SickKids® Pharmacogenomics Report

NAME: Mock Report
Physician Copy for:
DOB: 01/01/2019
ID #: 281

Test report date: 10/11/2021
Updated at: 31/05/2023
Case #: HSC-DEMO 20211110

Consultation:

PGx guidance for pain medications

Patient is in the category of a CYP2C19 rapid metabolizer, and CYP2D6 ultrarapid metabolizer, suggesting increased function.
Patient is considered a poor CYP2C9 metabolizer, suggesting reduced to poor function.
Dosing adjustment of change in therapy may be required for drugs activated or broken down by these enzyme pathways.
CYP2C19, CYP2C9 and CYP2D6 metabolizer statuses have an impact on medications used for pain management.

For more specific dosing recommendations, please refer to the section: "drug/dosing recommendations".

This report has been approved on xx.xx.2021 by:
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Focus Drugs:

Amitriptyline		Increased CYP2C19 and CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. This may affect the clinical response and probability of side effects. Avoid use of tricyclic antidepressants. If amitriptyline cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Celecoxib		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Initiate therapy with 25-50% of the lowest recommended starting dose. Titrate dose to clinical effect or 25-50% of the maximum recommended dose with caution. In accordance with the prescribing information, use the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Alternatively, select an alternative NSAID that is not affected by CYP2C9 metabolism (e.g., aspirin, ketorolac, naproxen and sulindac).

Medication List:

Currently, patient is not on any medications.

Drug Summary:

Therapeutic Category	Use as directed	Caution - read recommendation	Consider alternatives
Anticoagulant		Clopidogrel	
		Warfarin	
Cardiovascular	Atorvastatin	Metoprolol	Flecainide
	Simvastatin		Propafenone
Dentistry	Cevimeline		
Endocrinology	Hormonal contraceptives for systemic use		
Gastroenterology	Metoclopramide	Dexlansoprazole	Ondansetron
		Dronabinol	Tropisetron
		Lansoprazole	
		Omeprazole	
		Pantoprazole	
Genetic disorder			Eliglustat
Gout		Lesinurad	
Immunology	Azathioprine		
	Tacrolimus		
Infectious Diseases			Voriconazole
Neurology	Clobazam	Phenytoin/fosphenytoin	
	Tetrabenazine	Siponimod	
Oncology	Mercaptopurine		
	Tamoxifen		
	Thioguanine		
Pain	Carisoprodol	Celecoxib	Codeine
	Oxycodone	Flurbiprofen	Meloxicam
		Ibuprofen	Piroxicam
			Tramadol

Therapeutic Category	Use as directed	Caution - read recommendation	Consider alternatives
Psychiatry	Aripiprazole	Atomoxetine	Amitriptyline
	Brexpiprazole	Fluvoxamine	Citalopram
	Clozapine	Haloperidol	Clomipramine
	Perphenazine	Venlafaxine	Desipramine
	Pimozide	Zuclopenthixol	Doxepin
	Sertraline		Escitalopram
	Thioridazine		Imipramine
	Vortioxetine		Nortriptyline
			Paroxetine
			Risperidone
			Trimipramine

Genetic results:

Gene	Genotype	Phenotype	Status
NUDT15	415C>T CC	Two functional alleles	Normal function
CYP2C19	*1/*17	One functional allele and one increased-function allele	Rapid metabolizer
CYP2C9	*2/*3	One reduced function and one non-functional allele	Poor metabolizer
CYP2D6	*2xN/*2	One functional allele and one duplicated allele	Ultrarapid metabolizer
CYP3A5	*3/*3	Two reduced-function alleles	Poor metabolizer
F5	1691G>A GG	Two normal risk alleles (WT = wild type)	Normal risk
SLCO1B1	*1/*1	Two functional alleles	Normal function
TPMT	*1/*1	Two functional alleles	Normal metabolizer
VKORC1	-1639 G>A GA	One normal functional allele and one reduced function allele	Reduced function

Drug/Dosing Recommendations:

