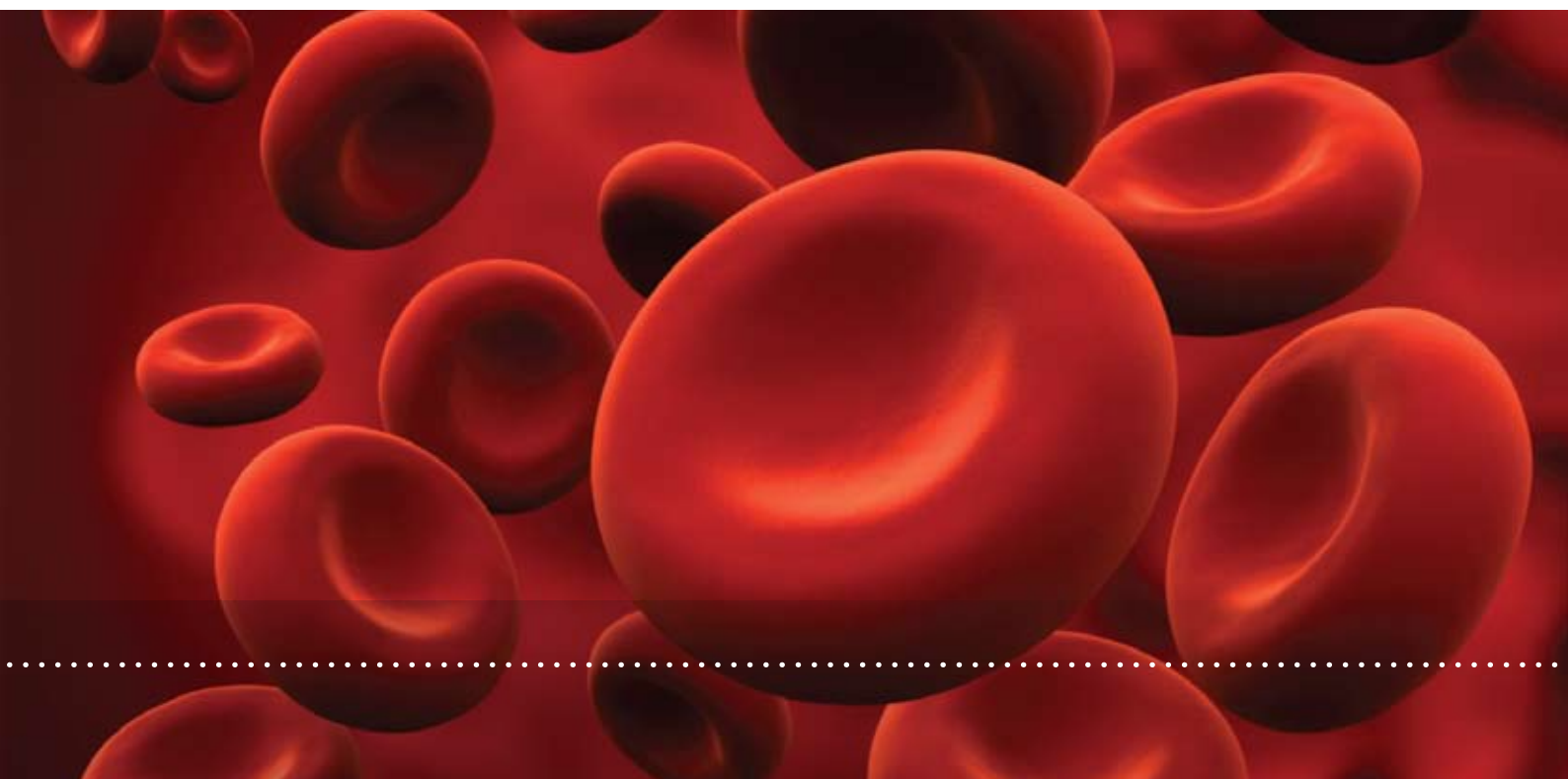


- > Diagnostic Work Up of Polycythaemia/Erythrocytosis in Adults by Dr Naadir Gutta
- > HPV Testing on BD SurePath™ Samples by Dr Jason Stone, Consultant Cytopathologist and Histopathologist
- > Warfarin Clinic Christmas Hours



Diagnostic Work Up of Polycythaemia/Erythrocytosis in Adults

Dr Naadir Gutta

A diagnosis of polycythaemia or erythrocytosis is made when a persistently, abnormally elevated haemoglobin concentration (Hb), haematocrit percentage (Hct) or red cell count (RCC) is detected on peripheral full blood count analysis. Erythrocytosis is not an uncommon problem in the adult general practice patient population. Identifying the cause of erythrocytosis is vital as this affects both patient management and prognosis. High haematocrit levels, particularly in Polycythaemia Vera (PV) have been implicated as a risk factor for thromboembolic disease.

Regulation of erythropoiesis

Red cell production occurs primarily in the bone marrow and is tightly regulated by homeostatic mechanisms to maintain an appropriate red cell count. Under normal physiological conditions, approximately 1×10^{10} red cells are released into the circulation hourly to maintain steady oxygen carrying capacity. Production can however be rapidly increased at times of blood loss or haemolysis.

Erythropoiesis begins with pluripotent stem cell differentiation into erythroid precursors. This process is controlled by a number of haemopoietic growth factors including interleukin-3, Granulocyte-macrophage colony stimulating factor (GM-CSF) and steel factor.

Erythropoietin (EPO) is a haemopoietic growth factor that is essential in terminal maturation of erythrocyte precursors to mature erythrocytes. In the foetus, EPO is produced primarily in the liver, while in adults, the kidneys are the primary production site of EPO. Tissue hypoxia is a potent stimulant for erythropoietin production. When significant bleeding, haemolysis or hypoxia is present, EPO gene transcription is up regulated and increased numbers of erythrocytes are released from the marrow into the circulation to compensate for the decreased tissue oxygen delivery.

