic Knowledge.** *Current protocols*  
Gong, L., Whirl-Carrillo, M., Klein, T. E.  
2021; 1 (8): e226
- **PharmVar GeneFocus: CYP2C9.** *Clinical pharmacology and therapeutics*  
Sanguhl, K., Claudio-Campos, K., Cavallari, L. H., Agundez, J., Whirl-Carrillo, M., Duconge, J., Del Tredici, A. L., Wadelius, M., Botton, M. R., Woodahl, E. L., Scott, S. A., Klein, T. E., Pratt, et al  
2021
- **PharmVar: A Global Resource and Repository for Pharmacogene Variation.** *Clinical pharmacology and therapeutics*  
Gaedigk, A., Casey, S. T., Whirl-Carrillo, M., Miller, N. A., Klein, T. E.  
2021
- **Clinical Pharmacogenetics Implementation Consortium (CPIC) guideline for the use of aminoglycosides based on MT-RNR1 genotype.** *Clinical pharmacology and therapeutics*  
McDermott, J. H., Wolf, J., Hoshitsuki, K., Huddart, R., Caudle, K. E., Whirl-Carrillo, M., Steyger, P. S., Smith, R. J., Cody, N., Rodriguez-Antona, C., Klein, T. E., Newman, W. G.  
2021
- **PharmVar GeneFocus: CYP2B6.** *Clinical pharmacology and therapeutics*  
Desta, Z. n., El-Boraie, A. n., Gong, L. n., Somogyi, A. A., Lauschke, V. M., Dandara, C. n., Klein, K. n., Miller, N. n., Klein, T. E., Tyndale, R. F., Whirl-Carrillo, M. n., Gaedigk, A. n.  
2021
- **Recommendations for Clinical CYP2D6 Genotyping Allele Selection: A Joint Consensus Recommendation of the Association for Molecular Pathology, College of American Pathologists, Dutch Pharmacogenetics Working Group of the Royal Dutch Pharmacists Association, and European Society for Pharmacogenomics and Personalized Therapy.** *The Journal of molecular diagnostics : JMD*  
Pratt, V. M., Cavallari, L. H., Del Tredici, A. L., Gaedigk, A., Hachad, H., Ji, Y., Kalman, L. V., Ly, R. C., Moyer, A. M., Scott, S. A., van Schaik, R. H., Whirl-Carrillo, M., Weck, et al  
2021
- **Pharmacogenetics at Scale: An Analysis of the UK Biobank.** *Clinical pharmacology and therapeutics*  
McInnes, G., Lavertu, A., Sangkuhl, K., Klein, T. E., Whirl-Carrillo, M., Altman, R. B.  
2020
- **Transfer learning enables prediction of CYP2D6 haplotype function.** *PLoS computational biology*  
McInnes, G., Dalton, R., Sangkuhl, K., Whirl-Carrillo, M., Lee, S., Tsao, P. S., Gaedigk, A., Altman, R. B., Woodahl, E. L.  
2020; 16 (11): e1008399
- **Pharmacogenetic information in Swiss drug labels - a systematic analysis.** *The pharmacogenomics journal*  
Jeiziner, C., Suter, K., Wernli, U., Barbarino, J. M., Gong, L., Whirl-Carrillo, M., Klein, T. E., Szucs, T. D., Hersberger, K. E., Meyer Zu Schwabedissen, H. E.  
2020
- **PharmGKB tutorial for pharmacogenomics of drugs potentially used in the context of COVID-19.** *Clinical pharmacology and therapeutics*  
Huddart, R., Whirl-Carrillo, M., Altman, R. B., Klein, T. E.  
2020
- **Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2C9 and HLA-B Genotypes and Phenytoin Dosing: 2020 Update.** *Clinical pharmacology and therapeutics*  
Karnes, J. H., Rettie, A. E., Somogyi, A. A., Huddart, R., Fohner, A. E., Formea, C. M., Lee, M. T., Llerena, A., Whirl-Carrillo, M., Klein, T. E., Phillips, E. J., Mintzer, S., Gaedigk, et al  
2020
- **Recommendations for Clinical Warfarin Genotyping Allele Selection A Report of the Association for Molecular Pathology and the College of American Pathologists** *JOURNAL OF MOLECULAR DIAGNOSTICS*  
Pratt, V. M., Cavallari, L. H., Del Tredici, A. L., Hachad, H., Ji, Y., Kalman, L. V., Ly, R. C., Moyer, A. M., Scott, S. A., Whirl-Carrillo, M., Weck, K. E.

