March 31, 2026

OAND – LABORATORY TEST SUBMISSION TEMPLATE

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INTRODUCTION

The Ontario Association of Naturopathic Doctors (OAND) acknowledges and thanks the College of Naturopaths of Ontario (CoNO) for its ongoing engagement and for its correspondence dated January 22 and January 26, 2026 regarding the application of the *Framework for the Review of Laboratory Test Submissions*, including its request for additional information on eighteen laboratory tests identified as meeting the requirements of the Council's approved framework. This submission reflects a continuation of the OAND's November 1, 2024 laboratory test submission and is provided in support of the College's review process.

The OAND engaged the expertise of its membership through a multi-step process that included the identification of subject-matter experts across relevant clinical domains, the establishment of focused working groups, and the solicitation of written clinical and technical input. Participating members included NDs with demonstrated experience in primary care, laboratory interpretation, chronic disease management, and interprofessional collaboration. This diversity of expertise ensured that the analysis reflected real-world clinical application across varied practice settings, supporting a comprehensive and evidence-based submission.

Through the application of the *Framework for the Review of Laboratory Test Submissions*, informed by external expert review, Lipoprotein-associated phospholipase A2 (Lp-PLA2) was identified as requiring additional information to demonstrate alignment with the framework's requirements. The OAND was advised by CoNO to provide further clarification by completing the Framework's standardized questions for Council consideration. In response, the OAND completed and submitted the requested information for Lipoprotein-associated phospholipase A2 in accordance with the Framework.

The inclusion of these additional eighteen laboratory tests would significantly enhance the capacity of Naturopathic Doctors in Ontario to deliver timely, evidence-informed, and patient-centred care to Ontario patients. Access to these tests would support improved clinical decision-making, facilitate early identification and monitoring of health concerns, reduce reliance on duplicative or fragmented testing pathways, and promote continuity of care through clearer communication with other regulated health professionals. Collectively, these outcomes serve to strengthen patient safety, diagnostic accuracy, and system efficiency.

Below you will find the additional information requested. The References to support the information are included within the document. If additional information is required, please contact the OAND.

PINWORMS

Specimen Type: Stool

B. Clinical Purpose and Indications

Testing for pinworms, especially in children

Alias for this test:(3) Pinworm Preparation, Anal Swab, Perianal Swab for Pinworms, Pinworms, Scotch Tape Test, Cellulose Tape Test, Enterobiasis Test, Enterobius vermicularis Preparation

C. Evidence Supporting Use

Key references:

1. Pinworm infection is among the most prevalent helminth infections in young children worldwide. Strategies to ensure proper diagnosis and treatment are necessary.[i]
2. Pinworm infestation (enterobiasis, syn. oxyuriasis), though not usually dangerous, remains one of the commonest parasitic infections seen by the family physician. Particularly prevalent in the pediatric age group, pinworms also infect adults.[ii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☑ Yes

☐ Sometimes

☐ No

Currently NDs have access to stool testing for parasites and ova, but not specifically for pinworm. Being able to test for pinworms is an essential aspect of proper diagnosis when presented with symptoms of intense anal or vaginal itching, particularly at night. In young children it can also result in irritability, abdominal pain, restlessness, teeth grinding, and skin infections often due to scratching.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

Currently NDs have access to stool testing for parasites and ova, but not specifically for pinworm. Being able to test for pinworms is an essential aspect of proper diagnosis when presented with symptoms of intense anal or vaginal itching, particularly at night. In young children it can also result in irritability, abdominal pain, restlessness, teeth grinding, and skin infections often due to scratching.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Pinworms are common in children. Pinworms also respond well to botanical anti-fungal therapy and lifestyle recommendations for preventing recurrence.

Positive results are used to guide an acute and/or preventative treatment plan based on the patient profile and symptom picture. No referral required; manage within naturopathic care.

Referral or co-management with a specialist may be required for complex cases or non-resolving infections, ensuring coordinated care and symptom follow-up.

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Testing for pinworms can assist in targeted naturopathic care. It is especially valuable in children where it can be difficult to get a clear picture based on patient feedback.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

NDs have the knowledge, training and skill to assess for and treat pinworms in children and adults.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☑ Occasional
☐ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 15%

Typical patient populations: Paediatrics

H. Clinical Example

Parents bring their 4-year old son to see the naturopathic doctor that have been a primary care doctor for their child since birth. The child is typically very well behaved but lately has been more irritable and restless, complaining of abdominal pain and parents notice that he seems to be scratching his pelvic and gluteal area, especially at night. The parents are seeking a clear diagnosis. Currently NDs have access to stool testing for parasites and ova, but not specifically for pinworm. Being able to test for pinworms is an essential aspect of proper diagnosis.

I. Additional Considerations (Optional)

Incidence--- 30-50% in children in school setting age 5-10 y/o have Enterobius vermicularis.

ANTI STREPTOLYSIN ANTIBODIES (ASOT)

Specimen Type: Blood

B. Clinical Purpose and Indications

Used to identify recent or chronic strep infection with the bacteria group A Streptococcus. To help diagnose complications resulting from a recent strep infection, such as rheumatic fever, endocarditis, scarlet fever, strep throat, glomerulonephritis, or PANDAS. Generally tested along with Anti-DNase-B. (OAND #6, 4)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test:

Anti-streptolysin O titre (ASOT) is a well-established serologic marker used to detect recent or prior infection with Group A Streptococcus (GAS). It is part of standard medical evaluation when post-streptococcal immune-mediated sequelae are suspected, including acute rheumatic fever and post-streptococcal glomerulonephritis. ASOT is not typically used to diagnose acute pharyngitis but is clinically valuable in confirming antecedent infection when complications arise.

ASOT is recommended in conjunction with Anti-DNase B antibodies to improve diagnostic sensitivity, particularly in cases where ASOT alone may be falsely negative (e.g., skin infections). Its use is supported across primary care, pediatrics, cardiology, nephrology, and psychiatry (e.g., PANDAS).

The test aligns with standard diagnostic frameworks used by physicians and nurse practitioners and supports safe, evidence-informed decision-making within naturopathic primary care, particularly in determining when escalation of care or referral is required.

Key references:

1. Gerber MA, Baltimore RS, Eaton CB, et al. Prevention of rheumatic fever and diagnosis and treatment of acute streptococcal pharyngitis. Circulation. 2009;119(11):1541–1551.
2. Shulman ST, Bisno AL, Clegg HW, et al. Clinical practice guideline for diagnosis and management of Group A streptococcal pharyngitis. Clin Infect Dis. 2012;55(10):e86–e102.
3. Johnson DR, Kaplan EL. A review of the correlation of ASO titers with clinical disease. Pediatrics. 2001;108(6):1236–1241.

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☑ Yes

☐ Sometimes
☐ No

Used to identify recent or chronic strep infection with the bacteria group A Streptococcus. To help diagnose complications resulting from a recent strep infection, such as rheumatic fever, endocarditis, scarlet fever, strep throat, glomerulonephritis, or PANDAS. Generally tested along with Anti-DNase-B.

Positive Results

Develop a treatment plan to address the underlying Group A Streptococcus infection and manage complications such as rheumatic fever, endocarditis, or PANDAS. Monitor the patient's progress and adjust treatment as needed within naturopathic care.

Critical results with certain clinical conditions are within scope (post-viral conditions, PANDAS).11 Rare occurrence of complex cases would necessitate a referral or co-management as required.

ASOT can directly influence time-sensitive clinical decisions in suspected post-streptococcal complications (e.g., rheumatic fever, glomerulonephritis, PANDAS), where early diagnosis impacts prognosis and need for urgent referral, antibiotic therapy, or specialist involvement.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?
☑ Yes, In ND scope, i.e. conditions it causes
☐ Yes, with referral/shared care
☐ No

Rationale:

Accurate diagnosis leads to best of treatments

Naturopathic Doctors in Ontario are trained to assess, diagnose, and manage common infections and immune-mediated conditions within primary care. Conditions such as recurrent streptococcal infections, post-infectious syndromes, and PANDAS fall within scope for assessment and adjunctive management.

However, complications such as rheumatic fever, endocarditis, and glomerulonephritis require collaborative care, medical imaging, and/or pharmacologic intervention beyond naturopathic scope. The ND's role includes identification, initial workup, supportive care, and timely referral.

Accurate diagnosis using ASOT supports appropriate triage, reduces delays in care, and facilitates interprofessional collaboration.

F. Use in Naturopathic Clinical Practice

Naturopathic treatment options may include but are not limited to dietary and lifestyle counselling to aid in immune response, nutritional supplementation such as vitamin C, vitamin D, zinc and botanicals such as Astragalus (*Astragalus membranaceus*), Echinacea (*Echinacea angustifolia*), Barberry (*Berberis vulgaris*), Turmeric (*Curcuma longa*) or Goldenseal (*Hydrastis canadensis*). Homeopathic remedies may also be effective. Results outside of normal values may lead to referral and co-management.

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

ASOT would be ordered in patients with:

- Recurrent sore throat or suspected chronic streptococcal exposure
- Post-infectious symptoms (fatigue, joint pain, neurological changes)
- Suspected PANDAS/PANS presentations (sudden-onset OCD, tics)
- Signs of immune-mediated sequelae (e.g., hematuria, carditis symptoms)

It is typically ordered alongside Anti-DNase B to improve diagnostic accuracy.