Identifying the cause of erythrocytosis

The causes of erythrocytosis may either be due to a true increase in the red cell mass (RCM) or an apparent 'increase' due to decreased plasma volume. Thus, the causes of erythrocytosis can largely be divided into relative or absolute erythrocytosis.

1. Relative erythrocytosis

Because the blood cell parameters are expressed as a concentration of plasma volume, an elevated Hb, Hct or RCC can be detected because of decreased plasma volume. This is also known as Gaisbock syndrome, spurious erythrocytosis, apparent erythrocytosis or stress erythrocytosis. Other biochemical features suggesting low intravascular volume (e.g., elevated urea, creatinine, electrolytes, etc.) are usually also present. Relative erythrocytosis should be considered particularly in patients on diuretic therapy or with clinical or biochemical signs of dehydration. Long-term alcohol abuse can result in chronic dehydration and a relative erythrocytosis as well.

2. Absolute erythrocytosis

Absolute erythrocytosis is also known as true erythrocytosis. In absolute erythrocytosis, there is an increase in the red cell mass (RCM) which is independent of the plasma volume. Absolute erythrocytosis can be divided into primary and secondary erythrocytosis.

With an increase in RCM more body iron reserves are held in the red cell compartment and tissue iron may reduce leading to iron depleted parameters in the iron studies assay.

Primary erythrocytosis

With primary erythrocytosis (most commonly Polycythaemia Vera (PV)), the increased RCM is independent of EPO levels and is usually due to an acquired genetic mutation that results in EPO independent erythropoiesis. PV is a myeloproliferative disorder involving the haemopoietic stem cell and results in increased phenotypically normal red cells with or without an increase in other haematological cell lines (white cells and platelets).

PV was first described 1892 by the French researcher Vaquez and was formally recognised as a disease in 1903. By 1950, a strong association with thrombotic complications and progression to myelofibrosis and acute myeloid leukaemia was clearly documented and well-recognised. Without prompt recognition and cytoreductive therapy life expectancy was shown to be 18 months after diagnosis, with most patients succumbing through thrombotic complications. Thus, recognition of PV with appropriate early referral and prompt initiation of therapy is imperative.

While there is a history of an arterial or venous thrombosis in almost 20% of newly diagnosed patients, presenting symptoms may be subtle. These include headaches, visual disturbances, gout, dizziness and pruritus. Patients can be completely asymptomatic and are diagnosed after routine blood tests. In established PV, it is not unusual to detect clinically apparent plethora, splenomegaly (70%) and hepatomegaly (40%). Unusual unexplained abdominal thrombosis such as mesenteric, portal or splenic vein thrombosis should alert one the possibility of underlying PV as the cause. It is important to note that this may occur in the pre-polycythaemic phase (prior to the development of peripheral blood erythrocytosis).

Diagnosis traditionally involved exclusion of a secondary cause of erythrocytosis and demonstration of an EPO independent increase in red cell mass. Erythropoietin levels however may often be equivocal and poorly reproducible making levels difficult to interpret. Thus in many cases, a clear division between PV and secondary erythrocytosis was difficult. In addition to EPO testing, invasive and labour intensive tests such as red cell mass testing, bone marrow sampling with the demonstration of spontaneous erythroid colonies were often required to differentiate between primary and secondary erythrocytosis.

In 2005, the discovery of the Janus kinase 2 V617F (JAK 2) mutation in patients with myeloproliferative disorders and the later discovery of related mutations (JAK 2 exon 12 and MPL mutation) changed diagnostic testing for these disorders significantly. It has been demonstrated that the JAK2 V617F mutation is present in most (>95%) of patients with PV. Additionally, the JAK 2 exon 12 and MPL mutations are likely present in almost all JAK2 V617F negative PV patients.

Protein structure of Janus Kinase 2

(Wikicommons)



The Janus kinase genes are essential for development of both lymphoid (lymphocytes) and myeloid cell lines (granulocytes, platelets and erythrocytes). The Janus kinase genes were named after the ancient Roman god Janus who was believed to have two identical faces. This was because of the JAK's two symmetrical kinase like domains.

Most current guidelines would suggest both EPO measurement and JAK2 V617F mutation testing as initial investigations when PV is suspected. JAK2 V617F (with both JAK2 exon 12 and MPL) mutations can be tested for on peripheral blood. Red cell mass analysis, bone marrow sampling and the demonstration of spontaneous erythroid colonies are not required for a diagnosis in most cases. Though not required for diagnosis in most cases, a baseline bone marrow biopsy with prognostic cytogenetic analysis is highly recommended.

Treatment of PV is best done in consultation with a clinical haematologist. The primary goal of therapy involves reversing the hypercoagulable state through reduction of the RCM. Principles involve venesection to render patients iron deficient to blunt erythrocytosis. It is important NOT to treat this iron deficiency, unless overzealous venesectioning leads to actual iron deficient Anaemia. Cytoreductive therapy such as hydroxyurea can also be used, particularly if there is a co-existent thrombocytosis or leukocytosis. Antiplatelet therapy (aspirin) is commonly used as an adjunct in therapy.

Monitoring for signs of myelofibrosis (splenomegaly, cytopenias, and the presence of early myeloid cells on the peripheral blood film) needs to be carried out routinely on all patients with PV. Transformation to acute myeloid leukaemia can develop in a patient with PV and carries a poor prognosis. This should be suspected if a patient develops unexplained fevers and cytopenias with or without blasts present in peripheral blood. Cytoreductive therapy from agents such as hydroxyurea may also cause cytopenias and dose adjustments are commonly required, particularly in the early phase of therapy.

Secondary erythrocytosis

In secondary erythrocytosis, there is an increased RCM which is usually because of increased EPO secretion. The increased EPO secretion is usually physiological and secondary to tissue hypoxia. The increased oxygen carrying capacity generated by an increased RCM is thus compensatory to low oxygen delivery. This physiological increase in red cells is often seen in heavy smokers, cyanotic heart disease, chronic obstructive and restrictive airway disease and obstructive sleep apnoea (see Table 1).

