Generic Cost-Effectiveness Models: A Proof of Concept of a Tool for Informed Decision-Making for Public Health Precision Medicine

Susan R. Snyder a, Jing Hao a, Larisa H. Cavallari b, Zhi Geng a, Amanda Elsey b, Julie A. Johnson b, Zahurin Mohamed c, Nathorn Chaiyakunapruk d, g, n, Huey Yi Chong d, Maznah Daulih h, Fatiha H. Shabaruddin i, George P. Patrinos j, k, Christina Mitropoulou l, Marc S. Williams m

aDepartment of Epidemiology and Health Services Research, Geisinger Health System, Danville, PA, USA; bDepartment of Pharmacotherapy and Translational Research, University of Florida, Gainesville, FL, USA; cDepartment of Pharmacology, University of Malaya, Kuala Lumpur, Malaysia; dSchool of Pharmacy, Monash University Sunway Campus, Subang Jaya, Malaysia; eCenter of Pharmaceutical Outcomes Research (CPOR), Department of Pharmacy Practice, Faculty of Pharmaceutical Sciences, Naresuan University, Phitsanulok, Thailand; fSchool of Pharmacy, University of Wisconsin, Madison, WI, USA; gAsian Centre for Evidence Synthesis in Population, Implementation and Clinical Outcomes (PICO), Global Asia in the 21st Century (GA21) Platform, Monash University, Subang Jaya, Malaysia; hDepartment of Social and Preventive Medicine, Julius Centre, University of Malaya, Kuala Lumpur, Malaysia; iDepartment of Pharmacy, University of Malaya, Kuala Lumpur, Malaysia; jUniversity of Patras School of Health Sciences Department of Pharmacy, Patras, Greece; kUnited Arab Emirates University, College of Medicine, Department of Pathology, Al Ain, UAE; lThe Golden Helix Foundation, London, UK; mGenomic Medicine Institute, Geisinger Health System, Danville, PA, USA; nDepartment of Pharmacotherapy, College of Pharmacy, University of Utah, Salt Lake City, UT, USA

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Abstract
Background/Aims: Economic evaluation is integral to informed public health decision-making in the rapidly growing field of precision and personalized medicine (PM); however, this research requires specialized expertise and significant resources. Generic models are a novel innovation to efficiently address a critical PM evidence shortage and implementation barrier by enabling use of population-specific input values. This is a generic PM economic evaluation model proof-of-concept study for a pharmacogenomic use case.

Methods: An 8-step generic economic model development process was applied to the use case of human leukocyte antigen (HLA)-B*15:02 genotyping for prediction of carbamazepine-induced cutaneous reactions, with a user-friendly decision-making tool relying on user-provided input values. This generic model was transparently documented and validated, including cross-validation comparing cost-effectiveness results with 3 country-specific models. Results: A generic pharmacogenomic use case cost-effectiveness model with decision-making tool was successfully developed and cross-validated using input values for 6 populations which produced consistent results for HLA-B*15:02 screening at country-specific cost-effectiveness threshold values. Differences between the generic and country-specific model results were largely due to differences in model structure and as-