Anticoagulant

Clopidogrel		Increased CYP2C19 enzyme activity may increase the conversion of clopidogrel to its active metabolite. Initiate therapy with the standard recommended starting dose. Patients with this genotype may have increased risk of bleeding.
Warfarin		Significantly reduced CYP2C9 and reduced VKORC1 enzyme activity may lead to increased sensitivity to warfarin. Per pharmacogenomic warfarin dosing algorithms a much lower warfarin starting dose is recommended for the target INR 2-3. An updated dose estimation chart should be used to guide warfarin dosing. The Clinical Pharmacogenetics Implementation Consortium (CPIC) recommends that warfarin dosing follows either the Gage and/or IWPC algorithms, both of which drive the web-based algorithm found at warfarindosing.org. The genetic information below can be entered into the warfarindosing.org form to estimate the most appropriate therapeutic dose in patients new to warfarin. After filling in the "Required Patient Information", the following can be entered into the "Genetic Information" section of the form: VKORC1-1639/3673 = AG CYP4F2 V433M = Not available/Pending GGCX rs11676382 = Not available/Pending CYP2C9*2 = CT (Heterozygous) CYP2C9*3 = AC (Heterozygous) CYP2C9*5 = CC (Wildtype) CYP2C9*6 = AA (Wildtype)

Cardiovascular

Flecainide		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and may affect clinical response. Consider an alternative treatment that is not predominantly affected by CYP2D6 metabolism (e.g., sotalol, disopyramide, quinidine, amiodarone). If flecainide cannot be avoided, utilize ECG monitoring as well as therapeutic drug monitoring monitor to guide dose adjustments. A higher maintenance dose may be required. This recommendation does not apply to the flecainide provocation test to diagnose Brugada syndrome.
Metoprolol		Elevated CYP2D6 enzyme activity may lead to lower levels of active drug and may affect the clinical response. A higher maintenance dose may be required. Titrate the dose based on the clinical response and side effects to a maximum of 2.5 times the standard recommended dose, or select an alternative treatment (e.g., bisoprolol, carvedilol).

Propafenone		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and its metabolites, which may affect clinical response. Consider an alternative medication that is not affected by CYP2D6 metabolism (e.g., sotalol, disopyramide, quinidine, amiodarone). If propafenone cannot be avoided, utilize ECG monitoring and therapeutic drug monitoring to guide dose adjustments.
Atorvastatin		Normal SLCO1B1 transporter activity, which is related to a standard risk for statin-induced myopathy (muscle toxicity). Initiate therapy with the standard recommended starting dose.
Simvastatin		Normal SLCO1B1 transporter activity, which is related to a standard risk for statin-induced myopathy (muscle toxicity). Initiate therapy with the standard recommended starting dose.

Dentistry

Cevimeline		Increased CYP2D6 enzyme activity may lead to decreased levels of active drug and may affect clinical response. There is insufficient data to support dose recommendations. Initiate therapy with the standard recommended starting dose.

Dermatology

Endocrinology

Hormonal contraceptives for systemic use		Hormonal Contraceptives for systemic use: Use label recommended dosage and administration.

Gastroenterology

Lansoprazole		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug and may affect clinical response. Consider increasing dose by 50-100% for the treatment of H. pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.
Omeprazole		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug and may affect clinical response. Consider increasing dose by 50-100% for the treatment of H. pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.
Pantoprazole		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug and may affect clinical response. Consider increasing dose by 50-100% for the treatment of H. pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.
Dexlansoprazole		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug and may affect clinical response. Consider increasing dose by 50-100% for the treatment of H. pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.
Ondansetron		Increased CYP2D6 enzyme activity may lead to to lower levels of active drug, which may increase the probability of pharmacotherapy failure. Select an alternative drug that is not metabolized by CYP2D6 (e.g., granisetron). Please note that dolasetron, palonosetron, and ramosetron may not be good alternatives as these drugs are also metabolized by CYP2D6.

