AUSTRALIAN Clinicallabs

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PATHOLOGY *focus*

Medical Newsletter

season's greetings and HAPPY NEW YEAR!

Thank you from Clinical Labs!

As we reflect on another busy year, we want to express our gratitude for your trust in Clinical Labs. It has been a privilege to support you and your patients with our pathology services throughout 2024. We look forward to strengthening our partnership and remain dedicated to delivering excellence in pathology to enhance patient management and care.

We hope you've enjoyed the curated clinical articles in our editions of Pathology Focus, including "The Changing Landscape of STIs," "Bulk-Billed Genetic Carrier Screening: A Milestone for Preventative Medicine," and "Fatigue in Women: A Pathological Perspective." We look forward to bringing you more insightful articles from the world of pathology in 2025.

As the festive season approaches, we wish you joyful celebrations and cherished moments with loved ones, along with some well-deserved rest and relaxation. Here's to a successful New Year for you and your team!

RETHINKING STIS:

Recognising Systemic Manifestations in General Practice

By Dr Stella Pendle, Dr Linda Dreyer, and Dr Sudha Pottumarthy-Boddu

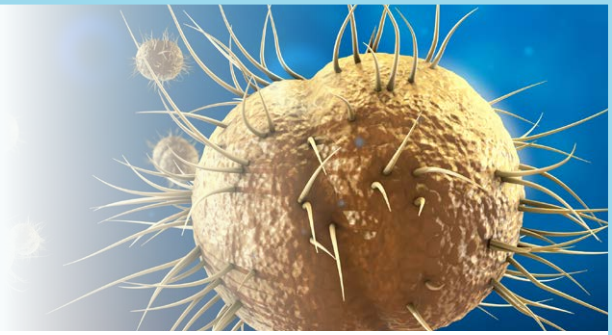
Clinical Labs
STI CASE STUDY
Special

Sexually transmitted infections (STIs) often present with classic symptoms localised to the genital area; however, they can also manifest in unexpected ways, affecting various non-genital sites. The following Clinical Labs case studies highlight the importance of clinicians remaining alert to the systemic (non-genital) manifestations of STIs, particularly in high-risk populations. As STIs continue to evolve and present atypically, healthcare providers must adapt their diagnostic approaches to ensure timely recognition and treatment.

Clinical Labs
STI CASE STUDY

An Unlikely Site for a Gonococcal Infection

By Dr Stella Pendle



Case Report:

A sexually active homosexual man presented to his doctor complaining of discomfort in the right nipple. A purulent discharge was noted from a nipple piercing which had been in place for several months. Prior to this, the patient had not experienced any symptoms.

The patient was previously well and presented to his doctor for routine testing every 3 to 6 months. Nucleic acid testing (NAT) for gonorrhoea and chlamydia on urine and anal swabs were negative, as was a routine throat culture for gonorrhoea.

Laboratory Findings:

A wound swab collected from the discharging skin site grew a scanty, pure growth of *Neisseria gonorrhoeae* (NG). A review of the Gram stain showed the presence of scanty Gram-negative intracellular diplococci resembling *Neisseria gonorrhoeae*.

The patient was recalled for further investigation and treatment. Additional NAT testing revealed the presence of NG in a throat swab, but urine and rectal swabs were negative. The patient denied any throat symptoms, and a throat examination was normal. He was treated with ceftriaxone and azithromycin.

Follow-Up:

The patient returned for follow-up a few days later, reporting complete resolution of the nipple symptoms. He provided additional clinical history involving a casual male sex partner two weeks prior, with both oral-oral and oral-nipple contact, but denied contact with ejaculate.

In this case, transmission could have occurred through direct oral-to-nipple contact, or it could have been autoinoculation from the patient's own saliva. Saliva has been shown to remain infectious in untreated patients for 2 weeks or longer.[1] Transmission to other body sites via saliva should also be considered in high-risk patients.

"Considering gonorrhoea transmission at extra-genital sites is important, particularly in high-risk patients."