2020; 22 (7): 847–59

- **PharmVar GeneFocus: CYP2C19.** *Clinical pharmacology and therapeutics*  
Botton, M. R., Whirl-Carrillo, M., Del Tredici, A. L., Sangkuhl, K., Cavallari, L. H., Agundez, J. A., Duconge, J., Lee, M. T., Woodahl, E. L., Claudio-Campos, K., Daly, A. K., Klein, T. E., Pratt, et al  
2020
- **Response to: Unveiling the guidance heterogeneity for genome-informed drug treatment interventions among regulatory bodies and research consortia.** *Pharmacological research*  
Huddart, R. n., Li, G. n., Sangkuhl, K. n., Thorn, C. F., Whirl-Carrillo, M. n., Caudle, K. E., Relling, M. V., Klein, T. E.  
2020: 104838
- **PGxMine: Text mining for curation of PharmGKB.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*  
Lever, J. n., Barbarino, J. M., Gong, L. n., Huddart, R. n., Sangkuhl, K. n., Whaley, R. n., Whirl-Carrillo, M. n., Woon, M. n., Klein, T. E., Altman, R. B.  
2020; 25: 611–22
- **PGxMine: Text mining for curation of PharmGKB**  
Lever, J., Barbarino, J. M., Gong, L., Huddart, R., Sangkuhl, K., Whaley, R., Whirl-Carrillo, M., Woon, M., Klein, T. E., Altman, R. B., Altman, R. B., Dunker, A. K., Hunter, et al  
WORLD SCIENTIFIC PUBL CO PTE LTD.2020: 611-622
- **Variant Interpretation in Current Pharmacogenetic Testing.** *Journal of personalized medicine*  
Luvsantseren, S. n., Whirl-Carrillo, M. n., Sangkuhl, K. n., Shin, N. n., Wen, A. n., Empey, P. n., Alam, B. n., David, S. n., Dunnenberger, H. M., Orlando, L. n., Altman, R. n., Palaniappan, L. n.  
2020; 10 (4)
- **PharmVar and the Landscape of Pharmacogenetic Resources.** *Clinical pharmacology and therapeutics*  
Gaedigk, A., Whirl-Carrillo, M., Pratt, V. M., Miller, N. A., Klein, T. E.  
2019
- **PharmVar GeneReview: CYP2D6.** *Clinical pharmacology and therapeutics*  
Nofziger, C., Turner, A. J., Sangkuhl, K., Whirl-Carrillo, M., Agundez, J. A., Black, J. L., Dunnenberger, H. M., Ruano, G., Kennedy, M. A., Phillips, M. S., Hachad, H., Klein, T. E., Gaedigk, et al  
2019
- **Are Randomized Controlled Trials Necessary to Establish the Value of Implementing Pharmacogenomics in the Clinic?** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Huddart, R., Sangkuhl, K., Whirl-Carrillo, M., Klein, T. E.  
2019; 106 (2): 284–86
- **Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2B6 and Efavirenz-Containing Antiretroviral Therapy** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Desta, Z., Gammal, R. S., Gong, L., Whirl-Carrillo, M., Gaur, A. H., Sukasem, C., Hockings, J., Myers, A., Swart, M., Tyndale, R. F., Masimirembwa, C., Iwuchukwu, O. F., Chirwa, et al  
2019
- **Standardized Biogeographic Grouping System for Annotating Populations in Pharmacogenetic Research** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Huddart, R., Fohner, A. E., Whirl-Carrillo, M., Wojcik, G. L., Gignoux, C. R., Popejoy, A. B., Bustamante, C. D., Altman, R. B., Klein, T. E.  
2019; 105 (5): 1256–62
- **Pharmacogene Variation Consortium Gene Introduction: NUDT15** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Yang, J. J., Whirl-Carrillo, M., Scott, S. A., Turner, A. J., Schwab, M., Tanaka, Y., Suarez-Kurtz, G., Schaeffeler, E., Klein, T. E., Miller, N. A., Gaedigk, A.  