Table 1: Causes of secondary polycythaemia

Physiological increase in EPO	Inappropriate increase in EPO
Chronic obstructive pulmonary disease	Renal cell carcinoma
Cyanotic heart disease	Haemangioblastoma
Obstructive sleep apnoea	Hepatocellular carcinoma
Restrictive lung disease (e.g., obesity)	Uterine fibroids
Carbon monoxide poisoning (e.g., smoking)	Cerebellar tumours

EPO can also be increased as part of a paraneoplastic effect. Certain tumours such as renal cell carcinoma and hepatocellular carcinoma (see Table 1) are capable of secreting EPO and resulting in secondary erythrocytosis. Uterine myomata (fibroids) have also been associated with secondary erythrocytosis. In these cases, the EPO secretion is inappropriate as it is not stimulated by physiological mechanisms.

In secondary erythrocytosis not due to a paraneoplastic effect, there may be evidence of tissue hypoxia and often a clear underlying medical condition. Symptoms and signs present may include fatigue, dyspnoea and cyanosis in the presence of plethora. Pulse oximetry and arterial blood gas analysis are important tools when secondary polycythaemia is suspected. In most respiratory and cardiovascular disorders, oxygen saturations are often low and arterial blood gas analysis would be consistent with hypoxia. The presence of carbon monoxide in the blood of exposed patients (such as smokers) can cause a false normal peripheral oxygen saturation result. A period of smoking abstinence prior to pulse oximetry or greater reliance on arterial blood gas sampling (noting PaO₂ and carboxyhaemoglobin) would be required in these cases. Obstructive sleep apnoea patients may have normal pulse oximetry and arterial blood gas testing during the day as their hypoxic episodes occur only nocturnally. In non-paraneoplastic secondary erythrocytosis, EPO levels are often, but not always elevated and JAK-2 mutation testing is negative.

Further investigations must be directed to identify the suspected cause. A chest x-ray and echocardiogram may be warranted if a cardiovascular or respiratory cause is suspected. Overnight oximetry and a sleep study would be useful if obstructive sleep apnoea is suspected. In secondary erythrocytosis, where EPO levels are elevated without evidence of tissue hypoxia, screening for neoplasia is recommended. Assessing liver function and alpha fetoprotein may unmask an undiagnosed hepatocellular cancer. Microscopic haematuria may be present if an underlying renal cell cancer is suspected. Ultrasound or CT scanning may be helpful in diagnosing both malignancies and uterine myomata.

Treatment of secondary erythrocytosis is primarily directed at addressing the cause for the elevated EPO levels. This may involve optimising cardio-respiratory function and sometimes oxygen supplementation or nocturnal CPAP. When smoking is the cause, it is vital to encourage cessation. Paraneoplastic erythrocytosis is best managed by therapy directed at the underlying tumour.

The role of venesection in non-paraneoplastic secondary erythrocytosis remains controversial and needs to be individualised. Although erythrocytosis has been shown to increase thrombosis, venesection in certain instances can be detrimental. This is because in the increased red cell mass is due to a physiological response to tissue hypoxia and is compensatory to either cardiovascular or respiratory compromise. Decreasing the oxygen carrying capacity by venesection may worsen tissue hypoxia and cause cardio-respiratory decompensation.

Other causes of erythrocytosis to be considered

Androgen therapy is being used more frequently particularly in older men with clinical and biochemical hypogonadism. Females with osteoporosis may also be prescribed androgen therapy – though probably less so nowadays. One of the commonest reported adverse effects from exogenous testosterone replacement therapy is a rise in baseline haematocrit. The erythrocytosis is not EPO dependent and the exact cause remains poorly understood. Recent evidence points to androgen associated disruption of the iron regulatory protein system and particularly hepcidin suppression. Hepcidin is an iron regulatory peptide that is usually suppressed in iron deficient states. In its suppressed state, hepcidin interacts with ferroportin and increases iron absorption and systemic iron transport. This increased iron load is thought to drive erythropoiesis. Management may include adjusting the dose of testosterone with or without venesection.

In patients with high affinity haemoglobin mutations where, as the name implies, haemoglobin does not release oxygen readily at the tissue level, an EPO dependent erythrocytosis develops. In these patients, blood oxygenation is normal in the presence of tissue hypoxia. Many of these conditions are hereditary and a careful family history is important.

Particularly in high performance athletes, 'blood doping', erythropoietin self-injection and the use of androgens and anabolic steroids need to be considered as a rare cause of erythrocytosis. Exposure to low atmospheric oxygen levels can cause an EPO dependent erythrocytosis. This has been observed in patients after high altitude mountain climbs.

An apparent 'erythrocytosis' may also be present in adolescent males because of difficulties with reference ranges in this age group. As testosterone levels rise during male puberty, the mean haemoglobin levels also rise toward adult male values. An in-house analysis of haemoglobin levels at QML Pathology noted that the reference ranges used for young adolescent males (14-16 year olds) caused a number of patients to be flagged as 'polycythaemic' when the paediatric criteria was applied to them. A reference range of 125-165g/L is probably more appropriate for this adolescent group, than the 'paediatric' range now being used (115-155 g/L).

In a similar vein, patients may be incorrectly sexed due to ambiguous names or typographical entry errors resulting in a male patient being reported with a female reference range. This would lead to any Haemoglobin > 160 being flagged as 'polycythaemia', yet the level is within proper male parameters.



Stone carving of ancient Roman god, Janus. (Wikicommons)

Janus was thought to be the god of beginnings, transitions, end and time. He is two faced because he looks towards the future and the past.

Notes on some laboratory tests used during the work up of erythrocytosis

• Serum Erythropoietin assays

Serum erythropoietin assays can be helpful in distinguishing primary from secondary erythrocytosis. However, one should take care in interpreting EPO levels in isolation. EPO is released in response to tissue hypoxia and stimulates red cell production. Once tissue oxygenation is re-established by a compensatory increase in the red cell mass, the stimulus for increased EPO secretion is lost. This is why sometimes in secondary erythrocytosis, EPO levels can be normal or suppressed in the presence of an increased haemoglobin concentration.