Conclusion:

The case illustrates two important points: wounds can harbour gonorrhoea and should not be overlooked during testing, and saliva can serve as a transmission source for gonorrhoea through autoinoculation or direct contact. NG is a fastidious organism requiring special culture conditions and may not be detected by routine laboratory culture methods. It may easily be missed if not specifically requested. Untreated gonorrhoea may spread via the bloodstream to distant sites, including joints, causing much more serious systemic infection.

Considering gonorrhoea transmission at extra-genital sites is important, particularly in high-risk patients. Increasing proportions of infections are extra-genital in men who have sex with men, and the number is also rising in other groups.[2] In this instance, the low-grade asymptomatic infection in the throat might have gone undiagnosed. Gonorrhoea infection of the pharynx is often asymptomatic but remains infectious; the potential for transmission to others is high, especially when open wounds are present.

References

1. Chow, EP., *et al*., Detection of *Neisseria gonorrhoeae* in the pharynx and saliva: implications for gonorrhea transmission. *Sex Transm Infect*. 2016; 92: 347–9. doi:10.1136/sextrans-2015-052399.
2. Dukers-Muijrers, N., *et al*., What is needed to guide testing for anorectal and pharyngeal *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in women and men? Evidence and opinion. *BMC Infect Dis*. 2015; 15: 533–45. doi:10.1186/s12879-015-1280-6.

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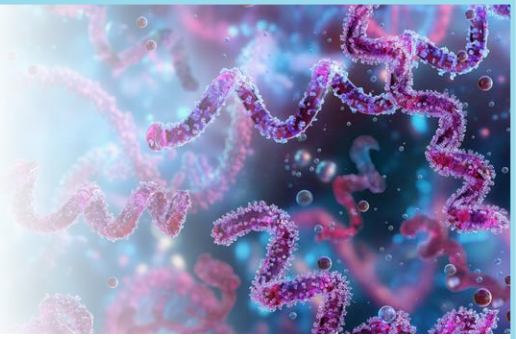
Dr Pendle has been working as a Clinical Microbiologist in Australia since 2005, when she obtained her fellowship of the Royal College of Pathologists of Australasia (FRCPA). In 2012, she joined Australian Clinical Labs (formerly Healthscope Pathology) as Supervising Pathologist in charge of the microbiology, infectious serology, and molecular diagnostics departments. Dr Pendle has special interests in general bacteriology, infectious serology, syphilis, and hepatitis. She has published several papers in her fields of interest, including VRE, chlamydial infections, and HIV. She actively participates in hospital infection control and promotes rational antibiotic prescribing. She is a member of the Australasian Society for Infectious Diseases and the Antimicrobial Society of Australia.

Clinical Labs
STI CASE STUDY

When a Rash Is More Than Just a Rash: Uncovering Secondary Syphilis

By Dr Linda Dreyer



Case Report:

A 54-year-old female presented to her general practitioner (GP) with a rash localised to her legs, which was initially diagnosed and treated as eczema. However, she returned the following day, reporting worsening of the rash. During her second visit, she was seen by a different GP who noted changes on her palms, prompting further investigation. Syphilis serology was requested, revealing a positive result with an RPR titre of 1:256 and reactive specific *Treponema pallidum* serology (EIA and TPPA).

Clinical Presentation:

Secondary syphilis typically occurs 4 to 10 weeks after the primary chancre resolves. It is characterised by systemic symptoms, including:

- **Rash:** The rash can be easily confused with guttate psoriasis, drug eruptions, or pityriasis rosea. It is often generalised, may present as copper-coloured spots, and can appear on the trunk and extremities, including palms and soles.
- **Mucous membrane lesions:** Painless mucous membrane lesions, known as mucous membrane pemphigoid, may occur.

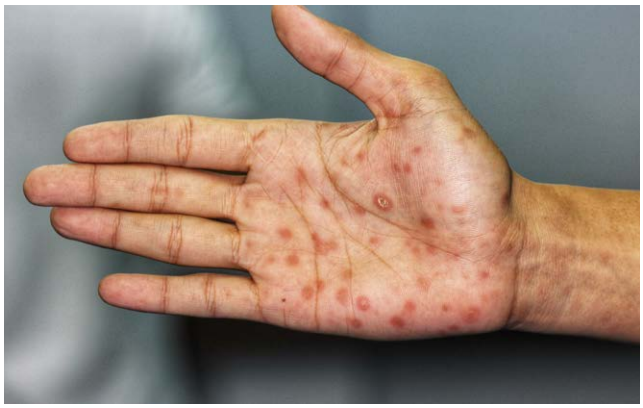


Image shows secondary stage syphilis rash spots on the palms of the hand.