2019; 105 (5): 1091–94
- **Clinical Pharmacogenetics Implementation Consortium Guideline for Thiopurine Dosing Based on TPMT and NUDT15 Genotypes: 2018 Update** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Relling, M., Schwab, M., Whirl-Carrillo, M., Suarez-Kurtz, G., Pui, C., Stein, C. M., Moyer, A. M., Evans, W. E., Klein, T. E., Guillermo Antillon-Klussmann, F., Caudle, K. E., Kato, M., Yeoh, et al  
2019; 105 (5): 1095–1105

- **Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2B6 and Efavirenz-containing Antiretroviral Therapy.** *Clinical pharmacology and therapeutics*  
Desta, Z., Gammal, R. S., Gong, L., Whirl-Carrillo, M., Gaur, A. H., Sukasem, C., Hockings, J., Myers, A., Swart, M., Tyndale, R., Masimirembwa, C., Iwuchukwu, O. F., Chirwa, et al  
2019
- **Are Randomized Controlled Trials Necessary to Establish the Value of Implementing Pharmacogenomics in the Clinic?** *Clinical pharmacology and therapeutics*  
Huddart, R., Sangkuhl, K., Whirl-Carrillo, M., Klein, T. E.  
2019
- **BIOINFORMATICS: ACCUMULATING AND IMPLEMENTING PHARMACOGENOMICS INFORMATION**  
Whirl-Carrillo, M.  
JAPANESE SOC STUDY XENOBIOTICS.2019: S6
- **Standardizing CYP2D6 Genotype to Phenotype Translation: Consensus Recommendations from the Clinical Pharmacogenetics Implementation Consortium and Dutch Pharmacogenetics Working Group.** *Clinical and translational science*  
Caudle, K. E., Sangkuhl, K. n., Whirl-Carrillo, M. n., Swen, J. J., Haidar, C. E., Klein, T. E., Gammal, R. S., Relling, M. V., Scott, S. A., Hertz, D. L., Guchelaar, H. J., Gaedigk, A. n.  
2019
- **The Clinical Pharmacogenetics Implementation Consortium: 10 Years Later.** *Clinical pharmacology and therapeutics*  
Relling, M. V., Klein, T. E., Gammal, R. S., Whirl-Carrillo, M. n., Hoffman, J. M., Caudle, K. E.  
2019
- **Recommendations for Clinical CYP2C9 Genotyping Allele Selection: A Joint Recommendation of the Association for Molecular Pathology and College of American Pathologists.** *The Journal of molecular diagnostics : JMD*  
Pratt, V. M., Cavallari, L. H., Del Tredici, A. L., Hachad, H. n., Ji, Y. n., Moyer, A. M., Scott, S. A., Whirl-Carrillo, M. n., Weck, K. E.  
2019
- **The Evolution of PharmVar.** *Clinical pharmacology and therapeutics*  
Gaedigk, A., Sangkuhl, K., Whirl-Carrillo, M., Twist, G. P., Klein, T. E., Miller, N. A., PharmVar Steering Committee  
2018
- **Pharmacogene Variation Consortium Gene Introduction: NUDT15.** *Clinical pharmacology and therapeutics*  
Yang, J. J., Whirl-Carrillo, M., Scott, S. A., Turner, A. J., Schwab, M., Tanaka, Y., Suarez-Kurtz, G., Schaeffeler, E., Klein, T. E., Miller, N. A., Gaedigk, A.  
2018
- **Standardized biogeographic grouping system for annotating populations in pharmacogenetic research.** *Clinical pharmacology and therapeutics*  
Huddart, R., Fohner, A. E., Whirl-Carrillo, M., Wojcik, G. L., Gignoux, C. R., Popejoy, A. B., Bustamante, C. D., Altman, R. B., Klein, T. E.  
2018
- **Clinical Pharmacogenetics Implementation Consortium (CPIC) guideline for thiopurine dosing based on TPMT and NUDT15 genotypes: 2018 update.** *Clinical pharmacology and therapeutics*  
Relling, M. V., Schwab, M., Whirl-Carrillo, M., Suarez-Kurtz, G., Pui, C., Stein, C. M., Moyer, A. M., Evans, W. E., Klein, T. E., Antillon-Klussmann, F. G., Caudle, K. E., Kato, M., Yeoh, et al  
2018
- **Essential characteristics of pharmacogenomics study publications.** *Clinical pharmacology and therapeutics*  
Thorn, C. F., Whirl-Carrillo, M., Hachad, H., Johnson, J. A., McDonagh, E. M., Ratain, M. J., Relling, M. V., Scott, S. A., Altman, R. B., Klein, T. E.  
2018
- **Standardization can accelerate the adoption of pharmacogenomics: current status and the path forward** *PHARMACOGENOMICS*  
Caudle, K. E., Keeling, N. J., Klein, T. E., Whirl-Carrillo, M., Pratt, V. M., Hoffman, J. M.  