Naturopathic treatment approaches may include:

- Immune modulation: vitamin D, vitamin C, zinc
- Anti-inflammatory support: curcumin, omega-3 fatty acids
- Antimicrobial botanicals (adjunctive): *Hydrastis canadensis, Berberis vulgaris, Echinacea spp.*
- Microbiome support: probiotics
- Lifestyle interventions: sleep optimization, stress modulation, diet that make stop cell danger response or IDO1 inflammation.

Treat biofilm which may house chronic infection

Importantly:

- Positive ASOT does not confirm active infection and must be interpreted in clinical context

- Suspected acute GAS infection requiring antibiotics is referred or co-managed appropriately
- Suspected complications trigger timely referral (e.g., cardiology, nephrology, pediatrics, psychiatry)

Impact on patient care:

- Improves diagnostic accuracy in complex or chronic presentations
- Supports early identification of serious sequelae
- Reduces risk of missed diagnoses (e.g., rheumatic fever)
- Facilitates appropriate referral and co-management
- Prevents unnecessary empiric treatment when symptoms are non-streptococcal

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Ontario Naturopathic Doctors receive training in:

- Immunology and infectious disease
- Laboratory medicine and interpretation of serologic markers
- Differential diagnosis of post-infectious syndromes
- Recognition of red flags requiring referral

ASOT interpretation is comparable in complexity to other commonly interpreted antibody-based tests (e.g., EBV serology, Lyme serology), which are routinely used in naturopathic practice.

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☐ Occasional

☑ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test: *(Realizing this will be a very difficult one to answer – however – please try to provide a reasonable estimate and rationale)*

30–50%. Strep infections occur in 20-30% of children, up to 15% are asymptomatic carriers; 37% of sore throats in children, balance is viral; can be recurrent in some children; among adults 10% get strep sore throats.

Rationale:

Use is concentrated among NDs managing:

- Pediatric populations
- Chronic infection or immune dysregulation cases
- Neuropsychiatric presentations (e.g., PANDAS)

Not all NDs routinely see these populations, which limits universal utilization.

Typical patient populations:

- Children (ages 3–15) with recurrent pharyngitis or behavioural changes
- Pediatric patients with suspected PANDAS/PANS
- Adults with chronic sore throat, post-infectious fatigue, or autoimmune sequelae
- Patients with unexplained inflammatory symptoms following infection

Epidemiology context:

- Group A Streptococcus accounts for ~20–30% of pediatric pharyngitis cases
- Up to 10–15% of children may be asymptomatic carriers
- ~5–10% of adult sore throats are streptococcal

H. Clinical Example

Brief clinical example: *(A short, realistic vignette showing how this test informs clinical decision-making)*

A 9-year-old child presents with sudden-onset obsessive-compulsive behaviours, emotional lability, and motor tics following a recent sore throat. No throat swab was performed at the time of illness.

An ND orders ASOT and Anti-DNase B titres, which return elevated, indicating recent streptococcal exposure. Based on these findings and clinical presentation, the ND initiates supportive naturopathic care (anti-inflammatory and immune-modulating interventions) and refers the patient to a pediatrician for evaluation and consideration of antibiotic therapy and further management under a PANDAS framework.

This approach facilitates timely diagnosis, appropriate escalation of care, and integrated management.

I. Additional Considerations (Optional)

- ASOT titres rise 1–3 weeks post-infection and may remain elevated for months; timing of testing is critical
- False negatives may occur in skin infections; Anti-DNase B improves sensitivity
- Interpretation requires correlation with clinical presentation, not isolated use
- Over-reliance without clinical context may lead to misdiagnosis or unnecessary treatment

ANTI-DNASE-B

Specimen Type: Blood

B. Clinical Purpose and Indications

Request: Used to aid in the diagnosis of poststreptococcal complications (eg. Rheumatic fever; glomerulonephritis).

Often ordered alongside ASO.

Used to aid in the diagnosis of post-streptococcal complications, including acute rheumatic fever and post-streptococcal glomerulonephritis, by providing evidence of a preceding Group A Streptococcus (GAS) infection. It is often ordered alongside ASOT, particularly when ASOT is negative or low despite a clinical picture suggestive of recent streptococcal infection. Anti-DNase B is especially useful where skin infection is suspected as the antecedent streptococcal source, since ASOT may be less reliably elevated in that setting.

Symptoms or findings that may support ordering this test include:

- recent history of sore throat, impetigo, or suspected streptococcal infection
- new joint pain or swelling
- rash
- hematuria, edema, hypertension, or other signs suggestive of glomerulonephritis
- suspected post-infectious neuropsychiatric or inflammatory sequelae where evidence of prior streptococcal exposure would affect management or referral

C. Evidence Supporting Use

Determinants of a streptococcal infection is present or past; measures antibody levels in the blood and often done with ASO is low to confirm if antibodies are present. The symptoms that suggest the need for this test after an infection are joint pain or swelling; skin rashes; kidney inflammation or alterations in KI output.

Summary of evidence supporting clinical use of this test:

Anti-DNase B is a standard serologic marker used to demonstrate a preceding streptococcal infection when evaluating non-suppurative post-streptococcal sequelae. It is recognized in guideline-based and standard medical workups for acute rheumatic fever and post-streptococcal glomerulonephritis. The American Heart Association's revised Jones Criteria recognize elevated or rising streptococcal antibody titres, including Anti-DNase B, as evidence of preceding infection in the diagnosis of acute rheumatic fever

Anti-DNase B is clinically valuable because streptococcal antibody responses vary by site of infection and by patient. In some cases, ASOT may be normal while Anti-DNase B is elevated, making combined use more sensitive than either test alone. Serial titres may further strengthen the evidence of recent infection.

Its use is therefore evidence-based, clinically established, and consistent with the diagnostic approaches used by other regulated primary care providers and specialists.

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Gewitz MH, Baltimore RS, Tani LY, et al. Revision of the Jones Criteria for the Diagnosis of Acute Rheumatic Fever in the Era of Doppler Echocardiography. Circulation. 2015;131(20):1806-1818.
2. Shulman ST, Bisno AL, Clegg HW, et al. Clinical Practice Guideline for the Diagnosis and Management of Group A Streptococcal Pharyngitis. Clin Infect Dis. 2012;55(10):e86-e102.
3. Salie MT, Engel ME, Lee J, et al. Utility of Human Immune Responses to GAS Antigens in the Diagnosis of Acute Rheumatic Fever: A Systematic Review and Meta-Analysis. Front Cardiovasc Med. 2021.

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes, yes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Anti-DNase B is not usually an emergency test for acute streptococcal pharyngitis, but it can materially affect timely diagnosis, referral, and co-management when post-streptococcal complications are suspected. In patients presenting after a recent infection with symptoms such as migratory joint pain, edema, hematuria, hypertension, rash, carditis symptoms, or neuropsychiatric change, access to Anti-DNase B can help establish evidence of preceding GAS infection and support more urgent referral, further workup, or shared-care treatment planning.

This can reduce delays in identifying rheumatic fever, post-streptococcal glomerulonephritis, or related immune-mediated sequelae, particularly when the original infection was not cultured or has already resolved.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☐ Yes

☑ Yes, with referral/shared care as antibiotic therapy may be required

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Ontario Naturopathic Doctors practicing primary care assess and diagnose patients with common infectious and post-infectious presentations and determine when referral or collaborative management is required. Ordering Anti-DNase B supports assessment, differential diagnosis, monitoring, and referral decisions that are already within naturopathic scope.

While the ND may assess the patient, identify concern for a post-streptococcal complication, and provide supportive or adjunctive care, some resulting conditions—such as acute rheumatic fever, glomerulonephritis, or possible need for antibiotic therapy or specialist evaluation—require referral or co-management with a physician or nurse practitioner. Access to this test strengthens appropriate triage and integrated care

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? (Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)

Anti-DNase B would be used in naturopathic primary care for:

- assessment of suspected prior GAS exposure when symptoms have evolved after the acute infection resolved
- differential diagnosis of post-infectious joint, renal, cardiac, dermatologic, or neuropsychiatric symptoms
- clarification of a suspected post-streptococcal immune-mediated process
- informing referral urgency and shared-care decisions
- complementing ASOT where ASOT is negative, equivocal, or insufficiently explanatory

A typical presentation may be a patient who reports a recent sore throat or skin infection, often with fever, now mostly resolved, but who has subsequently developed joint pain, rash, edema, dark urine, or changes in kidney function. If Anti-DNase B is elevated, this supports prior streptococcal exposure as a likely contributor and helps direct the next step in care.

Within naturopathic management, results may inform:

- the need for prompt referral or co-management
- supportive treatment planning
- monitoring and follow-up
- reducing diagnostic uncertainty in complex post-infectious cases

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

- improves diagnostic precision in post-infectious presentations
- supports patient safety by identifying cases needing medical referral

- reduces delays in care where complications are evolving
- helps avoid unnecessary empiric treatment when evidence of prior strep exposure is absent
- supports collaborative, evidence-informed primary care

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Patient complains of a recent infection, sore throat and often with fever. It is mostly resolved but now they have joint pain, rashes or changes in kidney function. If the test is positive the antibodies are present and strep A could be the most likely cause of their symptoms. This then needs to be addressed with ND treatments or referred for MD treatment options.

Ontario Naturopathic Doctors receive education and clinical training in laboratory medicine, immunology, infectious disease, differential diagnosis, and interpretation of serologic testing. Interpretation of Anti-DNase B is comparable to other antibody-based markers routinely interpreted in primary care. NDs are trained to interpret the result in context, including symptom timing, pre-test probability, and the limitation that a positive result supports preceding infection, not necessarily current active infection.

NDs are also trained to identify red flags and determine when elevated titres in the setting of systemic symptoms warrant referral or shared care.