Dronabinol		Significantly reduced CYP2C9 enzyme activity may result in higher systemic concentrations and higher adverse reaction risk. Monitor for adverse reactions.
Metoclopramide		Increased CYP2D6 enzyme activity may lead to decreased levels of active drug. However, compared to normal metabolizers no significant difference in clinical effect or probability of side effects is expected. Initiate therapy with the standard recommended starting dose.
Tropisetron		Increased CYP2D6 enzyme activity may lead to lower levels of active drug, which may increase the probability of pharmacotherapy failure. Select an alternative drug that is not metabolized by CYP2D6 (e.g., granisetron). Please note that dolasetron, palonosetron, and ramosetron may not be good alternatives as these drugs are also metabolized by CYP2D6.

Genetic disorder

Eliglustat		Increased CYP2D6 enzyme activity may lead to to lower levels of active drug and increases the probability of therapeutic failure. Eliglustat should not be used as per the product monograph.

Gout

Lesinurad		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Use with caution.

Immunology

Azathioprine		Normal NUDT15 and TPMT enzyme activities. Initiate therapy with the standard recommended starting dose.
Tacrolimus		CYP3A5 non-expressors have a low enzyme activity, which is found in the majority of the population. Dosing recommendations for tacrolimus are based on CYP3A5 non-expressors. Initiate therapy with the standard recommended starting dose and utilize therapeutic drug monitoring to guide dose adjustments.

Infectious Diseases

Voriconazole		Increased CYP2C19 enzyme activity may lead to lower levels of active drug, which increases the probability of therapeutic failure. Consider an alternative agent that is not affected by CYP2C19 metabolism (e.g., isavuconazole, liposomal amphotericin B, posaconazole). If voriconazole cannot be avoided, consider increasing the standard recommended starting dose by 50% and utilize therapeutic drug monitoring to guide dose adjustments.

Neurology

Phenytoin/fosphenytoin		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Consider reducing the standard recommended starting dose by 50% and utilize therapeutic drug monitoring to guide dose adjustments.

Clobazam		Increased CYP2C19 enzyme activity may lead to to lower levels of the active metabolite. However, compared to normal metabolizers no significant difference in clinical effect or probability of side effects is expected. Initiate therapy with the standard recommended starting dose and titrate based on clinical effect.
Tetrabenazine		Increased CYP2D6 enzyme activity may lead to to lower levels of active drug and its metabolites. Current evidence suggests that the probability of side effects or clinical effect is not influenced by this genotype. Initiate therapy with the standard recommended starting dose.
Siponimod		Reduced CYP2C9 enzyme activity may lead to elevated levels of active drug. Use 50% of the normal maintenance dose. Reconsider the choice and the potential benefit of siponimod if the patient is also using a moderate CYP3A4 inducer, such as modafinil. For this genetic variation, a moderate CYP3A4 inducer results in a reduction in the exposure of siponimod by 49%, according to a pharmacokinetic model.

Oncology

Tamoxifen		Increased CYP2D6 enzyme activity may increase the conversion of tamoxifen to its active metabolite (e.g., endoxifen). This increases the probability of therapeutic effect, without causing an increase in side effects. Initiate therapy with the standard recommended starting dose.
Mercaptopurine		Normal NUDT15 and TPMT enzyme activity. Initiate therapy with the standard recommended starting dose.
Thioguanine		Normal NUDT15 and TPMT enzyme activity. Initiate therapy with the standard recommended starting dose.

Pain

Codeine		Increased CYP2D6 enzyme activity may increase the conversion of codeine to its more potent metabolite, which increases the probability of potentially life threatening side effects. Select an alternative treatment that is not affected by CYP2D6 metabolism (e.g., acetaminophen, NSAID, morphine and non-opioid analgesics).
Oxycodone		Increased CYP2D6 enzyme activity may lead to higher levels of active metabolite oxymorphone, but this does not appear to translate into increased analgesia or side effects. Initiate therapy with the standard recommended starting dose and monitor for side effects. NOTE: Codeine, hydrocodone and tramadol are NOT good alternatives because their metabolism is affected by CYP2D6 activity.
Tramadol		Increased CYP2D6 enzyme activity may increase the conversion of tramadol to its more potent metabolite, which increases the probability of potentially life-threatening side effects. Select an alternative treatment that is not affected by CYP2D6 metabolism (e.g., acetaminophen, NSAID, morphine and non-opioid analgesics), or reduce the standard recommended starting dose by 60% and monitor for side effects. NOTE: Codeine, hydrocodone and oxycodone are NOT good alternatives because their metabolism is also affected by CYP2D6 activity.