• Mutation testing (JAK2 V617F/JAK2 exon 12 and MPL)

Mutation testing can be done on peripheral blood and is performed by PCR. While, JAK2 testing is very sensitive (>95%) for polycythaemia vera, JAK2 negative cases have been described.

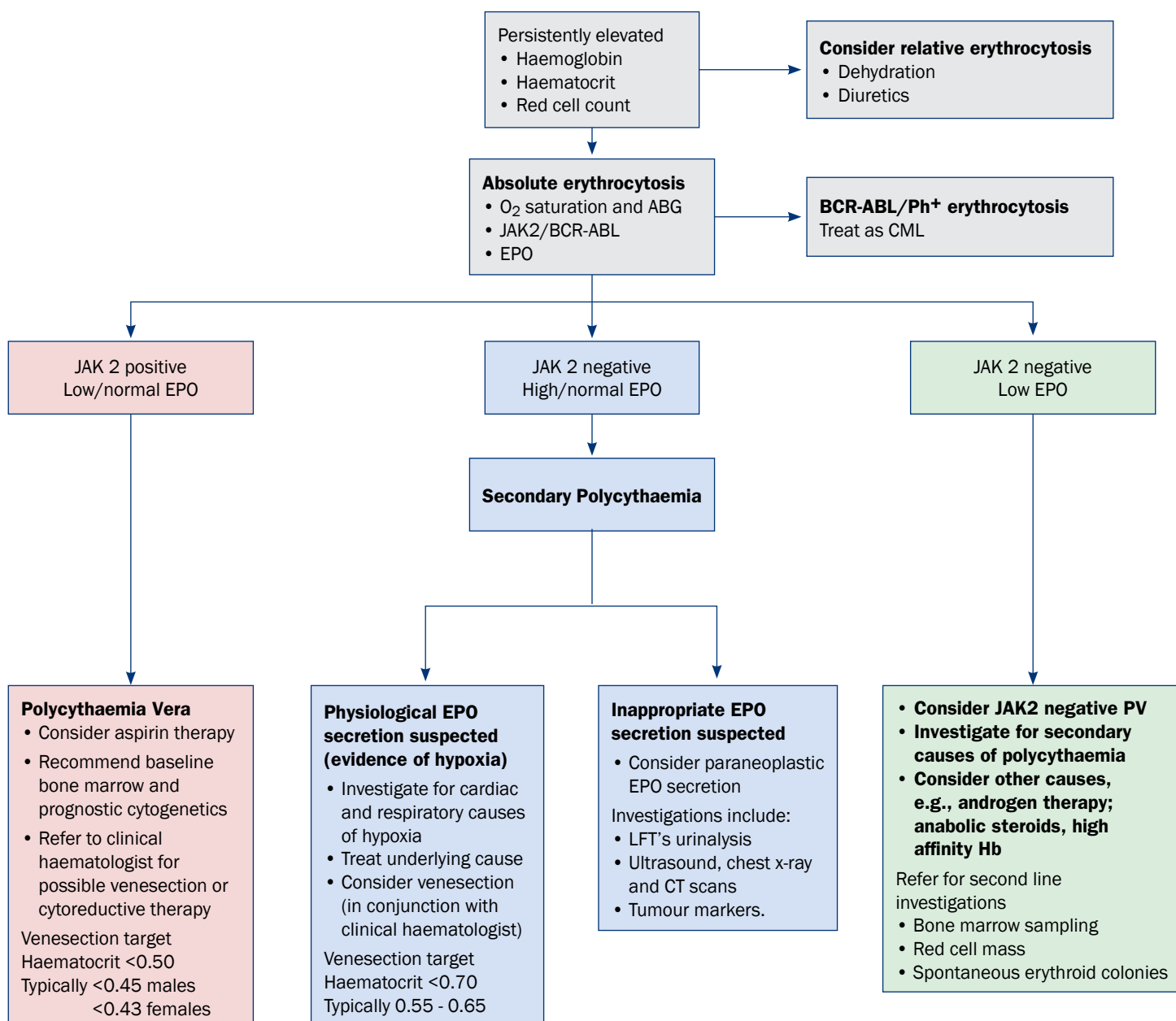
A Medicare rebate for JAK2 and MPL mutation testing is available in the diagnostic work up, by, or on behalf of, the specialist or consultant physician, of a patient with clinical and laboratory evidence of:

- polycythaemia vera; or
- essential thrombocythaemia;

• Arterial blood gas analysis

Arterial blood gas analysis can provide evidence of hypoxia and can help diagnose secondary erythrocytosis. It is particularly useful in patients who are exposed to carbon monoxide (e.g., smokers) where peripheral pulse oximetry can overestimate oxygen saturation. This is because the pulse oximeter measures both oxyhaemoglobin and carboxyhaemoglobin together.

SUGGESTED DIAGNOSTIC SCHEMA FOR PATIENTS PRESENTING WITH ERYTHROCYTOSIS



Summary and key points

- Erythrocytosis is not an uncommon finding in full blood count analysis. Untreated, it may result in thromboembolic morbidity and mortality.
- Erythrocytosis aetiology is best thought of in terms of EPO dependent (secondary) or EPO independent (primary) erythrocytosis.
- Causes of secondary erythrocytosis are often easily diagnosed from careful history, clinical examination and pulse oximetry.
- EPO assays can be difficult to interpret and should not be used in isolation to differentiate primary from secondary erythrocytosis.
- JAK2 V617F mutation testing with detect >95% of polycythaemia vera patients and can be done on peripheral blood.