- **Lymphadenopathy:** Swollen lymph nodes are commonly noted.
- **Other systemic signs:** Fever, malaise, and headache may also be present.

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Laboratory Findings:

Diagnosis is established through serological testing. Initial testing typically involves treponemal-specific antibody assays, such as EIA or CMIA. If these results are reactive, supplemental treponemal tests (e.g., TPPA/TPHA, FTA-ABS) are performed. Non-treponemal tests (e.g., RPR, VDRL) are then used to monitor treatment response and confirm active disease. In this case, the elevated RPR titre of 1:256 indicates active syphilis.

Treatment:

The recommended treatment for secondary syphilis is benzathine benzylpenicillin G, administered as two intramuscular injections of 1.2 million units (MU) each, totalling 2.4 MU. For patients with penicillin allergies, alternative regimens such as doxycycline may be used, although they are generally less effective.

Conclusion:

This case emphasises the need for vigilance when assessing atypical rashes, as syphilis can mimic other dermatological conditions. Given that secondary syphilis is highly infectious to both sexual partners and the foetus, prompt identification and treatment are essential to prevent complications associated with untreated syphilis.

References

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Workowski, K. A., & Bolan, G. A. (2015). Sexually Transmitted Diseases Treatment Guidelines, 2015. MMWR Recomm Rep, 64(RR-03), 1-137.

Young, H. H., & Peters, J. B. (2019). Clinical manifestations of syphilis. *American Family Physician*, 100(7), 426-433.

https://sti.guidelines.org.au/sexually-transmissible-infections/syphilis/

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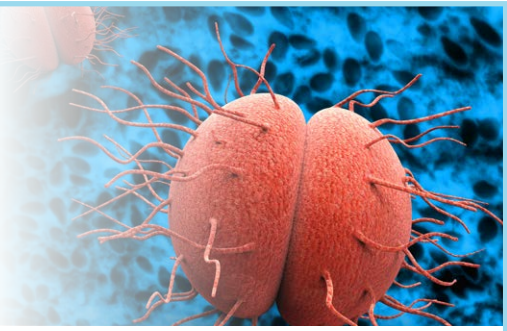
Dr Linda Dreyer completed her undergraduate studies in 1996, receiving a Bachelor's degree in Medicine and Surgery (MBChB) from the Faculty of Health Sciences, University of Pretoria, South Africa. Following four years of clinical practice as a Medical Officer in the Department of Family Medicine, she commenced specialisation in 2000. She was appointed as Registrar in Clinical Virology at the University of Pretoria/Gauteng Province, where she worked for two years. In 2003, she was appointed as Senior Registrar in Microbiology. Dr Dreyer received her Master's degree in Clinical Microbiology (MMed (Path)) from the University of Pretoria in 2006. She worked as a consultant for the National Health Laboratory Services (NHLS) in Pretoria until January 2008. During her time at NHLS, she was involved in teaching medical students and microbiology registrars, and gave lectures to nursing staff, medical students, and specialists. She also sat on the Infection Control Committee and the Antimicrobial Stewardship Committee of the Pretoria Academic Hospital. In 2008, she came to Melbourne and joined Australian Clinical Labs (formerly Healthscope Pathology) as a Senior Registrar, and obtained Fellowship of The Royal College of Pathologists of Australasia (FRCPA) in 2010.

Clinical Labs
STI CASE STUDY

Gonococcal Ophthalmia Neonatorum: A Sight-Threatening Medical Emergency

By Dr Sudha Pottumarthy-Boddu



Case Report:

A five-day-old ill neonate presented to general practice with redness, purulent discharge, chemosis of the conjunctiva, and significant oedema of the right eyelid. The general practitioner swabbed the discharge and prescribed eye drops.

