incitegenomics

AUSTRALIAN Clinicalabs

CNSDose®

(Comprehensive+)

Specialised pharmacogenetic insights for mental health care

ONLY AVAILABLE with Australian Clinical Labs

CNSDose®

(Comprehensive+)

- ***174 medications** across **19 genes** and multiple therapeutic areas*
- *Enhanced guidance for **antidepressants**, **antipsychotics**, **anxiolytics**, **ADHD and dementia** medications, and other psychotropics*
- ***User-friendly report** developed by psychiatrists*
- *Actionable insights for a lifetime*

CNSDose® is a pharmacogenetic (PGx) blood test and clinical decision support tool developed by Australian psychiatrists to enable more informed medication selection and dosing in mental health care. Unlike conventional pharmacogenetic tests that only analyse liver metabolic genetics, **CNSDose** was developed to analyse both liver and blood-brain barrier genetics. This approach identifies potential genetic barriers to psychotropic drug penetration, as well as the doses that ultimately reach the central nervous system and their targets, making **CNSDose** a uniquely informative tool.

What clinical evidence supports CNSDose?

- **CNSDose** was the first pharmacogenetic test to demonstrate positive outcomes in a randomised controlled trial for antidepressant treatment, with recovery rates of 72% in **CNSDose** guided prescribing compared to 28% with unguided prescribing.[1]
- A 2017 study published in Pharmacogenetics and Genomics found that patients with major depressive disorder whose treatment was guided by **CNSDose** were 2.5 times more likely to achieve remission compared with unguided prescribing.[2]
- In a retrospective analysis of 1,100 **CNSDose** test results, 19% of patients with mental illness had normal liver metabolic genetics (e.g. *CYP2D6* and *CYP2C19*), which would not assist clinicians in psychotropic medication selection. Of these patients, 40% had blood-brain barrier genetic variants affecting psychotropic medication transport into the brain, with significant implications for medication selection and dosing.

The CNSDose Report

The CNSDose Report was developed by Australian psychiatrists and covers 174 medications (see reverse). The user-friendly report includes:

PSYCHOTROPIC DOSE GUIDANCE:

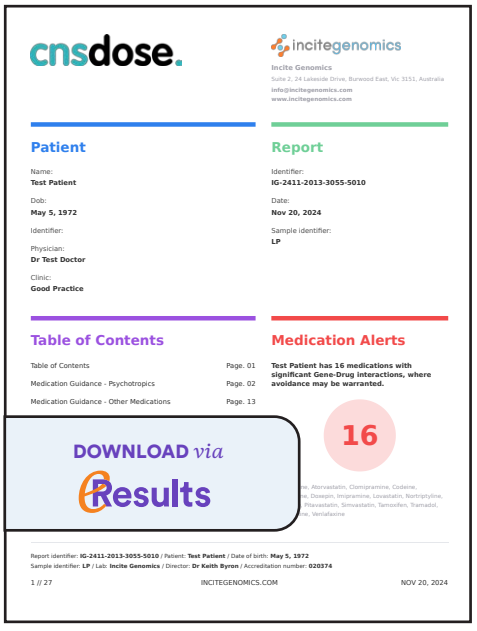
Clear guidance on whether lower, average or higher doses may be required.

INTERNATIONAL CLINICAL RECOMMENDATIONS:

Bespoke annotations aligned with FDA *(US Food and Drug Administration)*, CPIC *(Clinical Pharmacogenomic Implementation Consortium)* or DPWG *(Dutch Pharmacogenomic Working Group)* guidelines.

MEDICATION SAFETY ALERTS:

Highlights medications with significant drug-gene interactions where avoidance may be warranted.



Clinical Labs PGx Test Comparison

Comprehensive PGx

- 8 genes analysed
- 97 medications covered
- Avoidance and cautionary recommendations in line with FDA, CPIC or DPWG guidelines
- Prescribing guidance across mental health, cardiology, oncology, pain management, gastroenterology and other clinical areas using liver metabolism genetics

CNSDose (Comprehensive+) PGx

- 19 genes analysed
- 174 medications covered
- Avoidance and cautionary recommendations in line with FDA, CPIC or DPWG guidelines
- Prescribing guidance across mental health, cardiology, oncology, pain management, gastroenterology and other clinical areas using liver metabolism and blood-brain barrier genetics
- **Dose predictions (low, average, high) for psychotropic medications**

How to Order CNSDose® Pharmacogenetic (PGx) Testing

When to Order:

- Prior to commencing psychotropic therapy
- Following adverse reactions or treatment resistance

Request Form Instructions:

- Complete a standard Australian Clinical Labs request form and specify 'CNSDose' PGx testing. ***Please note: CNSDose is only available through Australian Clinical Labs.***
- Please list any prescribed medications you would like included at the top of the report (only medications specified on the request form will be prioritised in this section).
- Electronic requesting available via Best Practice, MedicalDirector, Genie, Gentu and eResults.
- Patients can attend any Clinical Labs collection centre. For locations, visit clinicallabs.com.au/location.