References

1. McMullin, M. F. (2008). "The classification and diagnosis of erythrocytosis." *International Journal of Laboratory Haematology* 30: 447-449.
2. Tefferi, A. et al. (2005). "Polycythaemia Vera: Scientific Advances and Current Practice." *Seminars in Haematology* 42(5): 206-220.
3. Finazzi, G. et al. (2007). "How I treat patients with polycythaemia vera." *Blood* (109): 5104-5111.
4. McMullin, M. F. et al. (2005). "Guidelines for the diagnosis, investigation and management of polycythaemia/erythrocytosis." *British journal of haematology* (130): 174-195.
5. McMullin, M. F. et al. (2007). "Amendment to the guideline for diagnosis and investigation of polycythaemia/erythrocytosis." *British journal of haematology* (138): 812-823.
6. Tefferi, A. (2010). Diagnostic approach to the patient with polycythaemia. UpToDate. S. L. Schrier, Waltham, MA, UpToDate.
7. Tefferi, A. (2011). Diagnostic approach to the patient with suspected polycythaemia vera. UpToDate, S.L. Schrier, Waltham, MA, UpToDate.
8. Thiele, J. (2008). Polycythaemia Vera. WHO Classification of Tumours of Haemopoetic and Lymphoid Tissues. S. H. Swerdlow. Lyon, IARC.
9. Bachman, E. et al. (2010). "Testosterone suppresses Hepcidin in Men: A Potential Mechanism for Testosterone-Induced Erythrocytosis." *J Clin Endocrinol Metab.* 95(10): 4743-4747.

Profile

Dr Naadir Gutta

HAEMATOLOGY ADVANCED TRAINEE

Dr Naadir Gutta is a registrar undergoing training towards fellowships in both clinical haematology and laboratory haematology. He completed his physician training and first clinical year at the Princess Alexandra Hospital. He is currently undergoing laboratory training with QML Pathology. Naadir is the current national representative of joint trainees in Haematology.

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Haemochromatosis (HFE) Gene Mutation


QML Pathology has introduced a 'Patient Eligibility for Medicare Rebate: Haemochromatosis (HFE) Gene Mutation' form.

This form is designed to make it easier for doctors and patients for determining eligibility for Medicare rebate. To obtain a copy of this form, please contact Marketing Department on (07) 3121 4506 or your local branch Medical Liaison Officer, or download a copy from www.qml.com.au in the 'Latest News' section.

If you would prefer to receive the newsletter via email rather than hard copy, please send your details to info@qml.com.au or phone (07) 3121 4506.

HPV Testing on BD SurePath™ Samples

Dr Jason Stone, Consultant Cytopathologist and Histopathologist



In addition to cervical screening, BD SurePath™ can be used for HPV testing. All HPV tests on BD SurePath™ samples from Queensland are done by Hybrid Capture II technique through QML Pathology's sister laboratory Lavery Pathology (www.lavery.com.au).

The specific trade name of the test is the digene HPV test marketed by QIAGEN. It is a test that detects viral DNA and not RNA, and it is not PCR based.

Regarding the digene HPV test specifically:

- This is a tried and tested test that has been clinically validated in numerous multiple randomised trials including over 1 million women worldwide
- It has, to date, been used in the management of over 70 million women worldwide¹
- It has been included in over 350 publications in peer reviewed journals
- As such, it is the most clinically validated diagnostic test for HPV on the market.

The BD SurePath™/digene combination is well proven internationally:

- Very recent data from the UK on laboratories using the digene HPV test on both ThinPrep and BD SurePath™ samples showed no difference between the two collection media²
- A College of American Pathologists survey of 3296 laboratory results³ to HPV challenge tests found a 98.8% correct concordance among laboratories using the BD SurePath™/digene combination. A result that is comparable to the 99.6% of those using the ThinPrep/digene combination
- The use of BD SurePath™ samples for digene testing is also widespread throughout Europe and Canada
- There are many articles proving the validity of BD SurePath™ samples for digene testing.^{4, 5, 6, 7, 8, 9}

The use of the digene HPV test on BD SurePath™ samples is accredited in Australia:

- In Australia, The National Pathology Accreditation Advisory Council (NPAAC) states that where a laboratory uses a commercial test kit according to the manufacturer's instructions, the kit does not need to be independently revalidated in the testing laboratory
- The digene HPV test package insert gives specific instructions for use of the test with BD SurePath™ medium, indicating that the manufacturers (QIAGEN) are satisfied with the quality of tests done on BD SurePath™ medium. In fact, the package insert reads "BD SurePath™ Preservative Fluid is an appropriate alternative collection and transport medium for gynaecologic specimens tested with the digene HC2 High-Risk HPV DNA Test"
- Although ostensibly superfluous, QML Pathology's sister laboratory Laverty Pathology also performed a rigorous in-house validation of the digene test on BD SurePath™ samples, prior to implementation, with good results (unpublished data).

The BD SurePath™/digene combination has not yet got FDA approval in the USA – the application has already been submitted and approval is still pending. This bureaucratic stamp of approval remains the only 'box left to tick' regarding digene HPV test on BD SurePath™ samples.

Queensland clinicians using the BD SurePath™/digene combination for HPV testing should be reassured that it has already passed rigorous scientific trials in many countries, is widely used, internationally accepted, fully validated both in our laboratories and internationally and is based on sound scientific evidence.

Obviously, QML Pathology also performs the digene test on samples submitted in ThinPrep collection fluid or in the digene transport medium, which are all equally appropriate and effective.

References:

- 1) QIAGEN press release. Hilden, Germany, and Germantown, Maryland, May 8, 2011.
- 2) Kelly RS, Patnick J, Kitchener HC and Moss SM, on behalf of the NHSCSP HPV Special Interest Group. HPV testing as a triage for borderline or mild dyskaryosis on cervical cytology: results from the Sentinel Sites study British Journal of Cancer (2011) 105, 983–988. doi:10.1038/bjc.2011.326. Published online 6 September 2011.
- 3) Bentz JS. HPV testing – what and how the labs did in '08. CHPV Survey. May 2009 PAP/NGC Programs Review.
- 4) Ko V, Tambouret RH, Kuebler DL, Black-Schaffer WS, Wilbur DC. Human papillomavirus testing using hybrid capture II with SurePath collection: initial evaluation and longitudinal data provide clinical validation for this method. Cancer 2006 Dec 25;108(6):468-74.
- 5) Kuebler DL, Illingworth A, Blenc AM, Wilbur DC. A peer comparison program for the quality assurance of human papillomavirus DNA detection using the Digene Hybrid Capture II/ SurePath method shows excellent analytic interlaboratory correlation. Cancer Cytopathology 25 October 2007, Volume 111, Issue 5, 339–343.
- 6) Siddiqi A, Spataro M, McIntire H, Akhtar I, Baliga M, et al. Hybrid Capture 2 Human Papillomavirus DNA Testing for Women with Atypical Squamous Cells of Undetermined Significance Papinicolou Results in SurePath and ThinPrep Specimens. Cancer Cytopath 2009 Oct 25, 318-325.
- 7) Hardie A, Moore C, Patnick J, Cuschieri K, Graham C, et al. High-risk HPV detection in specimens collected in SurePath preservative fluid: comparison of ambient and refrigerated storage. Cytopathology Aug 2009, Vol 20, Issue 4, 235-241.
- 8) Zhao FH, Hu SY, Bian JJ, Liu B, Peck RB, et al. Comparison of ThinPrep and SurePath liquid-based cytology and subsequent human papillomavirus DNA testing in China. Cancer Cytopathol. 2011 Jul 19.
- 9) Nassar A, O'Reilly K, Cohen C, Siddiqui MT. Comparison of p16INK4A and Hybrid Capture 2 human papillomavirus testing as adjunctive tests in liquid-based gynaecologic SurePath preparations. Diagn Cytopathol 2008 Mar;36(3): 142-8.

Pathologist Profile



Dr Jason Stone MBChB FRCPath FRCPA

CONSULTANT HISTOPATHOLOGIST AND CYTOPATHOLOGIST

After graduating with a Bachelor of Medicine and Bachelor of Surgery in 1997 from the University of Cape Town, South Africa, where he received multiple academic prizes, Dr Jason Stone continued his internship and Orthopaedics SHO at Greys Hospital Pietermaritzburg South Africa.

In 2000, Dr Stone went to the UK and worked in the Department of Physiology and Histology at Bristol University. He commenced his histopathology training in Sheffield where he handled a wide range of general surgical specimens, including non-gynaecological cytopathology. Dr Stone joined Doncaster and Bassetlaw Hospital as a Consulting

Pathologist in 2006, and in 2010 moved to Australia and joined the QML Pathology Brisbane histology and cytology team.

In addition to his work at the Brisbane Laboratory, Dr Stone also oversees histology and cytology for the Mackay region.

Special Interests: Breast and gynaecological pathology and cytopathology.

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Email: drjason.stone@qml.com.au

Doctor's Noticeboard

The Doctor's Noticeboard is a free service for practitioners to advise changes to their practice. If you would like to place a notice, please email details to info@qml.com.au.

DR STEVEN FREDERIKSEN,

Orthopaedic Surgeon has moved his Spring Hill practice.

New contact details are:

Address: Suite 343, Level 5, St Andrew's Place
33 North Street, Spring Hill

Phone/Fax: (07) 3832 3203



DR SUE TAJI, Paediatric Dental Specialist wishes to advise colleagues of additional consulting locations at Annerley, Kenmore and the Wesley Medical Centre and continuation at the main Wickham Terrace Branch at Silverton Place.

Special interests include the management of dental trauma, early childhood decay, dental abscesses and infections as well as other aspects of paediatric oral health. Advanced dental care is provided for infants, children, teenagers and those with special care needs either under local anaesthesia at the Wickham Terrace or Kenmore surgeries or under general anaesthesia at St Andrew's War Memorial Hospital.

Enquiries regarding referrals and appointments can be directed to:

Ground Floor, Silverton Place,
Suite 12, 101 Wickham Terrace, Brisbane Qld 4000

Phone: (07) 3839 8000 or (07) 3720 0200

Fax: (07) 3720 0400

Web: www.qdg4kids.com.au

DR DANIEL VARGHESE, Consultant Psychiatrist, is pleased to announce he has expanded his practice at Suite 55, Level 5, 101 Silverton Place and is currently accepting new referrals.

Dr Varghese has been a staff psychiatrist at Princess Alexandra Hospital for the last 4 years and also has admitting rights to Toowong Private Hospital.

He is an active fellow of the Royal Australian and New Zealand College of Psychiatrists, currently holding the position of Chair of the Queensland Branch of the RANZCP as well as being active in the teaching and assessment of registrars and medical students.

His interests are in pharmacotherapy and psychotherapy for anxiety and depressive disorders in adults and he also has considerable experience in the diagnosis and management of psychotic disorders.

Referrals can be made by phone, fax or mail.

Phone: (07) 3839 5152

Fax: (07) 3832 0428

Email: daniel@varghesepsychiatric.com.au



Collection Centre Updates

NEW COLLECTION CENTRES

BROADBEACH WATERS (07) 5570 3589

Shop 8, 10 Monaco St

Opening Hours:

Tue & Thu: 7.30am – 10.00am

CLERMONT (07) 4983 1801

24 Francis St

Opening Hours:

Mon, Tue & Wed: 8.00am – 11.00am

KIRRA (07) 5599 3975

Shop 8, 32 Musgrave St

Opening Hours:

Mon – Fri: 8.30am – 10.30am

KIRWAN (07) 4723 1296

40 Thuringowa Dr

Opening Hours:

Mon – Fri: 8.00am – 12.30pm,
1.00pm – 3.00pm

ROSSLEA (07) 4728 9193

112 Bowen Rd

Opening Hours:

Tue & Thu: 9.00am – 1.00pm

SOUTHPORT 0434 076 620

Ferry Road Shopping Centre

Cnr Cotlew St East and Ferry Rd

Opening Hours:

Mon, Wed & Fri: 8.00am – 10.00am

RELOCATED COLLECTION CENTRES

BENOWA (07) 5539 6755

Pindara Private Hospital

Suite 1.05

Pindara Specialist Centre

29 Carrara St

Opening Hours:

Mon – Fri: 7.30am – 4.30pm

MONTO (07) 4166 1212

35 Flinders St

Opening Hours:

Tue & Thu: 9.00am – 12.00pm

Season's Greetings

The Pathologists and staff at QML Pathology would like to wish you peace, joy and happiness throughout this festive season.



