

<p>TEST RELATED</p> <p>Dengue and Arbovirus Testing</p> <p>Thyroid Function Testing</p> <p>ESR or CRP</p> <p>Antenatal Testing</p> <p>Red Cell Folate</p>	<p>REQUEST RELATED</p> <p>SAMPLE RELATED</p> <p>PATIENT IDENTIFICATION</p> <p>LINKS FOR REFERRERS</p>
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TEST RELATED

Testing for Dengue virus and other Arbovirus

Dengue serology is no longer available as a stand-alone test. It has been replaced it with a combined arbovirus serology/ PCR panel, which, depending upon travel history and the nature and timing of symptoms, includes testing for Zika, Chikungunya and Dengue viruses. Travel history and history of symptoms are now required with all requests. All requests will be reviewed by the clinical microbiologist prior to testing. Please note: due to the more extensive testing that will now be undertaken, the cost to patients who are not eligible for funding (eg non-residents) will be \$342.50. Should you wish to discuss a request please contact

Dr Antje van der Linden Ph 03-470 2920 antje.vanderlinden@sclabs.co.nz or
 Dr James Ussher Ph 03-4702924 james.usscher@sclabs.co.nz

Requests for free triiodothyronine (Free T3, FT3)

Thyroxine (T4) and tri-iodothyronine (T3) are produced by the thyroid gland in response to the hormone thyropin (TSH). Most of the metabolic functions of thyroid hormones are exerted by T3 but only about 20% of circulating T3 is derived from the thyroid gland (most is formed from the conversion of T4 to T3 in peripheral tissues). For both T3 and T4, the active fraction of the hormone is that which is free (i.e. not protein-bound), free thyroxine (FT4) and FT3. These account for much less than 1% of the total circulating form of each hormone. Common clinical findings in hyperthyroidism are anxiety, tremor, tachycardia, heat intolerance and weight loss. Typical laboratory findings are low or suppressed TSH with elevated levels of FT4 and / or FT3.

The laboratory has a 'TSH' first policy when dealing with thyroid function tests. With regard to hyperthyroidism, if a TSH result is clearly low, FT4 **and** FT3 are automatically added. Therefore in normal circumstances there is no need to specifically request FT3 when assessing thyroid function unless it is already known that the individual has hyperthyroidism (e.g. monitoring previously diagnosed hyperthyroidism). Serum FT3 concentration is often normal in hypothyroidism. Measurement of FT3 has no part to play in the diagnosis or monitoring of hypothyroidism and should not be requested when thyroid function tests are being used for this purpose. In summary:

- Request TSH, FT4 and FT3 when monitoring established HYPERthyroidism.
- Don't routinely request FT3 when investigating possible thyroid disease as the laboratory will automatically add it when the TSH is clearly low.
- FT3 has no role in the investigation or monitoring of hypothyroidism and should not be requested.

Requesting Erythrocyte Sedimentation Rate or C - reactive protein ?

ESR and CRP are both markers for inflammation but are products of different processes. CRP (C-reactive protein) is a specific protein produced by the liver that rises rapidly with onset of inflammation, and also declines rapidly with resolution. CRP rises within 4-6 hours, peaks at 40-50 hours, and returns to physiological levels in up to one week. ESR is a much less specific test, reflecting a wide variety of factors that affect the sedimentation of red blood cells. It can rise not only with inflammation, but also with various non-inflammatory changes in serum proteins, e.g. increasing age, pregnancy etc. It is also affected by haematocrit (rises in anaemic patients). Compared with CRP, ESR rises slowly in response to a stimulus and peaks in up to one week taking several more weeks to drop to physiological concentrations. Hence, CRP gives a much more real-time indication of onset and resolution of inflammation. In addition to these biological factors, the analytical uncertainty associated with ESR is higher than that associated with CRP, so CRP is analytically more robust.

When to request and which to order?