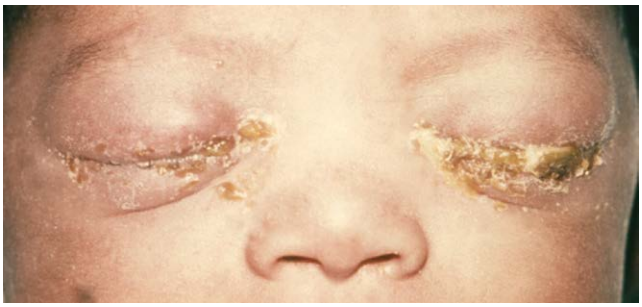


Image shows newborn with gonococcal ophthalmia neonatorum caused by a maternally transmitted gonococcal infection. Image credit: CDC/J. Pledger, Public Health Image Library (PHIL), #3766.

Laboratory Findings:

- **Gram stain**: Numerous leucocytes and Gram-negative diplococci.
- **Culture result:** Growth of *Neisseria gonorrhoeae*.
- **Susceptibility:** Resistant to penicillin and sensitive to ceftriaxone.

The culture result was immediately notified to the general practitioner and public health authorities, and the neonate received appropriate parenteral therapy at the Children's Hospital.

Understanding Ophthalmia Neonatorum:

Ophthalmia neonatorum, a conjunctivitis in the neonatal period, occurs in 1% to 12% of neonates.[1] However, the accurate incidence is unknown, as the notification of ophthalmia neonatorum as an entity is not universally mandated. Aseptic neonatal conjunctivitis (due to chemicals like silver nitrate) is unusual in present times. Septic neonatal conjunctivitis due to sexually transmitted bacteria, *C. trachomatis* and *N. gonorrhoeae*, is typically acquired during the birthing process, with *C. trachomatis* being the most common cause of neonatal conjunctivitis. The incidence of *C. trachomatis* neonatal conjunctivitis is markedly higher than that due to *N. gonorrhoeae* (US incidence: 8.2 versus 0.3 per 1,000 live births; over 20-fold higher).[1] Other bacterial and viral aetiological agents of neonatal conjunctivitis include *S. aureus, S. pneumoniae, H. influenzae, P. aeruginosa,* adenovirus, and herpes simplex virus.[1,2]

N. gonorrhoeae can infect the eye either directly or indirectly:

- **Vertical transmission** occurs during the passage of the infant though the birth canal if the mother is infected with genital *N. gonorrhoeae.*
- While less likely, transmission is still possible if the infant is delivered by caesarean section.
- **Auto-inoculation** from genital gonorrhoea to the eyes via fingers or fomites (eg., clothes, towels) contaminated with their genital secretions.
- **Contact** with contaminated fingers or fomites of another person who has conjunctival or genital gonorrhoea.

While gonococcal ophthalmia neonatorum is a relatively rare entity, up to half of infants (48%) born to mothers infected with *N. gonorrhoeae* develop the disease. It presents as an acute illness that manifests 3-5 days after birth, characterised by hyperacute conjunctivitis, marked lid oedema, chemosis, and purulent discharge. If neglected, this can lead to corneal ulceration, globe perforation, and vision loss within 24 hours. Furthermore, it may result in disseminated disease with meningitis, arthritis, and septicaemia.[3]

Conclusion:

Gonococcal ophthalmia neonatorum is becoming increasingly rare, thanks to the screening and treatment of gonococcal infection during pregnancy, along with the universal neonatal ocular prophylaxis. However, clinicians and microbiology laboratories must remain vigilant and employ methods to test, detect, and treat any outliers. Early detection and initiation of treatment are key to achieving a favourable outcome.

References

1. Ochoa, K.J.C. and Mendez, M.D. (2023) Ophthalmia neonatorum, StatPearls [Internet]. Available at: https://www.ncbi.nlm.nih.gov/books/NBK551572/ (Accessed: 09 October 2024).
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3. Gonococcal infections among neonates - STI treatment guidelines. (2022) Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/std/treatment-guidelines/gonorrhea-neonates.htm (Accessed: 09 October 2024).