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☑ Occasional

☐ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test: *(Realizing this will be a very difficult one to answer – however – please try to provide a reasonable estimate and rationale)*

Typical patient populations: Pediatrics or parents who often get ill when or after their children are ill.

Estimated percentage of Ontario NDs who would order this test: Approximately 20–35%

Rationale:

This test is likely to be ordered more often by NDs who see:

- pediatric patients
- recurrent infection cases
- post-infectious inflammatory presentations
- PANDAS/PANS-type presentations
- complex immune or chronic disease populations

It is not likely to be a routine test for all Ontario NDs, but it is a relevant and appropriate tool for a meaningful subset of practitioners working in primary care, pediatric, and integrative infection-focused practices.

Typical patient populations:

- pediatric patients with recent pharyngitis or suspected streptococcal illness followed by new symptoms
- adults with post-infectious inflammatory symptoms
- parents or adults with recurrent exposure to streptococcal infections through children in the household
- patients with suspected post-streptococcal sequelae, especially when acute infection was not tested at the time

H. Clinical Example

Brief clinical example: *(A short, realistic vignette showing how this test informs clinical decision-making)*

A 10-year-old patient presents two weeks after a febrile sore throat that resolved without testing. They now report knee and ankle pain, fatigue, and a new rash. On history and examination, the ND is concerned about a possible post-streptococcal complication. ASOT is non-diagnostic, so the ND orders Anti-DNase B, which is elevated. This supports a recent streptococcal infection and increases suspicion for a post-streptococcal immune-mediated process. The ND arranges prompt referral to the child's

physician for further medical evaluation and co-management, while also providing supportive care and close monitoring.

This use of Anti-DNase B improves diagnostic clarity, supports timely referral, and helps avoid delay in recognition of a potentially significant complication.

I. Additional Considerations (Optional)

- Anti-DNase B is best interpreted in the context of clinical history and timing; titres may remain elevated for weeks to months after infection.
- The test supports evidence of preceding streptococcal infection but does not by itself prove active infection.
- In some cases, paired acute and convalescent titres provide stronger evidence than a single measurement.
- Combined use with ASOT is often preferable for sensitivity.

ALBUMIN CREATININE RATIO (ACR)

Specimen Type: Urine

B. Clinical Purpose and Indications

A urine Albumin Creatinine Ration (uACR) compares the amount of albumin and creatinine in the urine, helping to assess kidney function. uACR is a valuable test for the early detection of kidney disease, especially in those individuals with diabetes or hypertension. (1, ACR5)

Alias: uACR, Urine microalbumin, Urine Albumin

C. Evidence Supporting Use

Albumin is a protein that is present in the blood. When the kidneys are working properly, only tiny amounts of albumin pass from the bloodstream into the urine. In kidney failure (the last stage of a slow process of decline in kidney function) large amounts of protein leak into the urine. A long time before this amount of damage, small changes in the kidney allow very small, but abnormal amounts of albumin to leak through, often as a result of having diabetes. Too little albumin is present to be detected by the

usual simple urine test strip (sometimes called a protein dipstick). This is termed microalbuminuria because of the low but significant concentration of albumin in the urine, not because it is a smaller type of the protein. Microalbuminuria is usually simply called albuminuria. Macroalbuminuria is indicative of kidney disease. (ACR4, ACR5)

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Insulin resistance preceding a type 2 diabetes diagnosis may serve as an early predictor of kidney complications[iii]
2. Several organizations and guidelines, including the American Diabetes Association, KDIGO 2022, and NICE, recommend annual monitoring of microalbuminuria and using estimated glomerular filtration rate (GFR) and albumin-creatinine ratio assessments for managing kidney disease. (ACR 1,2)
3. Exercise-induced albuminuria has been shown to worsen progressively in individuals with impaired glucose metabolism.[iv]
4. Kidney function and cardiovascular disease are closely connected and albuminuria is a proven marker of cardiovascular risk. Urinary albumin was closely associated with blood pressure, C-reactive protein, and B-type natriuretic peptide, indicating that the severity of albuminuria parallels that of systemic inflammation, cardiac load, and blood pressure.[v]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

uACR testing allows for more timely and accurate assessment and diagnosis of how the complications of diabetes and/or hypertension are impacting kidney function. It provides a justification and rationale for the depth and focus of a naturopathic treatment plan.

An increased uACR is not confined to diabetes and hypertension. It may also be seen with a urinary tract infection, several immune disorders, acute and chronic dehydration, certain drugs and by vigorous

exercise. Temporary elevated results can indicate an underlying chronic condition (such as chronic dehydration or insulin resistance) and a susceptibility to kidney disease long-term.

Laboratory results, such as uACR also provide value to patients as they add to compliance and an understanding for the complexity and focus of a naturopathic treatment plan.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑Yes

☐ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Diabetes (1 in 9 adults) and hypertension (25% of adults over 20 years old) are a very common cause of kidney failure. Studies have shown that identifying the very early stage of kidney disease in diabetes, insulin insensitivity and/or hypertension as indicated by an abnormal uACR or a uACR that is increasing over times, provides valuable information that guides adjustments in naturopathic treatment protocols. Proper management and control of diabetes, insulin insensitivity and hypertension can slow down or prevent the progression of kidney disease.

Naturopathic Doctors commonly assess for insulin resistance and/or hypertension risk by assessing family history, lifestyle and markers that are non-optimal for a patient's age. Hence, NDs are commonly treating these conditions prior to them warranting conventional treatment. Including uACR in the naturopathic assessment provides a more targeted treatment plan.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

uACR would be indicated when diabetes, insulin insensitivity or hypertension is first diagnosed and if there are concerns of chronic dehydration and/or kidney disease. It is then usually measured annually or more frequently if significantly raised uACR values are found.

After assessing for the causal factors of the key associated conditions (diabetes, hypertension, chronic dehydration for example) and any other associated conditions, naturopathic treatment options would be individualized to each patient and may include, but are not limited to, dietary recommendations such as avoiding caffeine, sugar and alcohol, ensuring adequate (but not excessive) water consumption, addressing food allergies and intolerances, ensuring a balanced diet with adequate fibre, fruits and vegetables and lean protein (amount of protein may need to be limited in severe kidney disease), lifestyle counselling such as smoking cessation, addressing relevant environmental or infectious factors; nutritional support such as vitamin supplementation, calcium, potassium, magnesium and botanicals such as *Goldenseal (Hydrastis canadensis)*, Barberry *(Berberis vulgaris),* Skullcap *(Scutellaria lateriflora)* and Dandelion *(Taraxacum officinale).*

Homeopathic remedies and acupuncture may also be effective. Results outside of normal values may lead to referral and co-management.

This is a common test that would be requisitioned every six to twelve months to monitor the effectiveness of treatment and the risk of kidney disease progression.

Impact on patient care: (Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)

uACR would be indicated when diabetes, insulin insensitivity or hypertension is first diagnosed and if there are concerns of chronic dehydration and/or kidney disease. It is then usually measured annually or more frequently if significantly raised uACR values are found. If uACR values are critical or progressing more rapidly than expected over time, it may warrant referral.

Does the profession have the knowledge, skills, and judgment to interpret this test?

Yes, NDs are trained to understand ACR as both a screening and monitoring tool. They learn to recognize elevated ACR as an early indicator of kidney damage, often before overt disease develops, and as an independent marker of cardiovascular risk. This is particularly relevant in the context of chronic conditions such as diabetes, hypertension, and metabolic syndrome, all of which are central to naturopathic primary care practice. NDs are also trained to monitor ACR longitudinally, understanding that trends over time are more clinically meaningful than any single reading in isolation.

The clinical judgment required to interpret ACR goes beyond reading a number on a lab report. NDs are trained to integrate ACR results with a patient's full clinical picture, including their history, physical examination findings, blood pressure, and other laboratory values such as eGFR, fasting glucose, and

HbA1c. This integrative approach allows them to contextualize ACR findings within a broader assessment of cardiometabolic and renal health.

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Diabetes, insulin insensitivity, hypertension and kidney disease are a part of fundamental basic naturopathic education. Conditions such as diabetes and hypertension are commonly included in continuing education courses that NDs would have access to take and these conditions are commonly seen in the clinical training at CCNM.

G. Utilization in Practice

Estimated frequency of use: High

Estimated percentage of Ontario NDs who would order this test: 90%

As diabetes, hypertension and other NCDs associated with this test are extremely common within the naturopathic patient base (HTA), we would expect that the majority of NDs that do laboratory testing would use this test.

Typical patient populations: patients with diabetes, hypertension or kidney disease. Test is relevant across the lifespan of patients but would be more common in middle-age and older patients.

H. Clinical Example

Brief clinical example:

A 48-year-old, 5 foot, 10 inch, 205 pound male with a family history of diabetes, hypertension and kidney disease notices that his health is not as robust as it used to be. His visit to his medical doctor resulted in basic labs and vitals that all came back within normal range. As both of his parents died in their late 60's the patient wants to ensure that he is not heading down the same path. The naturopathic physical exam revealed a blood pressure of 138/94. The patient's HbA1c is 5.6 and his eGFR is 78 with Creatinine at 105. The patient remarks that when he eats high-sugar foods he feels like he has brain fog and becomes tired for a couple of hours. The patient also reports that he feels more dehydrated and doesn't seem to be able to hold onto water to the same degree (i.e., he urinates quickly after drinking water).