Neither should be used as part of a general screening panel. There should be clear clinical evidence or suspicion of inflammation when considering requesting ESR or CRP. CRP is the preferred test when suspecting inflammation from most causes. ESR should be requested only in specific conditions:

- Both ESR and CRP should be requested simultaneously in the initial workup of patients with possible Giant Cell Arteritis (GCA), because rarely one or other marker may be raised in isolation. Once a diagnosis is made, ESR can be used alone for monitoring if CRP is not elevated at initial work-up.
- Management of polymyalgia rheumatica (PMR)
- ESR can also be used in the assessment of patients with Rheumatic fever, Rheumatoid Arthritis, and (in specialist settings) Hodgkin lymphoma, and Kawasaki disease.
- ESR should not be requested to screen for plasma cell dyscrasias. It can be falsely normal (e.g. in light chain myeloma). Serum electrophoresis is the preferred initial test in such cases. When there is strong suspicion, then urine electrophoresis or serum free light chains (in consultation with a haematologist or chemical pathologist) may also detect a small number of additional cases. Note that CRP is also not a sensitive test to identify such patients.
- CRP is relatively less sensitive in assessment of inflammation in some other conditions such as systemic lupus erythematosus (SLE) and inflammatory bowel disease. It is still preferable to ESR as a nonspecific marker of inflammation. In these conditions, however, more specific tests are available that are more useful for diagnosis (e.g. ds DNA antibodies for SLE and faecal calprotectin for inflammatory bowel disease). All requests for ESR should be accompanied by appropriate clinical details to mitigate any delays in testing.

Co-authored by Labtests Biochemistry Pathologists, Haematology pathologists, Immunopathologist

Antenatal Testing

The First Antenatal panel now includes the following tests:

CBC Blood Group Red Cell Abs Syphilis Hep B Antigen Rubella HbA1C HIV

The HIV testing is optional and patients are required to be counselled prior to testing. Our assumption is that unless we are told otherwise that has happened and where First Antenatal is requested HIV will be included i.e. patients must actively 'opt off' and we must be advised of that

Measurement of red cell folate

Folic Acid is a vitamin central to the metabolism of single carbon units. Stores of folic acid are limited and a folate-deficient diet (or a failure of folate absorption) is likely to lead to deficiency and its associated clinical findings. Folate deficiency in pregnancy is a risk factor for neural tube defect in the fetus. The first line test available for assessing folate status is measurement of serum folate (SF) concentration. Other tests available include measurements of red cell folate (RCF) and plasma homocysteine (HCys).

While RCF concentration is thought to provide an index of the quantity of folate available at the tissue level, there is little evidence that this is the case. The literature on the relative utility of SF and RCF assays was reviewed¹. RCF was found to be no better (or worse) than SF in predicting biochemical or haematological response to supplementation, in predicting elevated levels of plasma homocysteine² or in predicting tissue (liver) stores of folate³. In one study of 1355 specimens, 57 were found to have low RCF. Of these, in only 3 was the finding thought to provide information above that provided by SF alone (i.e. the patients had low RCF, normal SF and responded to folate supplementation). RCF provided no additional useful information above SF in the vast majority of patients⁴.

Current SF assays are relatively imprecise and there is often poor agreement between different assays. RCF assays require extra manual steps in order to form the haemolysate on which testing is carried out and measure haematocrit. This leads to a high degree of variability in the assays. RCF assays typically have very high coefficients of variation and up to 3-fold variation in reported concentration across a range of values.

In experimental folate deficiency, SF falls much earlier than RCF. When consuming a severely folate deficient diet, one investigator achieved subnormal SF concentrations by 170 days but only achieved low RCF by 390 days using one assay and not at all (after 540 days of a deficient diet) using two other assays. In this study, MCV and homocysteine became elevated much earlier than the fall in RCF⁵.

HCys is an amino acid that is able to accept a methyl group to form methionine. This single carbon group is in the form of methyl tetrahydrofolate (MTHF). Folate deficiency causes low levels of MTHF. Because this blocks the conversion of HCys to methionine, HCys levels in plasma become elevated. Thus, plasma concentration of HCys is seen as a functional test of folate status. However, HCys also becomes elevated in renal impairment and in deficiencies of vitamins B₆ and B₁₂. Each of these should be considered as potential causes of raised plasma HCys before ascribing any rise to folate deficiency.

For the reasons given above, RCF will cease to be offered from 1.6.16. Serum Folate will continue to be used as the first line test of folate status. Where doubt exists as to the presence of true folate deficient state (e.g. borderline low SF and no dietary risk factors) the option of measuring plasma HCys is available (with the cautions outlined above).