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Dr Sudha Pottumarthy-Boddu comes to us from Houston, Texas, where she was Assistant Professor in the Department of Pathology and Laboratory Medicine at the University of Texas, School of Medicine. She was also the Technical Director of the Clinical Laboratory Services at the Houston Department of Health and Human Services. After graduating from medical school in India, Dr Pottumarthy-Boddu migrated to New Zealand and completed her Pathology/Microbiology Fellowship training with the Royal College of Pathologists of Australasia. She is a recipient of various awards and scholarships, including the Neil Prentice Memorial Prize of RCPA. She is also a Diplomate of the American Board of Medical Microbiology. Over the last 10 years she gained experience in various hospital, research, and public health laboratories in the US, publishing over 30 articles in peer-reviewed journals and presenting at various national and international conferences. Detection of the first USA isolate of Enterobacter spp. with NmcAcarbapenem hydrolyzing enzyme and establishing clinical significance of Nocardia verterana are noteworthy. Dr Pottumarthy-Boddu's main research interests are antimicrobial susceptibility trends and molecular methods in the diagnosis of infectious diseases.

How to Order STI Testing with Clinical Labs

What to include on the request form:
Complete the Clinical Labs General Pathology Request Form, listing the required tests. If ordering a standard STI screen (including Gonorrhoea, Chlamydia, Syphilis, HIV, Hepatitis B, and Hepatitis C), please specify '*STI Screen*' in the Clinical Notes section.

Clinical notes recommendation:
Please provide adequate clinical details, including STI risk factors (if relevant), to assist with the processing of the samples and interpretation of results in our microbiology laboratory.

Specimens required:

- Urethral swabs, first-pass urine (FPU), and vaginal/endocervical swabs.
  Note: Vaginal/endocervical swabs are more sensitive than FPU samples in female patients.
- Serology for HIV, syphilis, Hepatitis B, and Hepatitis C.
- Lesions (skin, rectal, or pharyngeal): Collect 2 dry swabs from each site and request HSV, syphilis, and mpox PCR.

Test cost:
Bulk-billed, subject to Medicare eligibility criteria.

Further STI Testing Resources

To read the article, "The Changing Landscape of STIs" from the March 2024 edition of Pathology Focus, written by Dr Stella Pendle, Dr Linda Dreyer, and Dr Sudha Pottumarthy-Boddu, visit our website or scan the QR code.

For detailed clinical information about chlamydia, gonorrhoea, and syphilis—including symptoms, testing recommendations, and treatment options— visit clinicallabs.com.au/sti-testing or scan the QR code.

Clinicians' Guide to Pharmacogenetic Testing at Clinical Labs

By Associate Professor Mirette Saad

Pharmacogenetics (PGx) and Personalised Patient Care

The incorporation of genetic information obtained from pharmacogenetic testing holds substantial promise for improving therapeutic decision-making through enhanced efficacy and reduced adverse events. Considerations for clinical implementation are crucial for patient health.

PGx Testing at Clinical Labs

Clinical Labs offers an extensive range of pharmacogenetic testing panels to provide clinicians and healthcare providers with important information to help determine the most appropriate treatment for each individual, particularly in areas such as mental health, pain management, cardiology, and oncology.

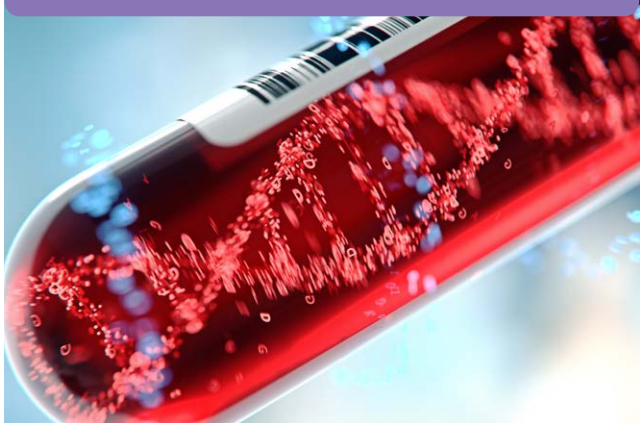
PGx Testing Recommended by Guidelines

Clinical pharmacotherapeutic guidelines, including the **Dutch Pharmacogenetics Working Group (DPWG)** and the **Clinical Pharmacogenetics Implementation Consortium (CPIC)**, have been implemented to assist in reducing healthcare costs associated with adverse drug events (ADEs) and poor responses to pharmacotherapy.