Celecoxib		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Initiate therapy with 25-50% of the lowest recommended starting dose. Titrate dose to clinical effect or 25-50% of the maximum recommended dose with caution. In accordance with the prescribing information, use the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Alternatively, select an alternative NSAID that is not affected by CYP2C9 metabolism (e.g., aspirin, ketorolac, naproxen and sulindac).
Carisoprodol		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug. However, compared to normal metabolizers no significant difference in clinical effect or probability of side effects is expected. Initiate therapy with the standard recommended starting dose and monitor for side effects.
Flurbiprofen		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Initiate therapy with 25-50% of the lowest recommended starting dose. Titrate dose to clinical effect or 25-50% of the maximum recommended dose with caution. In accordance with the prescribing information, use the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Alternatively, select an alternative NSAID that is not affected by CYP2C9 metabolism (e.g., aspirin, ketorolac, naproxen and sulindac).
Piroxicam		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Select an alternative NSAID that is not affected by CYP2C9 metabolism (e.g., aspirin, ketorolac, naproxen and sulindac) or choose an NSAID metabolized by CYP2C9 but with a shorter half-life such as celecoxib, celecoxib, flurbiprofen, lornoxicam, and ibuprofen.
Ibuprofen		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Initiate therapy with 25-50% of the lowest recommended starting dose. Titrate dose to clinical effect or 25-50% of the maximum recommended dose with caution. In accordance with the prescribing information, use the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Alternatively, select an alternative NSAID that is not affected by CYP2C9 metabolism (e.g., aspirin, ketorolac, naproxen and sulindac).
Meloxicam		Significantly reduced CYP2C9 enzyme activity may lead to elevated levels of active drug and increases the probability of side effects. Select an alternative NSAID that is not affected by CYP2C9 metabolism (e.g., aspirin, ketorolac, naproxen and sulindac) or choose an NSAID metabolized by CYP2C9 but with a shorter half-life such as celecoxib, celecoxib, flurbiprofen, lornoxicam, and ibuprofen.

Psychiatry

Amitriptyline		Increased CYP2C19 and CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. This may affect the clinical response and probability of side effects. Avoid use of tricyclic antidepressants. If amitriptyline cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Citalopram		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug and may affect clinical response. Consider an alternative drug that is not predominantly metabolized by CYP2C19.

Clomipramine		Increased CYP2C19 and CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. This may affect the clinical response and probability of side effects. Avoid use of tricyclic antidepressants. If clomipramine cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Desipramine		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and may decrease the clinical response and risk for side effects. If desipramine cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustment. A higher maintenance dose may be required to achieve clinical efficacy. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Doxepin		Increased CYP2C19 and CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. This may affect the clinical response and probability of side effects. Avoid use of tricyclic antidepressants. If doxepin cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Escitalopram		Increased CYP2C19 enzyme activity may lead to decreased levels of active drug and may affect clinical response. Consider an alternative drug that is not predominantly metabolized by CYP2C19.
Fluvoxamine		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and may affect the clinical response. Clinical guidelines do not contain dosing recommendations for CYP2D6 ultrarapid metabolizers due to the lack of scientific evidence. It may be reasonable, to select an alternative drug that is not predominantly metabolized by CYP2D6.
Imipramine		Increased CYP2C19 and CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. This may affect the clinical response and probability of side effects. Avoid use of tricyclic antidepressants. If imipramine cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Nortriptyline		Increased CYP2D6 enzyme activity may lead to lower levels of active drug, which may affect the clinical response. Avoid use of tricyclic antidepressants. If nortriptyline cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. A higher maintenance dose may be required. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Paroxetine		Increased CYP2D6 enzyme activity may lead to lower levels of active drug, which may affect the clinical response. Consider an alternative drug that is not predominantly metabolized by CYP2D6 (e.g., citalopram or sertraline if compatible with CYP2C19 status). If paroxetine cannot be avoided, initiate therapy with the standard recommended starting dose and titrate according to the clinical response.
Sertraline		Increased CYP2C19 enzyme activity may lead to altered levels of active drug, which may affect the clinical response. However, compared to normal metabolizers no significant difference in clinical effect is expected. Initiate therapy with the standard recommended starting dose. If no response to therapy, consider alternative drug not predominantly metabolized by CYP2C19.

