There is great heterogeneity in the way individuals and populations respond to medications in terms of both host toxicity and efficacy. It is now well recognized that genetic differences in drug metabolism and disposition as well in drug target receptors could have an even greater influence on the efficacy and toxicity of medications. A Wide range of drug metabolizing enzymes (DME) are subject to genetic polymorphism. The genotype-phenotype relationship is particularly important for drugs with narrow therapeutic index where slight changes in plasma levels can result in serious toxicity or lack of efficacy. While Caucasian and oriental populations have benefited from the intense interest in the field of pharmacogenomics, there still exists a wide gap in this knowledge on African populations. Hence, the main objective of this study was to investigate the occurrence and frequency of allelic variants of polymorphic DME in three major ethnic populations in Kenya.