From a naturopathic perspective the blood pressure is high normal. It would be considered mild hypertension. The HbA1c also indicates a high likelihood of insulin resistance. For a 48-year-old, the eGFR level indicates mild decreased kidney function. The uACR test would be an ideal marker to assess increased risk of kidney disease and progression to kidney disease.

Naturopathically it is common to have patients where their condition has not progressed far enough to have a firm diagnosis of diabetes or hypertension warranting medication, but where their blood work and vitals also indicate that their results are not optimal for their age. With the family history of diabetes, hypertension, kidney disease and early death of his parents, uACR testing can be very effective in ensuring optimal treatment focus.

I. Additional Considerations (Optional)

In response to the essential nature of the ACR test and the ease of testing for this analyte, a POC test is available. (ACR 3)

ALKALINE PHOSPHATASE (ALP) ISOENZYMES

Specimen Type: Blood

B. Clinical Purpose and Indications

Alkaline phosphatase (ALP) is an enzyme found in high amounts in bone and liver. Smaller amounts of ALP are found in the placenta of women who are pregnant, in the bile ducts and in the intestines. Each of these body parts makes different forms of ALP. The different forms are called isoenzymes. The alkaline phosphatase isoenzyme test is used to assess origin of elevated ALP and to assist in determining what additional testing may be required (ALP-i#1, ALP-i#2).

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Three distinct alkaline phosphatase isoenzymes have been identified: Identifying the distinct isoenzyme assist in diagnosis and guiding treatment[vi]
2. Identifying the distinct alkaline phosphatase isoenzyme can clarify additional testing that may be required to confirm a diagnosis. For example, Normal adult serum always contains slow-liver isoenzyme, and sometimes bone isoenzyme: the latter is always present in serum of children. In hepatobiliary disease slow-liver isoenzyme was always increased: intestinal isoenzyme appeared in many cases of cirrhosis (of blood groups B and 0) but fast-liver and bile isoenzymes were occasionally seen in miscellaneous cases.[vii]
3. The use of alkaline phosphatase isoenzymes may assist in early detection of liver diseases[viii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

There is a tremendous degree of inter-relatedness in blood markers, especially liver markers. For example, raised levels of ALP are usually due to a disorder of either the bone or liver. If other liver function tests such as bilirubin, gamma-glutamyl transferase (GGT) or alanine aminotransferase (ALT) are also raised, this usually indicates that the ALP is coming from the liver. However, if calcium and phosphate measurements are abnormal, this suggests that the ALP might be coming from bone. In some forms of liver disease, such as hepatitis, ALP is usually much less elevated than AST or ALT. However, when the bile ducts are blocked (for example by gallstones, scars from previous gallstones or surgery, or by a tumour), ALP and bilirubin may be increased much more than either AST or ALT (ALP-i#1).

Although you can get a sense of what is causing a high ALP based on evaluation of other markers, the ALP isoenzymes provide a more precise indication of the cause(s) of a high ALP and can indicate what additional testing is required and/or to guide treatment.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

ALP isoenzymes help to determine if there is an underlying condition that requires referral or further testing. Adding ALP isoenzymes as an additional marker for liver / bone health and other conditions ensures a more accurate treatment strategy and allows for earlier detection of more serious conditions.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

ALP isoenzymes are used to clarify a diagnosis and to streamline the naturopathic treatment plan. Abnormal results may also indicate the need for referral or co-management with conventional care.

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Liver enzymes, such as ALP rise in response to a number of factors and often when ALP is high other metabolic markers are abnormal or high-normal as well. At times the cause can be determined by assessing all the markers, at other times it is not so clear. When there is a jump in the ALP value or when there is a chronically high ALP without clear picture as to why, it is helpful to request the ALP isoenzymes as a way to clarify the diagnosis, determine if referral is required and to provide a targeted naturopathic treatment plan.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Liver and bone health are a part of fundamental basic naturopathic education. Liver and bone-related conditions are commonly included in continuing education courses that NDs would have access to take.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☑ Occasional
☐ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 30%

Typical patient populations: Middle-age and older population.

H. Clinical Example

A 52-year-old, 5 foot 5-inch, 175-pound female seeks naturopathic advice as her blood work has indicated high liver enzymes for a number of years. Liver scans show mild fatty liver, but other than that her medical doctor is simply monitoring her blood work. The patient reports that she has never smoked and is only an occasional drinker (less than once a week). She lives in the country and works in an office. Her main symptoms include fatigue, occasional heartburn, periodic night sweats and occasional muscle pain between her shoulder blades.

Review of her labs over the last 5 years indicates that her ALP is high (125) and has been rising slowly over that time. Her ALT is 35 and her AST is 28. Her Vitamin D is normal at 150. Her serum calcium 1.4 and serum phosphorus is 1.1. Her total bilirubin sits around 14.

This is a perfect example of when the additional of ALP isoenzymes would clarify the cause of the high ALP and would assist in a targeted naturopathic treatment plan.

I. Additional Considerations (Optional)

ANION GAP

Specimen Type: Blood

B. Clinical Purpose and Indications

The Anion GAP test is often done alongside testing for electrolytes. It is a measurement of the difference between the sum of the serum cations (sodium and potassium) and the sum of the serum anions (CO2/bicarbonate and chloride). Abnormal results can reflect thiamine (vitamin B1 deficiency), metabolic acidosis or can be associated with conditions such as dehydration or diabetes.

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. In body tissues and blood, electrolytes are found in the form of dissolved salts and minerals. The main electrolytes include sodium, potassium, bicarbonate, and chloride. Calcium, magnesium, phosphate, sulphate, organic acids and proteins are other electrolytes found in body fluids.

   Electrolytes help move nutrients into body's cells and help move waste out of the body's cells. Electrolytes maintain a healthy water balance and help stabilise the body's acid/base (pH) level. Electrolytes are usually measured as part of a kidney profile which measures the main electrolytes in the body, sodium (Na+), potassium (K+), together with creatinine and/or urea, and may occasionally include chloride (Cl-) and/or bicarbonate (HCO3-). Calcium, magnesium and phosphate are measured when imbalances in their concentrations are suspected.

   Most of the body's sodium is found in the extracellular fluid (ECF), outside of the body's cells, where it helps to regulate the amount of water in your body. Potassium is found mainly inside the body's cells. A small but vital amount of potassium is found in the plasma, the liquid portion of the blood. Monitoring potassium is important as small changes in the plasma potassium concentration can affect the heart's rhythm and ability to contract (pump). Chloride travels in and out of the cells to help maintain electrical neutrality, and its level usually mirrors that of sodium. The primary role of bicarbonate, which is excreted and reabsorbed by the kidneys, is to help maintain a stable pH level and, secondarily, to help maintain electrical neutrality.

   Diet provides sodium, potassium, and chloride and other electrolytes. In order to maintain a "normal" electrolyte concentration your kidneys excrete them in urine. Your lungs provide oxygen and regulate carbon dioxide which is in balance with the bicarbonate level in plasma. The balance

of these chemicals is an indication of the functional well-being of several basic body functions, including those performed by the kidneys and heart.

The Anion gap test is a calculated value. It reflects the difference between the positively charged ions (called cations) and the negatively charged ions (called anions). The Anion Gap test can identify inappropriate loss of the electrolyte when blood concentration is low or inappropriate retention of the electrolyte when blood concentration is high.[ix]

2. A higher serum anion gap and lower bicarbonate level were associated with higher levels of inflammatory biomarkers in a healthy sample of the general population.[x]

3. Anion GAP can be a valuable marker of physical fitness. Research indicates that lower levels of serum bicarbonate and higher levels of the anion gap are associated with lower cardiorespiratory fitness in adults aged 20–49 years in the general population.[xi]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?
☐ Yes
☑ Sometimes
☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Anion GAP is an important marker when assessing a patient's overall electrolyte state, their hydration level and for specific diseases such as diabetes and general fitness levels. It is often used to guide treatment, but critical values would warrant referral, co-management or close monitoring of a patient's response to treatment.

The Anion GAP is often a more accurate measurement of how the body is overall handling electrolyte balance, versus any one electrolyte or mineral analyte and it can provide an indication as to the degree that electrolyte imbalances are affecting overall health – such as fitness level and/or diabetes.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

Testing of the basic electrolytes and minerals are already on the list of acceptable laboratory tests. Assessing for, and treating, electrolyte imbalances, chronic dehydration, acid-alkaline imbalances and other conditions related to electrolyte imbalances are part of fundamental basic naturopathic education.

Results outside of normal values may lead to referral and/or co-management.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Naturopathic care already includes the ability to test for serum electrolytes. Anion gap is part of best practices when ordering serum electrolytes.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

After assessing for the causal factors related to electrolyte, hydration and/or acid-alkaline imbalances, naturopathic treatment options may include but are not limited to dietary counselling including addressing adequate water intake, avoiding foods high in sodium, increasing potassium rich foods, decreasing caffeine and other dehydrating foods and drinks, nutritional support such as Vitamin B1. Naturopathic treatment may also include exercise recommendations (including potentially a decrease in exercise), and other fitness guidelines.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Testing of the basic electrolytes and minerals are already on the list of acceptable laboratory tests. Assessing for, and treating, electrolyte imbalances, chronic dehydration, acid-alkaline imbalances, fitness level and other conditions related to electrolyte imbalances are part of fundamental basic naturopathic education.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☐ Occasional
☐ Moderate
☑ Frequent

Estimated percentage of Ontario NDs who would order this test: 90%

Typical patient populations: All patient populations.