When to Order the Test

Physicians may order pharmacogenetic testing at the time of drug prescribing and dispensing for patients with genotypes that require action, such as dose reductions. The preemptive use of testing could significantly optimise drug outcomes and be particularly useful for patients undergoing multiple treatments or experiencing poor drug responses.

"Pharmacogenetic testing could be particularly useful for patients undergoing multiple treatments or experiencing poor drug responses."



The *Cytochrome P450 (CYP450)* and Differences in Drug Metabolism

A family of enzymes catalyses the metabolism of many drugs and xenobiotics. The genes that code for *cytochrome P450* enzymes are highly polymorphic, which can significantly affect drug metabolism in certain individuals and influence plasma levels of both the active drug and its metabolites. *CYP2D6, CYP2C19, CYP2C9*, and *SLCO1B1* variants are responsible for the metabolism of a large number of commonly prescribed medications (see Table 1).

The UDP-glucuronosyltransferase gene (UGT1A1) is involved in the metabolism of irinotecan-based chemotherapy, which is used in patients with advanced solid tumours, including colorectal and lung cancers.

Thiopurine methyltransferase (TPMT) is the primary enzyme responsible for the metabolism of thiopurine drugs (azathioprine, 6-mercaptopurine, and 6-thioguanine). It is recommended that physicians order *TPMT* genotyping before prescribing thiopurines to avoid bone marrow toxicity and subsequent neutropenia.

Mutations in the ***dihydropyrimidine dehydrogenase gene (DPYD)*** interfere with the breakdown of chemotherapeutic cancer drugs with structures similar to pyrimidines, such as 5-fluorouracil and capecitabine (see Table 1). As a result, these drugs can accumulate in the body, leading to severe reactions and neurological manifestations due to *DPYD* deficiency.

Genetic Variations Can Render Some Medications Ineffective or Toxic

Pharmacogenetic variants result in four distinct phenotypes: **Normal Metabolisers (NMs), Intermediate Metabolisers (IMs), Poor Metabolisers (PMs)**, and **Ultrarapid Metabolisers (UMs)**, which provide guidance for drug dosing and selection.

Overall, wild-type alleles and **normal metabolisers** are usually associated with functional enzyme-mediated metabolism. **Ultrarapid metabolisers** may not achieve therapeutic plasma levels due to decreased trough drug concentrations, whereas **poor metabolisers** treated with drugs that are metabolised by these enzymes are at increased risk for prolonged therapeutic effects or toxicity due to elevated trough levels of therapeutic drugs.

Table 1: List of Genes Tested and Examples of Drug Metabolised

Medication	Gene(s)
Cardiology	
Carvedilol	*CYP2D6*
Clopidogrel	*CYP2C19*
Flecainide	*CYP2D6*
Metoprolol	*CYP2D6*
Warfarin	*VKORC1, CYP2C9*
Lipid Lowering Medication	
Atorvastatin	*SLCO1B1, CYP3A4*
Fluvastatin	*SLCO1B1, CYP2C9*
Lovastatin	*SLCO1B1*
Pitavastatin	*SLCO1B1*
Pravastatin	*SLCO1B1*
Rosuvastatin	*SLCO1B1*
Simvastatin	*SLCO1B1*
Gastroenterology	
Anti-Emetic	
Metoclopramide	*CYP2D6*
Ondansetron	*CYP2D6*
Tropisetron	*CYP2D6*
Proton Pump Inhibitors	
Esomeprazole	*CYP2C19*
Lansoprazole	*CYP2C19*
Omeprazole (Losec)	*CYP2C19*
Pantoprazole	*CYP2C19*
Rabeprazole	*CYP2C19*
Mental Health	
Anti-ADHD	
Atomoxetine	*CYP2D6*
Dextroamphetamine	*CYP2D6*
Lisdexamfetamine	*CYP2D6*
Anti-Depressants (MOAs)	
Moclobemide	*CYP2C19*
Anti-Depressants (SNRIs)	
Venlafaxine	*CYP2D6*
Anti-Depressants (SSRIs)	
Citalopram	*CYP2C19*
Escitalopram	*CYP2C19*
Fluoxetine (Prozac)	*CYP2D6*
Fluvoxamine	*CYP2D6*
Paroxetine	*CYP2D6*
Sertraline (Zoloft)	*CYP2C19*