2018; 19 (10): 847–60
- **Pharmacogenomics and big genomic data: from lab to clinic and back again.** *Human molecular genetics*  
Lavertu, A., McInnes, G., Daneshjou, R., Whirl-Carrillo, M., Klein, T. E., Altman, R. B.  
2018; 27 (R1): R72–R78

- **Clinical Pharmacogenetics Implementation Consortium (CPIC) Guideline for CYP2D6 and Tamoxifen Therapy** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Goetz, M. P., Sangkuhl, K., Guchelaar, H., Schwab, M., Province, M., Whirl-Carrillo, M., Symmans, W., McLeod, H. L., Ratain, M. J., Zembutsu, H., Gaedigk, A., van Schaik, R. H., Ingle, et al  
2018; 103 (5): 770–77
- **Comparison of the Guidelines of the Clinical Pharmacogenetics Implementation Consortium and the Dutch Pharmacogenetics Working Group** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Bank, P. D., Caudle, K. E., Swen, J. J., Gammal, R. S., Whirl-Carrillo, M., Klein, T. E., Relling, M. V., Guchelaar, H.  
2018; 103 (4): 599–618
- **Clinical Pharmacogenetics Implementation Consortium Guideline for HLA Genotype and Use of Carbamazepine and Oxcarbazepine: 2017 Update** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Phillips, E. J., Sukasem, C., Whirl-Carrillo, M., Mueller, D. J., Dunnenberger, H. M., Chantratita, W., Goldspiel, B., Chen, Y., Carleton, B. C., George, A. L., Mushiroda, T., Klein, T., Gammal, et al  
2018; 103 (4): 574–81
- **THE PHARMACOGENE VARIATION CONSORTIUM: INCORPORATION OF THE HUMAN CYTOCHROME P450 ALLELE NOMENCLATURE DATABASE.**  
Gaedigk, A., Klein, T. E., Twist, G. P., Whirl-Carrillo, M., Miller, N. A.  
WILEY.2018: S67
- **The Pharmacogene Variation (PharmVar) Consortium: Incorporation of the Human Cytochrome P450 (CYP) Allele Nomenclature Database** *CLINICAL PHARMACOLOGY & THERAPEUTICS*  
Gaedigk, A., Ingelman-Sundberg, M., Miller, N. A., Leeder, J., Whirl-Carrillo, M., Klein, T. E., PharmVar Steering Comm  
2018; 103 (3): 399–401
- **PharmGKB: A worldwide resource for pharmacogenomic information.** *Wiley interdisciplinary reviews. Systems biology and medicine*  
Barbarino, J. M., Whirl-Carrillo, M., Altman, R. B., Klein, T. E.  
2018
- **Clinical pharmacogenetics implementation consortium (cpic) guideline for pharmacogenetics-guided warfarin dosing: 2017 update.** *Clinical pharmacology & therapeutics*  
Johnson, J. A., Caudle, K. E., Gong, L., Whirl-Carrillo, M., Stein, C. M., Scott, S. A., Lee, M. T., Gage, B. F., Kimmel, S. E., Perera, M. A., Anderson, J. L., Pirmohamed, M., Klein, et al  
2017
- **Standardizing terms for clinical pharmacogenetic test results: consensus terms from the Clinical Pharmacogenetics Implementation Consortium (CPIC)** *GENETICS IN MEDICINE*  
Caudle, K. E., Dunnenberger, H. M., Freimuth, R. R., Peterson, J. F., Burlison, J. D., Whirl-Carrillo, M., Scott, S. A., Rehm, H. L., Williams, M. S., Klein, T. E., Relling, M. V., Hoffman, J. M.  
2017; 19 (2): 215-223
- **"The Pharmacogenomics Research Network Translational Pharmacogenetics Program: Outcomes and Metrics of Pharmacogenetic Implementations Across Diverse Healthcare Systems".** *Clinical pharmacology & therapeutics*  
Luzum, J. A., Pakyz, R. E., Elsey, A. R., Haidar, C. E., Peterson, J. F., Whirl-Carrillo, M., Handelman, S. K., Palmer, K., Pulley, J. M., Beller, M., Schildcrout, J. S., Field, J. R., Weitzel, et al  
2017
- **PharmGKB summary: ivacaftor pathway, pharmacokinetics/pharmacodynamics** *PHARMACOGENETICS AND GENOMICS*  
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