H. Clinical Example

Brief clinical example: *(A short, realistic vignette showing how this test informs clinical decision-making)*

A 35 year-old, 6 foot, 250 pound male is seeking naturopathic support for weight loss. He reports that he is an occasional drinker (less than 3 alcoholic drinks a week), a non-smoker, no recreational or prescription drugs. He reports that he walks his dog a ½ hour a day, but other than that he is not overly active. He is recently married and his diet is better, but both him and his wife work long hours, so they often get take-out food. They are working on improving their diet. He has found that his weight continues to go up. As part of a general blood workup for this patient, it would be common to include Anion GAP as one of the blood markers to be tested. A high Anion GAP along with a low bicarbonate marker would confirm low fitness level and potentially chronic dehydration, risk of insulin insensitivity, and electrolyte imbalances and/or acid-alkaline imbalances. In this case, the Anion GAP would be a reliable indicator of improvement over time.

I. Additional Considerations (Optional)

HEMOGLOBIN ELECTROPHORESIS

Specimen Type: Blood

B. Clinical Purpose and Indications

Hemoglobin electrophoresis provides essential information beyond a standard CBC, specifically for diagnosing hemoglobinopathies like sickle cell disease, thalassemia, and other abnormal hemoglobin variants. Early detection allows for more precise interventions, avoiding unnecessary treatments and focusing on supporting the specific type of hemoglobin abnormality. (OAND#17)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. "A haemoglobinopathy is an inherited blood disorder in which an individual has an abnormal form of haemoglobin (variant) or decreased production of haemoglobin (thalassaemia). A haemoglobinopathy evaluation is a group of tests that identifies abnormal forms of or suggests problems with production of haemoglobin in order to screen for and/or diagnose a haemoglobin disorder.

   Haemoglobin (Hb) is the iron-containing protein found in all red blood cells (RBCs) that binds to oxygen in the lungs and allows RBCs to carry the oxygen throughout the body, delivering it to the body's cells and tissues. Haemoglobin consists of one portion called heme, which is the molecule with iron at the centre, and another portion made up of four globin (protein) chains. The globin chains, depending on their structure, have different designations: alpha, beta, gamma, and delta. The types of globin chains that are present are important in the function of haemoglobin and its ability to transport oxygen.

   Normal haemoglobin types include:
   - Haemoglobin A: makes up about 95%-98% of Hb found in adults; it contains two alpha and two beta protein chains.
   - Haemoglobin A2: makes up about 2%-3% of Hb in adults; it has two alpha and two delta protein chains.

- Haemoglobin F (fetal haemoglobin): makes up to 1%-2% of Hb found in adults; it has two alpha and two gamma protein chains. This is the primary haemoglobin produced by the foetus during pregnancy; its production usually falls shortly after birth and reaches adult levels by 1-2 years.

Haemoglobinopathies occur when changes (mutations) in the genes that code for the globin chains cause alterations in the proteins. These genetic changes may result in a reduced production of one of the normal globin chains or in the production of structurally altered globin chains. Genetic mutations may affect the structure of the haemoglobin, its behaviour, its production rate, and/or its stability. The presence of abnormal haemoglobin within RBCs can alter the appearance (size and shape) and function of the red blood cells.

Red blood cells containing abnormal haemoglobin (haemoglobin variants) may not carry oxygen efficiently and may be broken down by the body sooner than usual (a shortened survival), resulting in haemolytic anaemia. Some of the most common haemoglobin variants include haemoglobin S, the primary haemoglobin in people with sickle cell disease that causes the RBC to become crescent shape (sickle), decreasing the cell's survival; haemoglobin C, which can cause a minor amount of haemolytic anaemia; and haemoglobin E, which may cause no symptoms or generally mild symptoms.

Thalassaemia is a condition in which a gene deletion or mutation results in reduced production of one of the globin chains. This can upset the balance of alpha to beta chains, causing abnormal haemoglobin to form (alpha thalassaemia) or causing an increase of minor haemoglobin components, such as Hb A2 or Hb F (beta thalassaemia).

Many other less common haemoglobin variants exist. Some are silent – causing no signs or symptoms – while others affect the function and/or stability of the haemoglobin molecule. An investigation of a haemoglobin disorder typically involves tests that determine the types and amounts of haemoglobin present in a person's sample of blood.

Some examples include:

- Haemoglobin solubility test: used to test specifically for haemoglobin S, the main haemoglobin in sickle cell disease
- Haemoglobin electrophoresis (Hb ELP)
- Haemoglobin isoelectric focusing (Hb IEF)
- Haemoglobin by high performance liquid chromatography (HPLC)
- Capillary electrophoresis

Information from these tests, along with results from routine tests such as a CBC, blood film, iron status, patient ethnicity, age, blood transfusion, patient origin aid in establishing a diagnosis." Haemoglobinopathy Evaluation

2. "Thalassemia, iron deficiency anemia, macrocytosis such as megaloblastic anemia and non-severe aplastic anemia, thyroid dysfunction, hereditary persistence of fetal hemoglobin, abnormal hemoglobin diseases, the uncertainty of the method are all important causes of abnormal hemoglobin electrophoresis results. In clinical work, the patient's indicators should be comprehensively analysed to determine the possible cause."[xii]

3. Reliable and cost-effective diagnostic tools for anemia and its underlying causes are critical for accurately assessing the scope and distribution of the condition, as well as for identifying the most appropriate strategies for its prevention and timely treatment.

   Diagnosing thalassemia typically involves a complete blood count (CBC), reticulocyte count, and hemoglobin electrophoresis or a comparable method for beta thalassemia and sickle cell disease, while alpha thalassemia generally requires genetic testing. The diagnosis of sickle cell anemia, or the identification of sickle cell trait, depends on determining the presence and relative concentration of hemoglobin S in a blood sample, which can be accomplished through hemoglobin electrophoresis, or alternatively through genetic analysis to detect mutations in the hemoglobin genes.[xiii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?
☐ Yes
☑ Sometimes
☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Positive results are used to guide a targeted treatment plan for managing hemoglobinopathies and preventing complications based on the patient profile and symptom picture.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?
☑ Yes
☐ Yes, with referral/shared care
☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

Complete blood count (CBC) is already part of the labs that can be requisitioned by NDs. A hemoglobin electrophoresis is essential marker when aspects of the CBC are abnormal and warrant further investigation, for example when determining between iron deficiency anemia and Thalassaemia.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

A hemoglobin electrophoresis is essential marker when aspects of the CBC are abnormal and warrant further investigation, for example when determining between iron deficiency anemia and Thalassaemia.

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Results of a hemoglobin electrophoresis would allow for an accurate diagnosis with respect to an abnormal CBC and would guide a targeted naturopathic care.

In cancer care, anemia is a common finding. Determining if this due to the cancer, to the cancer treatment(s), or an underlying hemoglobin issue is critical to appropriate patient care.

Does the profession have the knowledge, skills, and judgment to interpret this test?
☑ Yes
☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

NDs have the skill to assess and treat anaemias as part of the foundational basis of naturopathic training.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☑ Occasional
☐ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 35%

Typical patient populations: Patients with an abnormal CBC, or patients whose ethnicity would warrant screening for Thalassemia.

H. Clinical Example

A 26-year-old female is seeking naturopathic care. Her main complaints include ongoing fatigue, periodic dizziness and dysmenorrhea. The patient was born in the Mediterranean (but her mom was from originally from the United States) and she has recently moved to Canada to finish her education and to create some distance from her family of origin. She does not recall having any blood work and other than dysmenorrhea pretty much since the onset of her periods, she has never been diagnosed with a condition or disease. Her blood pressure is low at 105/62. She reports eating a good diet and engaging in regular exercise. She has been unable to find a family doctor and would prefer to work with a Naturopathic Doctor.

The initial blood work (conducted on day 25 of her cycle) indicates low RBC and low hemoglobulin in the presence of normal ferritin. In this case, the hemoglobulin electrophoresis along with an iron-panel would clarify whether the patient has iron-deficiency anaemia or Thalassemia.

I. Additional Considerations (Optional)

LACTATE DEHYDROGENASE ISOENZYMES

Specimen Type: Blood

Alias: LD isoenzymes, Lactic dehydrogenase isoenzymes, LDH fractionation

B. Clinical Purpose and Indications

An LDH isoenzymes test is mainly used as a general test to check for tissue damage. It can also help find out how serious the damage may be. An LDH isoenzymes test may be used to show which organs and other tissues are likely to be damaged. An LDH isoenzyme test may be used with other tests to help diagnose and monitor many types of acute (sudden) and chronic (long-lasting) conditions. (LD-i #1)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Lactate dehydrogenase (LDH, or LD) is an enzyme found in almost all body tissues. Usually, the concentration of LDH in the blood is low, because it usually stays contained within the tissues' cells. When cells are damaged or destroyed, however, they release LDH into the bloodstream, causing blood levels to rise. For this reason, LDH is used as a general marker of injury to cells.

   Elevations of LDH may be measured either as a total LDH or as LDH isoenzymes. Isoenzymes are slightly different molecular versions of the same enzyme. A total LDH level is an overall measurement of five different LDH isoenzymes. A high total LDH level reflects tissue damage, but it is not specific to any one type of tissue, and so, by itself, it cannot be used to identify the underlying cause or its location.