Warfarin

Dosing Over Christmas

QML Pathology wishes to advise that over the upcoming Christmas period, the QML Pathology Warfarin Care Clinic will be closed. Please note that NO NEW REGISTRATIONS will be taken from 5.00pm on Wednesday, 14 December 2011, with the registration line re-opening at 7.00am on Tuesday, 3 January 2012.

During this period, it is essential that any new patients on Warfarin are supplied with instructions and/or referred to their local doctor for supervision. Patients who are currently monitored by QML Pathology and are being discharged from hospital will be accepted over this period.

INR/PT Assay

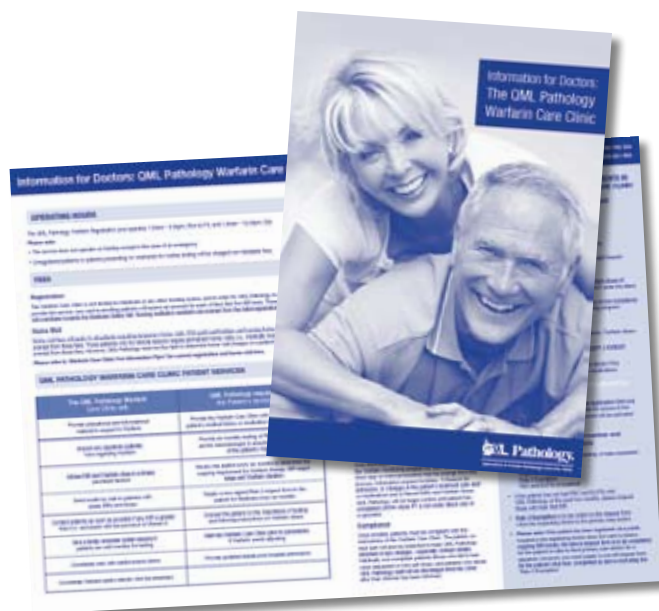
QML Pathology has recently changed its Prothrombin Time (PT) reagent to Thromborel S, which is currently being used by QHealth. The reported reference range for the PT will change slightly from 8-13 sec to 8-14 sec due to this change in reagents.

Updated Health Summaries

If QML Pathology is monitoring your patients' Warfarin doses, please ensure that you have provided us with a current health and medication summary. This is imperative for safe monitoring of your patient and for auditing requirements. If you have not supplied this update within the last 6 months, please fax it to (07) 3121 4316 or email _inrsupport@qml.com.au (PLEASE NOTE the underscore at the start of the email address).

Information for Doctors Publication

A new information guide that gives an overview of how to register a patient for the Warfarin Care Clinic and the specific information required. To order, please contact Marketing on phone (07) 3121 4506 or email info@qml.com.au.



Cholesterol Campaign

The problem of cardiovascular disease in Australia is rising steadily as the population ages. Heart, stroke and vascular diseases kill more Australians than any other disease group and affects more than 3.4 million Australians¹, making it one of Australia's largest health problems

High blood cholesterol is one of the major risk factors for heart disease and The National Heart Foundation recommends that all adults over 45 years old have a regular blood cholesterol test every few years². People younger than 45 who are at higher risk of coronary heart disease, for example, those who have diabetes, a family history of raised cholesterol, heart disease or high blood pressure, should also have a regular cholesterol test.

Pathology plays an essential role in the monitoring of cholesterol, and can help prevent or delay the development of complications. Starting in November, QML Pathology will be running a cholesterol awareness campaign. Our campaign will focus on those patients visiting QML Pathology collection centres for pathology testing and will be supported with reference material.

As part of the campaign we have available a cholesterol brochure for patients and the Cardiac Pack for doctors.

The Cardiac Pack includes the following information:

- Cardiac Pack - Introduction
- Cardiac Troponin
- B-type Natriuretic Peptide
- Homocysteine: Practice Points
- High Sensitivity C-Reactive Protein
- Laboratory Testing for Thrombophilia in Arterial Thrombosis
- Discontinuing Anticoagulation for Dental Procedures
- Anticoagulation Management of Patients with Prosthetic Heart Valves
- Cardiovascular Risk Calculator.

Cardiovascular disease¹:

- kills one Australian nearly every 11 minutes
- affects more than 3.4 million Australians
- prevents 1.4 million people from living a full life because of disability caused by the disease
- affects one in five Australians, and affects two out of three families
- claimed the lives of almost 48,500 Australians (34% of all deaths) in 2008 - deaths that are largely preventable.

If you would like copies of the patient brochure or the pack, or would like further information about the campaign, please contact Marketing on (07) 3121 4506 or info@qml.com.au.

References:

1. <http://www.heartfoundation.org.au/information-for-professionals/data-and-statistics/Pages/default.aspx>
2. <http://www.heartfoundation.org.au/information-for-professionals/Clinical-Information/Pages/coronary-heart-disease.aspx>

Which one of these people has high cholesterol?

You can't tell just by looking at someone

Can you tell who it is?
To find out whether you could be at risk of heart disease, ask your doctor for a cholesterol test.

I'm 7.5 mmol/L

I'm 4.0 mmol/L

A cholesterol test is the only way to find out what your levels are.

Ask your doctor about a test today.

Cholesterol and Other Lipid Tests

The National Heart Foundation recommends that all adults over 45 years old have a regular blood cholesterol test every few years.

People younger than 45 who are at higher risk of coronary heart disease, for example, those who have diabetes, a family history of raised cholesterol, heart disease or high blood pressure, should also have a regular cholesterol test.

CARDIAC PACK

QML Pathology



Introducing QML Pathology's Diabetes Care Clinic website.

The first of its kind in Australia, dedicated to helping patients with diabetes improve their health and lifestyle.

In partnership with GPs, the Diabetes Care Clinic is a specialised team devoted to helping people with diabetes improve their health and lifestyle. Diabetes Care Clinic members have access to a wide range of tools and features to help manage their diabetes.