Medication	Gene(s)
Mental Health	
Anti-Depressants (TCAs)	
Amitriptyline	*CYP2D6, CYP2C19*
Clomipramine	*CYP2D6, CYP2C19*
Desipramine	*CYP2D6, CYP2C19*
Dosulepin	*CYP2D6, CYP2C19*
Doxepin	*CYP2D6, CYP2C19*
Imipramine	*CYP2D6, CYP2C19*
Nortriptyline	*CYP2D6*
Trimipramine	*CYP2C19*
Anti-Depressants (Other)	
Vortioxetine	*CYP2D6*
Anti-Psychotics	
Aripiprazole	*CYP2D6*
Brexpiprazole	*CYP2D6*
Chlorpromazine	*CYP2D6*
Haloperidol	*CYP2D6*
Olanzapine	*CYP1A2*
Quetiapine	*CYP3A4*
Risperidone	*CYP2D6*
Zuclopenthixol	*CYP2D6*
Benzodiazepines (Anxiolytics)	
Clobazam	*CYP2C19*
Diazepam (Valium)	*CYP2C19*
Neurology	
Anti-Dementia	
Donepezil	*CYP2D6*
Galantamine	*CYP2D6*
Anti-Epileptics	
Phenytoin/ Fosphenytoin	*CYP2C9*
Multiple Sclerosis	
Siponimod	*CYP2C9*

Medication	Gene(s)
Oncology	
Atazanavir	*UGTA1*
Azathioprine	*TPMT*
Belinostat	*UGTA1*
Binimetinib	*UGTA1*
Capecitabine	*DPYD*
Cisplatin	*TPMT*
Gefitinib	*CYP2D6*
Irinotecan	*UGTA1*
Mercaptopurine	*TPMT*
Nilotinib	*UGTA1*
Pazopanib	*UGTA1*
Tamoxifen	*CYP2D6*
Tegafur	*DPYD*
Thioguanine	*TPMT*
5-Fluorouracil	*DPYD*
Organ Transplant	
Tacrolimus	*CYP3A5*
Pain Management	
NSAIDs	
Celecoxib	*CYP2C9*
Flurbiprofen	*CYP2C9*
Ibuprofen	*CYP2C9*
Piroxicam	*CYP2C9*
Meloxicam	*CYP2C9*
Opioids	
Codeine (prodrug)	*CYP2D6*
Dihydrocodeine	*CYP2D6*
Tramadol	*CYP2D6*
Urology	
Darifenacin	*CYP2D6*
Mirabegron	*CYP2D6*
Tamsulosin	*CYP2D6*
Tolterodine	*CYP2D6*
Anti-Fungal	
Voriconazol	*CYP2C19*

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Pharmacogenetic (PGx) Test List at Clinical Labs

Our range of pharmacogenetic tests can detect polymorphisms in genes coding for drug-metabolising enzymes that predispose individuals to metabolising drugs inadequately.

Gene Panels Offered:

- ***Cytochrome P450* Comprehensive Gene Panel Including***: *CYP2D6, CYP2C9, CYP2C19, CYP3A4, CYP3A5, CYP1A2, SLCO1B1,* and *VKORC1*.

Other Smaller PGx Genotyping Panels:

- **Statins Predictor:** *SLCO1B1*
- **Warfarin Panel:** *CYP2C9* and *VKORC1*
- **Organ Transplant (Tacrolimus Immunosuppressant) PGx:** *CYP3A5*
- **PPIs PGx:** *CYP2C19*
- **Tamoxifen PGx:** *CYP2D6*
- **Clopidogrel PGx:** *CYP2C19*
- **Voriconazole Predictor:** *CYP2C19*
- **Anti-Psychotics Predictor:** *CYP2D6*
- **Anti-Depressants Predictor:** *CYP2D6* and *CYP2C19*

Single Gene Tests:

- *TPMT*
- *DPYD*
- *UGT1A1*

*Please note that the *Cytochrome P450* Panel genes can be ordered separately or together (*CYP2D6, CYP2C9, CYP2C19, CYP3A4, CYP3A5, CYP1A2, SLCO1B1*, and *VKORC1*).