References

1. Galloway M and Rushworth L. Red cell or serum folate? Results from the National Pathology Alliance benchmarking review. *J.Clin.Pathol* 2003;56:924-926
2. Farrell CJ, Kirsch SH and Herrmann M. Red cell or serum folate: what to do in clinical practice? *Clin Chem Lab Med* 51(3):555-69
3. Wu A, Chanarin I, Slavin G, et al. Folate deficiency in the alcoholic—its relationship to clinical and haematological abnormalities, liver disease and folate stores. *Br J Haematol* 1975;29:469–78.
4. Jaffe JP, Schilling RF. Erythrocyte folate levels: a clinical study. *Am J Haematol* 1991;36:116–21.
5. Golding PH. Severe experimental folate deficiency in a human subject - a longitudinal study of biochemical and haematological responses as megaloblastic anaemia develops. *Springerplus* 2014; Sep 23;3:442.

REQUEST RELATED

Warfarin and INR testing

When changing the dose of warfarin the full effect on the INR can take 4-7 days. If the INR is checked too frequently, there is a risk of over-responding, leading to see-sawing of therapeutic control.

There are occasions when it is necessary to monitor the INR more frequently. For example, some algorithms use daily monitoring during the first few days of initiation of warfarin for acute thrombosis. In addition, in patients with INRs > 5.0 closer monitoring is recommended to follow the effects of treatment. However, in patients with INRs 3.0 – 5.0 in whom dosage is altered, daily monitoring may be declined - home visits over a weekend may not be necessary and will require approval by the laboratory haematologist.

Urgent Community Requests – requests for urgent Rest Home and Home Visits will only be accepted from Medical staff. A recent urgent call-out initiated by nursing staff was for a B12 and Folate - forgetting to request tests is seldom a reason for them becoming urgent (a call out can cost up to 6 hours pay plus travel costs)

Collection Centres - Taking photographs of procedures in our Collection Centres is not permitted. Notices to this effect have been posted for patients.

Patient Charging

The definition of what is provided to UK (and Australian) residents free of charge does not include routine cervical smears or STD screening. It has been noted that a small number of practitioners write 'urgent' on such requests or fail to identify the patient as a non-resident (presumably to avoid payment). The following from the MOH website:

Under a Reciprocal Health Agreement a UK citizen temporarily in New Zealand is eligible for treatment (medical, hospital and related) on the same basis as a New Zealand citizen if he/she:

is ordinarily resident in the UK, is on a temporary stay in NZ, and requires medical treatment which in the opinion of a medical practitioner needs prompt attention for a condition that arose after arrival into New Zealand, OR became, or without treatment would have become acutely exacerbated after arrival.

Recent 'false' declarations have included:

- A request for TFT plus Toxo / Rubella / Hep / CMV – clinical details ? hypothyroid – on questioning the patient she needed the tests as she was applying for a job in Russia
- Three requests for the normal health sciences panel - clinical details 'diagnostic'. One referrer said he had been 'bullied' into providing incorrect details and the other two were medical practitioners writing out forms for their student children.

Thrombophilia Screening - All requests require an Application for Thrombophilia Screening form. This can be found on the Healthscope website www.healthscope.co.nz by clicking on the "Southern Community Laboratories" icon , then "Clinician" then "Information".

Request Forms

Please do not issue repeat cards to patients requiring annual or even six monthly testing, they should just be given a normal referral form

Please include appropriate clinical details on your requests. Decisions to proceed with identification and susceptibility testing of potential pathogens is often based on the clinical details provided.