   Although there is some overlap, each of the five LDH isoenzymes tends to be concentrated in specific body tissues. Because of this, measurements of the individual LDH isoenzyme levels can be used, along with other tests, to help determine the disease or condition causing cellular damage and to help identify the organs and tissues involved. In general, the isoenzyme locations tend to be:

   - LDH-1 - heart, red cells, kidney, germ cells
   - LDH-2 - heart, red blood cells, kidney (lesser amounts than LDH-1)
   - LDH-3 - lungs and other tissues
   - LDH-4 - white blood cells, lymph nodes; muscle, liver (smaller amounts than LDH-5)
   - LDH-5 - liver, muscle

   While all of the isoenzymes are represented in the total LDH, LDH-2 usually makes up the greatest percentage.[xiv]

2. An LDH isoenzyme test may be used with other tests to help diagnose and monitor many types of acute (sudden) and chronic (long-lasting) conditions. Conditions that may cause high LDH levels include:

   - Anemia
   - Kidney disease
   - Liver disease, including hepatitis and cirrhosis
   - Pancreatitis
   - A blood clot in the lung (pulmonary embolism)
   - Muscular dystrophy

- A recent heart attack, although troponin tests have mostly replaced LDH isoenzyme tests for diagnosing damage to the heart muscle from a heart attack

LDH isoenzyme tests may also be used to find out if treatment for many other conditions is working/effective.

The test is used to learn how serious certain types of cancer may be and whether the cancer is likely to respond to certain treatments. Regular LDH isoenzyme testing may be done to see whether cancer is getting better during and/or after treatment (LD-i #1).

3. In general, a high level of one or more LDH isoenzymes usually means you have some type of tissue damage. The type of disease or damage depends on which LDH isoenzymes are high and how your isoenzyme levels compare with each other. For example:

   - LDH-1 that's higher than LDH-2 may be a sign of a certain type of anemia.
   - LDH-5 that's higher than LDH-4 may be a sign of liver damage or disease.

   High levels of two or more isoenzymes may mean an individual [patient has two different conditions. Or it could be a sign of cancer that has spread to different tissues.

   Higher than normal LDH isoenzyme levels don't always mean you have a medical condition that needs treatment. High levels of certain LDH isoenzymes can be caused by intense exercise and certain medicines, including aspirin. It's also possible to have high LDH isoenzymes if many red blood cells broke open when your sample was collected and tested (LD-i #1).

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?
☐ Yes
☑ Sometimes
☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

LDH isoenzymes would be requested if the LDH levels were high and/or were increasing over time. LDH isoenzymes testing allows for a more precise determination of the source of elevated levels of LDH.

Positive results would be used to guide a targeted treatment plan by identifying the specific tissue involved in the elevated LDH, allowing for focused management based on the patient profile and

symptom picture.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?
☑ Yes
☐ Yes, with referral/shared care
☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

LDH is a valuable marker for tissue damage that is already within the naturopathic scope. Conditions that can be diagnosed by using LDH isoenzymes, such as anemia, kidney or liver disease, chronic pancreatitis and muscle damage are within the scope of naturopathic care. Used as a preventive marker, LDH isoenzymes can provide valuable information on the body's ability to clean up and/or to handle the level of activity or stress that a person is imposing on the body.

The additional information provided by the isoenzymes of LDH are fully within the scope of naturopathic care. NDs also have the knowledge and training to recognize when a critical or rising value would indicate the need to referral and/or co-management.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Lactate dehydrogenase (LDH) is already included in the list of labs that NDs can requisition. Access to LDH isoenzymes would allow NDs to more accurately assess and diagnose the tissues that are expressing injury. Determining the tissues that are injured would significantly assist in determining whether or not the high LDH is due to an acute condition that likely needs referral, over exercise or due to a chronic condition that needs to be addressed.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Results from the LDH isoenzyme test would allow an ND to target their naturopathic care recommendations and to recognize if referral was needed.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

LDH is already part of the allowed laboratory testing for NDs. LDH isoenzymes are a further analysis of the LDH results. NDs are trained in various ways to assess, diagnose and treat tissue damage and to assess, diagnose and treat for many of the conditions that are associated with high LDH isoenzymes such as anemia, muscle damage, kidney and liver disease and/or chronic pancreatitis.

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☐ Occasional

☑ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 50%

Typical patient populations: Generally middle-aged and older aged individuals.

H. Clinical Example

A 57-year male, 5 foot, 10 inches, 195 pounds is seeking naturopathic care to address concerns of fatigue. The patient reports that they go to the gym 5 to 7 times a week, with a focus on weight training and some cardiovascular workouts. The patient comments that recently they are tired after a workout and that it can take them longer to recover. They report being active most of their adult life. The patient reports having a glass of wine or two with dinner and that they have never smoked or done any recreational drugs. They report that they eat very clean but periodically end up skipping meals due to the pressures of work. They report that their doctor states that their blood work is okay, other than their liver enzymes appear to be high and they have high ferritin. Their BP sits around 138/94, O2 98% and PR is 72.

Notable blood results include Hemoglobin at 168, Haematocrit 0.46, AST 38, ALT 32, LDH 225, Ferritin 325, eGFR 74, HbA1c 5.9.

Based on age of the patient, they are likely in Andropause or have just gone through Andropause. If they have been working out too much and skipping meals their testosterone levels potentially are low normal. If that is the case than resistance exercises can contribute to increase muscle breakdown which may account for the high normal ferritin and the high LDH. As the BP is consistent with mild-moderate hypertension and the AST value is high normal, the LDH isoenzymes would help to determine whether or not the workouts were stressing heart muscle or skeletal muscle. That difference is extremely valuable in selecting the correct naturopathic treatment and/or determining if a referral or co-management is required.

ANTIPHOSPHOLIPID ANTIBODY

Specimen Type: Blood

B. Clinical Purpose and Indications

Antiphospholipid antibody testing is used to help determine the cause of inappropriate blood clot formations, recurrent miscarriage, low platelet count, and prolonged PTT test. It also used to screen for Anti-phospholipid syndrome that is associated with increased risk of complications during pregnancy. (OAND #20)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. “Antiphospholipid antibody tests are immune proteins (antibodies) directed against phospholipids. Phospholipids are found in cell membranes including those of platelets. They are lipid molecules that play a crucial role in blood clotting. When antiphospholipid antibodies are produced, they interfere with the clotting process in a way that is not fully understood. They increase an affected patient’s risk of developing recurrent inappropriate blood clots (thrombi) in arteries and veins, which can lead to strokes and heart attacks. Antiphospholipid antibodies are

also associated with thrombocytopenia (low platelets) and with the risk of recurrent miscarriages (especially in the 2nd and 3rd trimester), premature labour, and pre-eclampsia.

Antiphospholipid antibodies are frequently seen with autoimmune disorders such as Systemic Lupus Erythematosus (SLE). They may also be seen with HIV, some cancers, in the elderly and temporarily with infections, and with some drug treatments (such as phenothiazines and procainamide).

Antiphospholipid syndrome (APS), also called Hughes syndrome, is a recognised group of signs and symptoms that includes the formation of thrombi (blood clots), recurrent miscarriages, thrombocytopenia, and the presence of one or more antiphospholipid antibodies. APS can be primary (with no underlying autoimmune disorder) or secondary (existing with a specific autoimmune disorder).

The most common antiphospholipid antibodies are cardiolipin antibodies (also called anticardiolipin antibodies or ACA) and the lupus anticoagulant. Others tested include anti-beta2 glycoprotein I and anti-phosphatidylserine. There are two types of tests that are used to detect antiphospholipid antibodies. The first is the test for cardiolipin or beta-2 glycoprotein I antibodies. The tests used can detect several classes (IgG, IgM, and/or IgA) of the antibodies themselves. The second type are lupus anticoagulant assays, which are functional tests that measure the time it takes for a patient's sample to clot, and they require the presence and action of phospholipids for clotting to occur. Lupus anticoagulant assays begin with an assay to detect prolongation of clotting, the most common of which is the PTT. Confirmatory studies then need to be performed, preferably with a similar method as the initial screening assay."[xv]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

When you have a prolonged PTT test; when you have had recurrent unexplained venous or arterial blood clots; when you have had recurrent miscarriages, especially in the second and third trimesters; if you have lupus or a related connective tissue disease

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☐ Yes

☑ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Antiphospholipid Antibody test can also assist an ND in provided more targeted management care to patients with recurring blood clots or those with autoimmune diseases. This test is also used by NDs in identifying causes for recurrent miscarriage, which already are co-managed with fertility primary care MDs.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☐ Occasional

☑ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: *(Realizing this will be a very difficult one to answer – however – please try to provide a reasonable estimate and rationale)*
30%

Typical patient populations: *(e.g., age groups, clinical presentations, risk factors)*

H. Clinical Example

Brief clinical example: *(A short, realistic vignette showing how this test informs clinical decision-making)*

I. Additional Considerations (Optional)

ANTINEUTROPHIL CYTOPLASMIC ANTIBODIES (ANCA)

Specimen Type: Blood

B. Clinical Purpose and Indications

Antineutrophil cytoplasmic antibodies (ANCA), particularly antibodies directed against proteinase 3 (PR3) and myeloperoxidase (MPO), are established serologic markers used in the diagnostic workup of ANCA-associated vasculitis (AAV), especially granulomatosis with polyangiitis (GPA) and microscopic polyangiitis (MPA), and in selected cases eosinophilic granulomatosis with polyangiitis (EGPA). ANCA testing is indicated when a patient presents with signs or symptoms suggestive of small-vessel vasculitis, including glomerulonephritis, hematuria, proteinuria, declining renal function, pulmonary hemorrhage, pulmonary-renal syndrome, chronic destructive upper airway disease, refractory sinusitis or otitis, scleritis, mononeuritis multiplex, palpable purpura, or unexplained multi-system inflammatory disease. High-quality PR3-ANCA and MPO-ANCA immunoassays are now recommended as the preferred initial laboratory method in patients with suspected GPA or MPA.