Trimipramine		Increased CYP2C19 and CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. This may affect the clinical response and probability of side effects. Avoid use of tricyclic antidepressants. If trimipramine cannot be avoided, utilize therapeutic drug monitoring to guide dose adjustments. This recommendation only applies to higher initial doses, for example used in conditions such as depression.
Venlafaxine		Increased CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites, which may affect the clinical response and probability of side effects. Consider an alternative drug that is not predominantly metabolized by CYP2D6 (e.g., citalopram or sertraline if compatible with CYP2C19 status). If venlafaxine cannot be avoided, initiate therapy with the standard recommended starting dose and titrate according to the clinical response. A higher maintenance dose to up to 150% of standard dose may be required.
Aripiprazole		Increased CYP2D6 enzyme activity may lead to decreased levels of active drug and its metabolites. Current evidence suggests that the probability of side effects or clinical effect is not influenced by this genotype. Initiate therapy with the standard recommended starting dose.
Atomoxetine		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and increases the probability of therapeutic failure. If atomoxetine is not effective, increase dose and utilize therapeutic drug monitoring to guide dose adjustments and monitor for clinical effect. Alternatively, select a treatment that is not affected by CYP2D6 metabolism.
Haloperidol		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and increases the probability of therapeutic failure. Initiate therapy with the standard recommended starting dose, however a higher maintenance dose may be required. Utilize therapeutic drug monitoring and clinical effect to guide dose adjustments. Alternatively, select a drug that is not predominantly metabolized by CYP2D6 (e.g., flupentixol, fluphenazine, quetiapine, olanzapine or clozapine).
Risperidone		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and to a high ratio of the active metabolite (9-hydroxyrisperidone (paliperidone)). Consider choosing an alternative drug or titrate the dose according to the maximum dose for the active metabolite (paliperidone) (oral 12 mg/day for adults and children from 15 years of age weighing at least 51 kg and 6 mg/day for children from 15 years of age weighing less than 51 kg; intramuscular 75 mg per 2 weeks).
Thioridazine		Increased CYP2D6 enzyme activity may lead to to lower levels of active drug, which may increase the probability of therapeutic failure. There is insufficient data to allow for dose recommendations. Initiate therapy with the standard recommended starting dose and titrate based on clinical effect.
Brexpiprazole		Reduced CYP2D6 enzyme activity may lead to increased levels of active drug. However, compared to normal metabolizers no significant difference in clinical effect or probability of side effects is expected. Initiate therapy with the standard recommended starting dose.
Clozapine		Increased CYP2D6 enzyme activity may lead to decreased levels of active drug and its metabolites. Current evidence suggests that the probability of side effects or clinical effect is not influenced by this genotype. Initiate therapy with the standard recommended starting dose.
Pimozide		Increased CYP2D6 enzyme activity may lead to decreased levels of active drug. However, compared to normal metabolizers no significant difference in clinical effect or probability of side effects is expected. Initiate therapy with the standard recommended starting dose.

Vortioxetine		Increased CYP2D6 enzyme activity may lead to altered levels of active drug and its metabolites. Current evidence suggests that the probability of side effects or clinical effect is not influenced by this genotype. Initiate therapy with the standard recommended starting dose.
Zuclopenthixol		Increased CYP2D6 enzyme activity may lead to lower levels of active drug and increases the probability of pharmacotherapy failure. Initiate therapy with the standard recommended starting dose and titrate the dose based on clinical effect. A higher maintenance dose may be required. Alternatively, select a drug that is not predominantly metabolized by CYP2D6 (e.g., flupentixol, fluphenazine, quetiapine, olanzapine or clozapine).
Perphenazine		Increased CYP2D6 enzyme activity may lead to decreased levels of active drug. However, compared to normal metabolizers no significant difference in clinical effect or probability of side effects is expected. Initiate therapy with the standard recommended starting dose.