Specimen Details:

- 2x EDTA blood samples

Turnaround Time:

- Results are available within 7-10 business days from sample receipt.
- Reports can be downloaded via eResults.

Test Cost:

- No Medicare rebate. Please visit clinicallabs.com.au/doctor/cnsdose for current pricing.
- Patients are required to pay upfront via our secure online portal at the time of collection. Assistance from our collector is available if required.
- Medibank members with eligible mental health cover may be able to claim a rebate following testing.

For further information, including a sample report, case studies, pricing and educational resources, visit clinicallabs.com.au/doctor/cnsdose

References

1. Clinical Psychopharmacology and Neuroscience 2015;13:150–156
2. Pharmacogenetics and Genomics 2017;27:1–6

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Associate Professor Mirette Saad is a Consultant Chemical Pathologist and the National Director of Molecular Genetics at Australian Clinical Labs. At Clinical Labs, A/Prof Mirette Saad leads the Molecular Genetic testing for non-invasive prenatal testing (NIPT), antenatal screening, personalised drug therapy and cancer. She is a Chair of the RCPA Chemical Pathology Advisory Committee, Member of the RCPA Genetic Advisory Committee, AACB and a Chair of the Precision Medicine Services at Clinical Labs.

174 Medications Covered by CNSDose

MEDICATION	GENE(S) INVOLVED
PSYCHOTROPICS (96)	
ANTI-ADHD	
Atomoxetine	***CYP2D6***
Clonidine	Multi-gene algorithm
Dextroamphetamine	Multi-gene algorithm
Guanfacine	Multi-gene algorithm
Lisdexamfetamine	Multi-gene algorithm
Methylphenidate	Multi-gene algorithm
Modafinil	Multi-gene algorithm
Viloxazine	***CYP2D6***
ANTI-DEMENTIA	
Donepezil	***CYP2D6***
ANTIDEPRESSANTS	
Agomelatine	Multi-gene algorithm
Amitriptyline	***CYP2C19, CYP2D6***
Bupropion	Multi-gene algorithm
Citalopram	***CYP2C19***
Clomipramine	***CYP2C19, CYP2D6***
Desipramine	***CYP2C19, CYP2D6***
Desvenlafaxine	Multi-gene algorithm
Dothiepin	Multi-gene algorithm
Doxepin	***CYP2D6***
Duloxetine	Multi-gene algorithm
Escitalopram	***CYP2C19***
Fluoxetine	Multi-gene algorithm
Fluvoxamine	***CYP2D6***
Imipramine	***CYP2C19, CYP2D6***
Levomilnacipran	Multi-gene algorithm
Mianserin	Multi-gene algorithm
Milnacipran	Multi-gene algorithm
Mirtazapine	Multi-gene algorithm
Moclobemide	Multi-gene algorithm
Nortriptyline	***CYP2D6***
Paroxetine	***CYP2D6***
Protriptyline	***CYP2D6***
Reboxetine	Multi-gene algorithm
Sertraline	***CYP2C19, CYP2B6***
Trazodone	Multi-gene algorithm
Trimipramine	***CYP2C19, CYP2D6***
Venlafaxine	***CYP2D6***
Vilazodone	Multi-gene algorithm
Vortioxetine	***CYP2D6***
ANTIPSYCHOTICS	
Amisulpride	Multi-gene algorithm
Aripiprazole	***CYP2D6***
Asenapine	Multi-gene algorithm
Brexpiprazole	***CYP2D6***
Cariprazine	Multi-gene algorithm
Chlorpromazine	Multi-gene algorithm
Clozapine	Multi-gene algorithm
Haloperidol	***CYP2D6***
Iloperidone	***CYP2D6***
Lurasidone	Multi-gene algorithm
Olanzapine	Multi-gene algorithm
Paliperidone	Multi-gene algorithm
Perphenazine	***CYP2D6***
Pimozide	***CYP2D6***
Quetiapine	***CYP3A4***
Risperidone	***CYP2D6***
Thioridazine	***CYP2C9***
Ziprasidone	Multi-gene algorithm
Zuclopenthixol	***CYP2D6***
ANXIOLYTICS & HYPNOTICS	
Alprazolam	Multi-gene algorithm
Bromazepam	Multi-gene algorithm
Buspirone	Multi-gene algorithm
Clobazam	***CYP2C19***
Clonazepam	Multi-gene algorithm