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

ANCA testing is standard of care in the diagnostic evaluation of suspected ANCA-associated vasculitis and is used by nephrologists, rheumatologists, internists, respirologists, and other regulated health professionals. The 2017 international consensus on ANCA testing recommends high-quality antigen-specific immunoassays for PR3-ANCA and MPO-ANCA as the primary screening method for diagnosing patients with suspected GPA or MPA, rather than relying on indirect immunofluorescence as the first-line test.

The 2022 EULAR update for the management of ANCA-associated vasculitis continues to support ANCA testing as part of the core diagnostic workup and notes that if immunoassay results are negative but clinical suspicion remains high, further testing may still be appropriate. EULAR also emphasizes that a negative ANCA does not exclude AAV in a minority of cases.

KDIGO's 2024 guideline for ANCA-associated vasculitis likewise treats ANCA testing as a central part of the evaluation of patients with suspected renal vasculitis and rapidly progressive glomerulonephritis, alongside biopsy and specialist-directed management where indicated.

Clinically, PR3-ANCA is more commonly associated with GPA, whereas MPO-ANCA is more commonly associated with MPA and renal-limited pauci-immune vasculitis. EGPA is less often ANCA-positive, and when positive is usually MPO-ANCA. These distinctions can assist in differential diagnosis and urgency of referral, although ANCA results must always be interpreted in clinical context and are not diagnostic in isolation.

Key references:

1. Antineutrophil cytoplasmic antibodies (ANCA) are a group of autoantibodies produced when a person's immune system mistakenly targets and attacks its own neutrophil proteins. Two of the most targeted proteins are myeloperoxidase (MPO) and proteinase 3 (PR3). This results in the production of antibodies to MPO and/or PR3. The ANCA blood test detects the presence or absence of these autoantibodies by looking for the presence of these antibodies by an ELISA test and may also look to confirm these by the pattern of fluorescence on a slide under a microscope.[xvi]

   Antineutrophil cytoplasmic antibodies may be present in a variety of autoimmune disorders that cause inflammation and damage to blood vessels, predominantly small blood vessels, throughout the body (systemic vasculitis). Vasculitis can cause tissue and organ damage due to the narrowing

and obstruction of these small blood vessels and the subsequent loss of blood supply. It can also produce areas of weakness in blood vessel walls, known as aneurysms, which have the potential to rupture.[xvii]

The symptoms experienced by a person with small vessel systemic vasculitis depend upon the degree of autoimmune activity and the parts of the body involved. Early in the disease process, symptoms are often nonspecific – they include fatigue, fever, weight loss, muscle aches, and night sweats. As the disorder progresses, vascular damage may affect the functioning of the kidneys, eyes, skin, lungs, and liver. This can cause a wide range of symptoms related to these organ systems.

PR3 antibodies are most frequently seen in Granulomatosis with polyangitis (GPA). MPO antibodies are most often associated with microscopic polyangitis but may also be seen in people with pauci-immune necrotising glomerulonephritis, and eosinophilic granulomatosis with polyangiitis (EGPA).[xviii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

ANCA is not typically a stand-alone emergency test, but it can materially affect time-sensitive clinical decisions when vasculitis is suspected, especially in patients with hematuria, proteinuria, reduced kidney function, pulmonary symptoms suggestive of alveolar hemorrhage, neuropathy, ocular inflammation, purpura, or chronic destructive ENT disease. In these situations, timely access to ANCA testing may help identify patients who require urgent referral, biopsy, emergency assessment, or specialist co-management. Delay in recognizing organ-threatening AAV can contribute to irreversible renal, pulmonary, neurologic, or ocular damage.

Positive results indicate the presence of ANCA, guiding further diagnostic evaluations and treatment strategies for managing autoimmune vasculitis, including potential immunosuppressive therapies.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☐ Yes

☑ Yes, with referral/shared care

☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

Ontario Naturopathic Doctors practicing in primary care assess patients with systemic inflammatory, autoimmune, renal, respiratory, dermatologic, ENT, and neurologic presentations and determine when urgent referral or collaborative care is required. ANCA testing supports assessment, differential diagnosis, monitoring, and referral decisions that are already within naturopathic scope. The current submission already uses this shared-care framing effectively for more medically complex post-infectious testing, and ANCA fits that model more closely than a fully independent-management model.

While definitive treatment of ANCA-associated vasculitis commonly requires specialist-directed therapy, biopsy, and hospital-based monitoring, the ND's role includes early recognition of concerning patterns, initial workup, identification of red flags, supportive care, and timely referral. Access to ANCA testing strengthens triage, reduces diagnostic delay, and facilitates interprofessional coordination.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

ANCA would be used in naturopathic primary care for assessment of suspected autoimmune small-vessel vasculitis in a patient with compatible systemic and organ-specific findings; for differential diagnosis of inflammatory renal, pulmonary, ENT, ocular, neurologic, and cutaneous presentations; for identifying patients who require urgent nephrology, rheumatology, internal medicine, ophthalmology, respirology, or emergency assessment; and for supporting the rationale for further investigations such as urinalysis, renal function testing, inflammatory markers, imaging, anti-GBM testing in appropriate contexts, or biopsy referral. EULAR specifically notes the importance of ANCA testing and also advises additional anti-GBM testing in the setting of pulmonary-renal syndrome.

A typical presentation may be a patient with fatigue, weight loss, persistent sinus symptoms, hematuria, and rising creatinine, or a patient with cough or hemoptysis plus urinary abnormalities suggesting pulmonary-renal syndrome. In this setting, ANCA testing helps clarify whether urgent evaluation for AAV is warranted. This framing is more clinically defensible than the current draft language, which is brief and does not yet clearly connect the test to triage and referral decisions.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

ANCA testing can improve diagnostic precision in complex inflammatory and multi-system presentations, support earlier identification of serious autoimmune vasculitis, reduce delay in referral for organ-threatening disease, and help prioritize appropriate further testing and specialist assessment. It also helps avoid overinterpreting nonspecific inflammatory presentations without a structured vasculitis workup.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Ontario Naturopathic Doctors receive education and clinical training in immunology, laboratory medicine, differential diagnosis, autoimmune disease, and recognition of red flags requiring referral. Interpretation of ANCA is comparable in complexity to other antibody-based and immune-mediated tests used in primary care, provided results are interpreted in proper clinical context. NDs are trained to understand that a positive ANCA is not diagnostic on its own, a negative ANCA does not fully exclude AAV, and suspected vasculitis with organ involvement requires prompt referral or shared care. That approach is consistent with the diagnostic cautions emphasized in the international consensus and EULAR guidance.

G. Utilization in Practice

Estimated frequency of use:

☑ Rare

☐ Occasional

☐ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test: *(Realizing this will be a very difficult one to answer – however – please try to provide a reasonable estimate and rationale)* Approximately 5–15%

Rational:

This is not a routine screening test. It would likely be ordered mainly by NDs seeing complex autoimmune, inflammatory, renal, respiratory, chronic ENT, or multi-system cases, or those practicing in integrative primary care settings where systemic autoimmune disease is part of the differential diagnosis. Utilization is therefore likely limited, but access remains important because the test has high clinical value in the subset of patients where vasculitis is suspected. This matches how ANCA is used in conventional care: targeted and high-value, not routine.

Typical patient populations: *(e.g., age groups, clinical presentations, risk factors)*

Adults with unexplained constitutional symptoms plus renal, pulmonary, ENT, ocular, neurologic, or skin findings; patients with hematuria or proteinuria and suspected inflammatory kidney disease; patients with refractory sinus disease or otitis plus systemic inflammation; patients with suspected pulmonary-renal syndrome; and selected patients in shared-care settings where GPA, MPA, or EGPA are part of the differential.

H. Clinical Example

Brief clinical example: *(A short, realistic vignette showing how this test informs clinical decision-making)*

A 46-year-old patient presents with several weeks of fatigue, weight loss, recurrent sinus congestion, migratory arthralgia, microscopic hematuria, and a rising creatinine. The ND recognizes that the combination of constitutional, ENT, and renal findings raises concern for systemic vasculitis rather than uncomplicated infection or isolated inflammation. The ND orders ANCA with PR3/MPO specificity as part of the initial laboratory workup, along with urinalysis and renal markers. The ANCA result is positive, increasing suspicion for ANCA-associated vasculitis. Based on the laboratory findings and clinical picture, the ND arranges urgent referral for nephrology or internal medicine assessment and possible biopsy, while ensuring close follow-up and supportive care. This use of ANCA improves triage, supports faster diagnosis, and helps reduce delay in recognition of organ-threatening disease.

I. Additional Considerations (Optional)

ANCA testing should be ordered only when clinical suspicion is appropriate, because indiscriminate testing increases the risk of false-positive or misleading results. Positive PR3-ANCA or MPO-ANCA supports, but does not by itself establish, a diagnosis of AAV. Negative serology does not fully exclude AAV, particularly when suspicion remains high. Biopsy may still be required to confirm diagnosis and guide management, especially in renal disease. Framing this test as a triage-enhancing and referral-supporting investigation is therefore more accurate and more defensible for a scope-expansion submission than implying independent ND management of severe vasculitis

C-TELOPEPTIDE (CTX)

Specimen Type: Blood

B. Clinical Purpose and Indications

Osteoporosis Serum CTX test measures the amount of degraded bone circulating in the bloodstream by detecting the C-terminal telopeptide of type I collagen – a protein component of bone. Osteoporosis Serum CTX test can detect relevant changes in bone breakdown in as little as a few months, unlike bone mass density test which requires several years to generate a measurable output.