Blood Bank Requests **Invercargill only**

1. All blood products should be issued to patients using the Blood Component MR22 (green) issue form. This includes products such as Intragam, Anti-D, Tetanus immunoglobulin, Albumin as well as blood and platelets etc. Please ensure a labelled MR22 is brought to the lab when picking up these products.
2. The blood bank is proposing to stop issuing reports through the laboratory computer system (Ultra) for Cross-matches, Group and Hold and Maternal/Cord blood specimens, with electronic reporting going to the hospital databases now directly from the NZBS Progesa system. If this is likely to cause a problem for Medical staff or Midwives, please contact Tracy Inder at the Invercargill Bloodbank laboratory to speak about possible alternative arrangements. Phone 03 2145764 or email tracy.inder@sclabs.co.nz

Respiratory PCR Testing

Please note that in the community respiratory PCR testing and *Bordetella pertussis* PCR are only at the direction of Public Health or after discussion with the Clinical Microbiologist. For further information, please contact either

Dr Antje van der Linden Ph 03-470 2920 antje.vanderlinden@sclabs.co.nz or

Dr James Ussher Ph 03-4702924 james.ussher@sclabs.co.nz

SAMPLE RELATED

Chlamydia Testing

When requesting both Chlamydia testing and routine microbiology culture two separate urine samples should be collected. Patients should be given clear instructions before collecting the samples.

- The first catch (10-20 ml) to be used for Chlamydia testing
- The midstream urine collected into another pottle for routine culture

Culture of the first catch sample will often contain urogenital contaminants requiring a repeat for a mixed growth or potentially a patient being treated inappropriately for a presumed urinary tract infection.

Please ensure the two samples are fully labelled including the sample type ie "first catch" or "midstream"

Transportation of Microbiology Specimens

When there is likely to be a delay of greater than 2 hours (or 30 minutes in the case of urine specimens) between specimen collection and receipt in the Microbiology Laboratory, please ensure that specimens are refrigerated as soon as possible after collection to ensure the best quality result. At room temperature bacteria continue to divide, resulting in rapid overgrowth of cultures. Specimens which should NOT be refrigerated are blood cultures and CSF specimens.

First and Subsequent Antenatals and Blood Grouping (Otago only not including Oamaru)

Effective Monday 18th April 2016 specimen requirement for First and Second Antenatals, and for Blood Grouping at SCL Dunedin has changed as follows:

First Antenatal: 1 x 6ml EDTA, **Pink** top tube

2 x 4 ml EDTA, **Lavender** top tube

1 x 5ml SST, **Yellow** top tube

Second Antenatal: 1 x 6ml EDTA, **Pink** top tube

1 x 4ml EDTA, **Lavender** top tube

Blood Group: 1 x 6ml EDTA, **Pink** top tube

For all enquiries please contact Immunology at SCL Dunedin on (03) 470 2984

Blood collection tube change for:

Testosterone, SHBG, Free testosterone, FAI index

From 15th May the blood collection tube requirements for the above tests will change. A **red top tube** is the only acceptable specimen type. Please refer to the collection Guide on

<http://www.sclabs.co.nz/images/docs/os-guide-2015.pdf>

PATIENT IDENTIFICATION

There have been a number of instances lately of referrers either ringing to say the sample they sent is not actually from that patient, or sending a form with one patient's details with samples labelled for another patient. With the exception of precious samples which cannot be recollected such samples are discarded, in the case of precious samples we require a disclaimer from the referrer as we can take no responsibility for the results.

If the sample has already been processed the results are backed out of the system and a comment added. There also have to be corrections made to the regional repositories. All this is time consuming and there is always the worry that there are other errors we are unaware of and which have the potential to do harm to the patient. In most instances the laboratory will not detect the error unless results have changed markedly, or the referrer phones for results on a patient and we haven't any record of receiving the specimen

Correct patient identification requires the following:

- Take the labelled request form to the patient
 - Positively ID the patient by asking them for their name and DOB, do not ask the patient to confirm their name (elderly patients in particular may affirm when they have not actually heard the question)
 - Also check the wristband ID in the case of a hospital patient
 - If the patient is unable to provide details these should be obtained from the caregiver or a relative, we advise our own staff to note down the details of the person who provided the identification
 - Label the tubes at the patient's side. Never pass the tubes over to someone else to label
- Please do not abuse our staff or try to cajole them into processing unlabelled or mislabelled samples. Our labelling policy is in place to protect you and your patient from the consequences of incorrect results being reported.

NZBS requirements for patient ID Otago Southland only

The requirement is now reduced from all names to first and last names (plus the DOB and NHI). This replaces the previous requirement for full names.

Jan Parker, COO SCL/MLS 0274 442 117 jan.parker@sclabs.co.nz