Diazepam	***CYP2C19***
Diphenhydramine	Multi-gene algorithm
Flunitrazepam	Multi-gene algorithm
Melatonin	Multi-gene algorithm
Midazolam	Multi-gene algorithm
Nitrazepam	Multi-gene algorithm
Propranolol	***CYP2D6***
Suvorexant	Multi-gene algorithm
Temazepam	Multi-gene algorithm
Zolpidem	Multi-gene algorithm
Zopiclone	Multi-gene algorithm
MOOD STABILISERS / ANTICONVULSANTS	
Brivaracetam	***CYP2C19***
Carbamazepine	Multi-gene algorithm
Lamotrigine	Multi-gene algorithm
Oxcarbazepine	Multi-gene algorithm
Perampanel	Multi-gene algorithm
Phenytoin	***CYP2C9***
Rufinamide	Multi-gene algorithm
Topiramate	Multi-gene algorithm
Valproic Acid	Multi-gene algorithm
OTHER PSYCHOTROPICS	
Amphetamine	***CYP2D6***
Bromocriptine	Multi-gene algorithm
Cabergoline	Multi-gene algorithm
Dapoxetine	Multi-gene algorithm
Deutetrabenazine	***CYP2D6***
Disulfiram	Multi-gene algorithm
Galantamine	***CYP2D6***
Naloxone	Multi-gene algorithm
Naltrexone	Multi-gene algorithm
Nicotine	Multi-gene algorithm
Rasagiline	Multi-gene algorithm
Ropinirole	Multi-gene algorithm
Rotigotine	Multi-gene algorithm
Selegiline	Multi-gene algorithm
NON-PSYCHOTROPICS (78)	
ANTIARRHYTHMICS	
Flecainide	***CYP2D6***
Propafenone	***CYP2D6***
ANTICOAGULANTS	
Acenocoumarol	***CYP2C9, VKORC1***
Warfarin	***CYP2C9, VKORC1***
ANTIDIABETIC	
Nateglinide	***CYP2C9***
ANTIFUNGALS	
Flucytosine	***DPYD***
Voriconazole	***CYP2C19***
ANTI-NAUSEA	
Dronabinol	***CYP2C9***
Metoclopramide	***CYP2D6***
Ondansetron	***CYP2D6***
Tropisetron	***CYP2D6***
ANTIPLATELET	
Clopidogrel	***CYP2C19***
ANTIVIRALS	
Atazanavir	***UGT1A1***
Dolutegravir	***UGT1A1***
Efavirenz	***CYP2B6***
Raltegravir	***UGT1A1***
BETA BLOCKERS	
Carvedilol	***CYP2D6***
Metoprolol	***CYP2D6***
Nebivolol	***CYP2D6***
IMMUNOSUPPRESSANTS	
Azathioprine	***TPMT, NUDT15***
Tacrolimus	***CYP3A5***
NSAIDs	
Celecoxib	***CYP2C9***
Flurbiprofen	***CYP2C9***
Ibuprofen	***CYP2C9***
Lornoxicam	***CYP2C9***
Meloxicam	***CYP2C9***
Piroxicam	***CYP2C9***
Tenoxicam	***CYP2C9***
ONCOLOGY/ANTINEOPLASTIC	
Belinostat	***UGT1A1***
Belzutifan	***CYP2C19***
Capecitabine	***DPYD***
Erdafitinib	***CYP2C9***
Fluorouracil	***DPYD***
Gefitinib	***CYP2D6***
Irinotecan	***UGT1A1***
Mercaptopurine	***TPMT, NUDT15***
Nilotinib	***UGT1A1***
Sacituzumab Govitecan	***UGT1A1***
Tamoxifen	***CYP2D6***
Tegafur	***DPYD***
Thioguanine	***TPMT, NUDT15***
OPIOID ANALGESIC	
Codeine	***CYP2D6***
Hydrocodone	***CYP2D6***
Oliceridine	***CYP2D6***
Tramadol	***CYP2D6***
PROTON PUMP INHIBITORS	
Dexlansoprazole	***CYP2C19***
Esomeprazole	***CYP2C19***
Lansoprazole	***CYP2C19***
Omeprazole	***CYP2C19***
Pantoprazole	***CYP2C19***
Rabeprazole	***CYP2C19***
STATINS	
Atorvastatin	***SLCO1B1***
Fluvastatin	***CYP2C9, SLCO1B1***
Lovastatin	***SLCO1B1***
Pitavastatin	***SLCO1B1***
Pravastatin	***SLCO1B1***
Rosuvastatin	***SLCO1B1, ABCG2***
Simvastatin	***SLCO1B1***
OTHERS	
Abrocitinib	***CYP2C19***
Allopurinol	***ABCG2***
Avatrombopag	***CYP2C9***
Carisoprodol	***CYP2C19***
Cevimeline	***CYP2D6***
Elagolix	***SLCO1B1***
Eliglustat	***CYP2D6***
Fesoterodine	***CYP2D6***
Flibanserin	***CYP2C19***
Lofexidine	***CYP2D6***
Mavacamten	***CYP2C19***
Meclizine	***CYP2D6***
Mirabegron	***CYP2D6***
Pazopanib	***UGT1A1***
Pitolisant	***CYP2D6***
Siponimod	***CYP2C9***
Tamsulosin	***CYP2D6***
Tetrabenazine	***CYP2D6***
Tolterodine	***CYP2D6***
Valbenazine	***CYP2D6***

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