My Blood Sugar

Record and monitor daily blood sugar levels, and view historical data and graphs for target and average blood sugar levels.



My Test Results

View HbA1c, cholesterol and albumin/creatinine ratio results as interactive graphs. Members have access to recent and past test results, and can monitor with our guide to interpreting test results.



My Care Clinic

Members can keep up to date with all the latest news and upcoming events, and receive helpful tips and hints from our Diabetes Educators.



About Diabetes

Information about diabetes, signs and symptoms and how pathology can assist with diagnosis and ongoing treatment.



Resources

A wide variety of information brochures, links and articles relating to diabetes, pathology and the Diabetes Care Clinic.



Lifestyle

Find a variety of low GI recipes for all meals, and exercises for a range of fitness levels. View helpful tips and hints for living with diabetes such as travelling with diabetes.

For further information, please contact The Diabetes Care Clinic at diabetescareclinic@qml.com.au.

Infectious Diseases Report

GEOGRAPHIC DISTRIBUTION - SEPTEMBER 2011

ORGANISM	Regions (as per key below)															TOTAL			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	SEP	AUG	JUL	JUN
Adenovirus (not typed)	4	12	6	6			16		11	4	28	6	6	8	1	108	108	83	70
Adenovirus (typing pending)	1	5					2		4	3	6	3	2		1	27	22	20	17
Barmah Forest virus	1	1	3	4		1	2		2	1	1	5		1		22	21	25	18
Bordetella pertussis	31	35	19	5	1		40		31	14	65	36	11	5	4	297	332	292	299
Brucella species	1	1	1						1	2	1					7	11	4	4
Campylobacter jejuni		1														1	0	0	1
Chlamydia pneumoniae																0	0	0	0
Chlamydia trachomatis, not typed	70	121	36	23	5		86		48	34	151	57	23	71	13	738	685	736	744
Coxiella burnetii		1	1				1				1					4	3	3	4
Cryptococcus species									1			3				4	4	3	3
Cytomegalovirus (CMV)	1	12	1	1			9		7	2	13	5	6	1	1	59	99	63	57
Entamoeba histolytica																0	2	0	0
Enterovirus - not typed																0	0	1	0
Epstein-Barr virus (EBV)	2	16	5	4			21		15	2	39	14	2	5	5	130	133	90	102
Flavivirus unspecified							2					1		1		4	11	8	6
Hepatitis A virus		1					1			1		1				4	0	4	2
Hepatitis B virus	3	12	4	1			9	1		2	56	4	4	5	1	102	100	79	77
Hepatitis C virus	16	64	15	5			36		42	7	66	24	5	15	4	299	314	245	276
Hepatitis D virus																0	0	0	0
Hepatitis E virus																0	0	0	0
Herpes simplex Type 1	17	47	15	10	3		32		19	13	54	23	5	16	5	259	301	287	253
Herpes simplex Type 2	17	34	4	5	1	1	32		12	1	33	16		9	3	168	196	169	176
Herpes simplex virus - not typed																0	0	0	0
HIV-1							4		1		3			1		9	7	6	10
HTLV-1									1							1	0	0	1
Influenza A virus	2	19	15			4	50	5	29	14	61	28	10	10	4	251	909	765	286
Influenza B virus	9	13	18	1		1	36		44	3	72	38	16	7	10	268	696	229	90
Legionella pneumophila (all serogroups)									1		1					2	0	2	0
Legionella species							1				1	1				3	4	3	1
Leptospira species	2										1					3	0	1	5
Measles virus																0	0	0	0
Mumps virus																0	1	2	1
Mycoplasma pneumoniae		4		1			5		3		2					15	28	26	49
Neisseria gonorrhoeae	17	4	4				8		6		9			2		50	58	39	36
Parainfluenza virus Type 1																N/A	4	3	4
Parainfluenza virus Type 2																N/A	16	2	3
Parainfluenza virus Type 3																N/A	91	26	16
Parainfluenza virus Type 1, 2, 3 Group	3	23	20	1	2	14	40	1	38	15	58	9	14	8	9	255	N/A	N/A	N/A
Parvovirus		2					4		3	1	7	3	1			21	27	24	19
Pneumocystis carinii		1														1	0	0	1
Respiratory Syncytial virus	3	11	4				21		15	5	18	5	9			91	128	95	84
Rickettsia - Spotted Fever Group	1	1										1				3	3	1	1
Ross River virus	2	2	1	3			5			2		2		1	1	19	24	12	22
Rubella virus											1					1	1	0	1
Salmonella paratyphi A																0	0	0	0
Salmonella paratyphi B																0	0	0	0
Salmonella typhi										1						1	0	0	1
Shigella dysenteriae																0	0	0	0
Shigella flexneri																0	0	0	0
Streptococcus Group A	11	18	2				4		4	3	13	8	4	3	4	74	72	66	66
Toxoplasma gondii																0	2	1	1
Treponema pallidum	18	7	2		4		29	2	4	1	24	7	5	13	2	118	133	104	84
Trichomonas vaginalis	13	1			3						4			5		26	21	16	20
Varicella Zoster virus	8	27	17		1		46		12	9	61	15	6	9	1	212	231	212	189
Yersinia enterocolitica																0	0	0	0
TOTAL	250	473	173	69	18	7	502	8	316	125	792	306	115	188	60	3657	4798	3747	3100

REGIONS:

1 Cairns

2 Gold Coast/Northern Rivers

3 Ipswich

4 Mackay

5 Mount Isa

6 New England

7 North Brisbane Suburbs

8 Northern Territory

9 Redcliffe

10 Rockhampton

11 South Brisbane Suburbs

12 Sunshine Coast

13 Toowoomba

14 Townsville

15 Wide Bay/Burnett

AUGUST 2011 AND FURTHER HISTORICAL CLINICAL DATA CAN BE OBTAINED BY CONTACTING YOUR LOCAL MEDICAL LIAISON OFFICER.