Urology

Legend:

	Use as directed	Use label recommended dosage and administration
	Use with caution	Use with caution - read detailed recommendation for potential dose adjustment
	Consider alternatives	Select alternative treatment if possible -read detailed recommendation for details.

DISCLAIMER

Genotyping of CYP2C19, CYP2C9, CYP2D6, CYP3A5, F5, NUDT15, SLCO1B1, TPMT and VKORC1 will be carried out using the Agena MassARRAY® platform. DNA samples are normalized to a concentration of 10 ng/uL, and 2uL per well is used for PCR amplification and primer extension with iPLEX, iPLEX Veridose Core, and Veridose CYP2D6 CNV reagents. A thermal cycler, Biorad C1000, is used for amplification. The extension products are dispensed onto a CPM 384 spectrochip Array using the Agena 384 chip prep module and detected using a MassARRAY MALDI-TOF mass spectrometer which provides genotyping and quantification. Haplotype reports are automatically generated using the Typer software and the ADME PGx Pro software, according to the manufacturer's standard protocols. Results are processed to generate SNP calls automatically, using the MassARRAY® TyperAnalyzer software (Agena Biosciences, San Diego, CA, USA), and then manually reviewed by the operator to validate the allele calls. Automatic SNP calls that are of concern will be removed.

Variants tested predict the following genotypes/haplotypes: CYP2D6 *1,*2,*3,*4*,*5,*6,*7,*8,*9,*10,*11,*12,*14A,*14B,*15,*17,*18,*19,*20,*29,*41,*69; CYP2D6 Copy Number Variant (CNV) analysis is performed using the Agena Veridose CYP2D6 CNV panel, which detects both CNV's and hybrid alleles and includes 22 assays to interrogate 7 regions (5', exon 1, intron 2, intron 4, intron 6, intron 7 and exon 9) of the CYP2D6 gene; CYP2C19 *1,*2,*3,*4A,*4B,*5,*6,*7,*8,*17; CYP2C9 *1,*2,*3*4,*5,*6,*8,*11,*12,*13,*15,*25,*27; CYP3A5 *1,*2,*3*6,*7; F5 rs6025 (1601G>A); NUDT15 rs116855232 (415C>T); SLCO1B1 *1, *5 (rs4149056); TPMT *1, *2, *3A, *3B, *4; and VKORC1 *1,*2 (-1639G>A).

Genetic variants not tested by this assay can contribute to an individual's efficiency of drug metabolism. This report is based on the technology and testing of certain variants listed above and may not fully take into account other factors that may affect drug sensitivity or efficacy such as co-medication, physical conditions, diet, smoking or the clinical context of the patient. The interpretation of this test may be affected by DNA rearrangements, blood transfusion, bone marrow transplantation or other rare events; these events can affect the testing and could cause false positive or false negative results. The interpretive report provided focuses on medications and genes with published pharmacogenomic practice guidance by professional organizations such as CPIC: Clinical Pharmacogenetics Implementation Consortium, DPWG: Dutch Pharmacogenetics Working Group, CPNDS: Canadian Pharmacogenomics Network for Drug Safety and FDA: U.S. Food and Drug Administration. The test used to prepare this report is a clinical investigational test; the test results are to be used for clinical research purposes only. Pharmacogenetic testing does not replace the need for therapeutic drug and clinical monitoring. It should be noted that the data interpretation outlined in this report is based on current understanding of genes and variants at the time of reporting. Patients are responsible for obtaining updates of this report, as necessary, in the future. The treating physician has ultimate responsibility for a patient's treatment plan, including treatment decisions made on the basis of this report. Neither the Hospital for Sick Children nor its employees or agents, shall have any liability to any person or entity with regard to claims, loss, damage arising, or alleged to arise, directly or indirectly, from the use of information contained in this report.