How to Order Pharmacogenetic Testing with Clinical Labs

When to Order:
Before commencing therapy, in cases of adverse reactions, or resistance.

How to Order:
Fill out our routine Clinical Labs testing request form, listing the gene required or group of genes, and include prescribed medications if available.

Turnaround Time:
Results will be available within 7-10 business days from the sample receipt date.

Specimen Required:
2 x EDTA blood samples.

Report:
You will receive an individual report indicating the genotype and predicted phenotypes of the ordered gene(s), including the metaboliser status and guideline recommendations, where applicable (*Comprehensive reports are only provided with the comprehensive panel order).

Test Cost:
Apart from the *TPMT* gene, *CYP450* Variants are non-Medicare rebatable (an out-of-pocket fee applies). Please visit clinicallabs.com.au/pharmacogenetictesting for current pricing.

References

Guidelines – CPIC (cpicpgx.org).
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Understanding BNP Testing: A Key Tool in Diagnosing Heart Failure

By Dr David Deam

New Medicare Item for BNP Testing

A significant new MBS item for the diagnosis of heart failure was introduced on 1 November 2024. This new item broadens the range of clinical situations in which BNP or NT-proBNP testing can be ordered, going beyond the existing item numbers that are limited to specific conditions or settings (see below).

- **66829:** Quantitation of BNP or NT-proBNP for the exclusion of a diagnosis of heart failure in a patient presenting in a non-hospital setting to assist in decision-making regarding the clinical necessity of an echocardiogram, where heart failure is suspected based on signs and symptoms but diagnosis is uncertain. *Applicable once in any 12-month period*.

NEW MBS Item *Available*

Clinical Utility of BNP Testing

B-type natriuretic peptides (BNP) are primarily synthesised and released by the heart's ventricles in response to ventricular stretch and pressure overload, reflecting myocardial wall tension. This makes BNP an important biomarker for the diagnosis, evaluation, and management of heart failure. It is particularly useful for distinguishing heart failure from other causes of dyspnoea.

Laboratory Diagnostics

Two forms of the test are available: BNP and N-terminal proBNP (NT-proBNP). The precursor protein, ProBNP, is cleaved into BNP and the inactive NT-proBNP.

Elevated levels of BNP or NT-proBNP correlate with the severity of heart failure and may indicate the need for further diagnostic evaluation. NT-proBNP is stable for 3 days in serum and is typically analysed in central laboratories. In contrast, BNP is often used as a point-of-care test.

In our laboratories, an NT-proBNP level of less than 125 ng/L makes a diagnosis of congestive heart failure unlikely.

Additional MBS Items

Several other MBS items are available for BNP or NT-proBNP testing in the diagnosis of heart failure, each with specific restrictions:

- **66830:** Quantitation of BNP or NT-proBNP for the diagnosis of heart failure in patients presenting with dyspnoea to a hospital Emergency Department. This test is available up to six times within a 12-month period.
- **66585:** Quantification of laboratory-based BNP or NT-proBNP testing in a patient with systemic sclerosis (scleroderma) to assess the risk of pulmonary arterial hypertension, with a maximum of two tests in a 12-month period.
- **66586:** Quantification of BNP or NT-proBNP testing in a patient with diagnosed pulmonary arterial hypertension to monitor for disease progression, applicable up to four times in any 12-month period.

How to Order BNP Testing with Clinical Labs

What to Write on the Request Form:
Use the Clinical Labs general pathology request form to order NT-proBNP.

Important Clinical Notes Requirement:
In the Clinical Notes section, please specify the reasons the patient requires the test to meet Medicare eligibility criteria. *If the patient does not meet the eligibility criteria, they will receive an invoice for payment*.

Test Cost:
The test is bulk-billed, subject to Medicare eligibility criteria. *If the patient does not meet the MBS criteria or exceeds the testing allowance for each item, the test can still be ordered, but the patient will receive a bill for the test*.

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