C. Evidence Supporting Use

1. CTX is a valuable marker to assess future fracture risk after adjusting for bone mass density and clinical risk factors.[xix]

2. CTX is a valuable marker for the management of osteoporosis.[xx]

3. Osteoporosis is responsible for the loss of bone mass without obvious symptoms until a bone is broken. CTX test can detect relevant changes in bone breakdown in as little as a few months and therefore can prevent, delay or reduce bone loss by indicating the need for treatment.[xxi]

4. CTX is effective in monitoring the effectiveness of exercise on bone mineral density (BMD). The aim of the current study was to examine the effects of light- to moderate intensity aerobic exercise on bone mineral density (BMD) in postmenopausal osteopenic women by using bone formation and resorption markers. “In conclusion, the current study revealed that regular walking exercise of light to moderate intensity significantly contributes to improvements in pain, walking

speed, balance, lower extremity dynamic balance, and activities of daily living in postmenopausal women with osteopenia compared to inactive individuals."[xxii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☐ Sometimes

☑ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Anyone can develop osteoporosis, but the risk increases with age. You should speak to your healthcare provider about having an CTX test if you have some of the following risk factors:

- are over the age of 50
- have disorders associated with rapid bone loss
- have used glucocorticoids such as prednisone for prolonged periods
- have experience fragility fractures
- experienced premature menopause or are a menopausal woman
- have a parent who had a hip fracture
- have a spine fracture or low bone mass identified on x-ray
- are a smoker

Positive results are used to guide a risk reduction and preventative treatment plan to limit bone loss through targeted supplementation, nutritional support, targeted exercise recommendations and lifestyle modifications based on the patient's risk profile and symptom picture.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

Assessing for and treating osteoporosis and the various factors that contribute to abnormal bone loss is part of naturopathic training and care.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

CTX would be used for early detection of bone loss, for the monitoring the effectiveness of naturopathic care with respect to osteopenia and/or osteoporosis, and other conditions that are associated with increased bone loss.

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

CTX testing is valuable for patients at increased risk of bone loss, including those over 50, with conditions associated with rapid bone loss, prolonged glucocorticoid use, fragility fractures, or premature/menopausal status. It serves as an early indicator of bone degradation, helping to guide interventions such as Vitamin D, K2, Calcium, nutritional adjustments, targeted exercise regimens and lifestyle changes for prevention and treatment monitoring.

Does the profession have the knowledge, skills, and judgment to interpret this test?
☑ Yes
☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Assessing for and treating osteopenia, osteoporosis and the various factors that contribute to abnormal bone loss is part of naturopathic training and care.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☐ Occasional
☑ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 75%

Typical patient populations: Older patients and/or any patient with a risk factor for increased bone loss.

H. Clinical Example

A 58 year old female, 5 foot, 6 inches and 125 pounds seeks naturopathic care. Her main complaints include ongoing night sweats, fatigue, chronic muscle pain and a sense of overall weakness. Her BP is low normal at 115/74. Her BMI is 26%. Relevant blood markers including a high normal serum calcium, mild anaemia, cholesterol ratio of 2.2 and triglycerides of 0.54. The patient reported that she has been menopausal for at least 10-years. The patient has been diagnosed with osteoporosis with a T-score of -2.8 (worse spine). The patient reports skipping meals due to being busy and walking 1 hour a day. The patient's recall of her diet appears to be high protein, adequate starch, but very low in vegetables. The patient reports that her mother fractured her hip in mid-60s and did not recover well.

Naturopathic treatment would further assess for and address any underlying hormone deficiencies and imbalances, as well as the underlying nutritional deficiencies. CTX would be a valuable marker for assessing and monitoring bone density improvements based on the naturopathic plan.

I. Additional Considerations (Optional)

C4A/C3A

Specimen Type: Blood

B. Clinical Purpose and Indications

C4a and C3a biomarkers help determine if a deficiency or abnormality is a contributing factor to increased infections or increased autoimmune activity. The measurement can also be used to monitor autoimmune disorders. C4a, in conjunction with C3a, may be useful markers in acute and chronic Lyme disease.

C3a and C4a are complement activation fragments that reflect activity of the innate immune system. Measurement may provide information about immune activation, inflammation, and complement pathway dysregulation.

These markers may be considered in patients with:

- suspected immune dysregulation or chronic inflammatory states
- recurrent infections or atypical immune responses
- autoimmune conditions (as adjunctive monitoring markers)
- complex chronic illness presentations where immune activation is suspected

C4a, in conjunction with C3a, has been proposed as a potential adjunctive biomarker in Lyme disease and other chronic inflammatory conditions, though this application remains emerging and not universally standardized.

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

C3a and C4a are well-characterized components of the complement cascade, and their measurement is used in immunology research and select clinical contexts to assess complement activation. Elevated levels are associated with acute and chronic inflammatory states, infection, and immune complex-mediated disease.

In conventional medical practice, complement testing more commonly includes C3 and C4 levels rather than activation fragments (C3a, C4a). Measurement of C3a/C4a is less standardized clinically and is not routinely included in major guidelines for autoimmune or infectious disease diagnosis.

Some studies have explored C4a as a marker of immune activation in Lyme disease and chronic inflammatory response syndromes, suggesting potential utility in monitoring inflammatory burden. However, evidence remains heterogeneous and not yet guideline-endorsed, and these markers should be interpreted cautiously and in conjunction with clinical findings and other validated tests.

Use of C3a/C4a in naturopathic practice is therefore best characterized as adjunctive and investigational, supporting clinical pattern recognition rather than serving as a standalone diagnostic tool.

Key references:

1. Ricklin D, Reis ES, Mastellos DC, Gros P, Lambris JD. Complement component C3: The “Swiss Army Knife” of innate immunity. Nat Immunol. 2016;17(6):651–662.
2. Markiewski MM, Lambris JD. The role of complement in inflammatory diseases. Nat Rev Immunol. 2007;7(10):785–797.
3. Stricker RB, Savely VR, Motanya NC, Giclas PC. Complement split products C3a and C4a in chronic Lyme disease. Scand J Immunol. 2009;69(1):64–69.

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Results can be used to guide treatment efficacy and progression of infections and autoimmune activity and to determine if changes are required or treatment can be stopped.

C3a/C4a are not typically used for urgent or acute diagnostic decision-making. However, in complex or chronic cases, results may influence treatment direction, monitoring strategies, and decisions regarding continuation, modification, or cessation of therapy.

They may also contribute to determining whether ongoing inflammation or immune activation is present, which can guide whether further investigation or referral is warranted. These markers are supportive rather than definitive and should not delay necessary referral for suspected serious pathology.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☐ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: *(Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)*

Naturopathic Doctors in Ontario are trained to assess and manage immune dysfunction, chronic inflammatory conditions, and complex multi-system presentations within a primary care framework. C3a/C4a testing supports:

- assessment of immune activation
- monitoring of treatment response
- clinical decision-making regarding need for referral or co-management

While interpretation of immune markers is within scope, the conditions potentially associated with abnormal results (e.g., autoimmune disease, chronic infection) may require collaborative care with medical specialists. The test supports clinical reasoning and appropriate triage rather than independent diagnosis of complex pathology.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Nearly 30,000 known cases of Lyme in Canada, many of them in Ontario

C3a/C4a may be used as adjunctive biomarkers in:

- assessment of chronic inflammatory or immune dysregulation patterns
- patients with suspected chronic infections (e.g., Lyme disease) where symptom patterns are complex
- monitoring response to treatment interventions aimed at reducing inflammation or modulating immune activity
- cases where conventional testing is inconclusive but clinical suspicion of immune activation remains

In Canada, there are tens of thousands of reported Lyme disease cases, with a growing number in Ontario, and a subset of patients present with persistent or complex symptom patterns where adjunctive markers may be considered.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

- may provide additional insight into immune system activity in complex cases
- supports individualized treatment planning and monitoring
- may help identify persistent inflammation requiring further investigation
- may reduce trial-and-error treatment approaches by providing objective markers of response
- supports clinical decision-making regarding referral, particularly when inflammatory markers remain elevated

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Ontario Naturopathic Doctors are trained in:

- immunology and inflammatory pathways, including complement activation
- laboratory interpretation within clinical context
- integrating emerging biomarkers with established diagnostic frameworks

Interpretation of C3a/C4a is comparable in complexity to other functional or specialty immune markers used in naturopathic and integrative practice. NDs are trained to recognize the limitations of non-standardized markers, avoid over-interpretation, and ensure results are used appropriately alongside clinical findings and conventional investigations.

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☐ Occasional

☐ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test (Realizing this will be a very difficult one to answer – however – please try to provide a reasonable estimate and rationale): ~20–30%

Rationale:

Use is more common among NDs with a clinical focus on:

- chronic infections (e.g., Lyme disease)
- environmental or complex chronic illness
- immune dysregulation and autoimmune conditions

It is not widely used in general primary care due to limited standardization and cost considerations.

Typical patient populations: (e.g., age groups, clinical presentations, risk factors)

- adults with chronic, unexplained inflammatory symptoms (fatigue, pain, cognitive changes)
- patients with suspected or diagnosed Lyme disease or other chronic infections
- patients with autoimmune conditions requiring monitoring of inflammatory activity
- individuals with multi-system, treatment-resistant presentations

H. Clinical Example

Brief clinical example: (A short, realistic vignette showing how this test informs clinical decision-making)

A 42-year-old patient presents with chronic fatigue, joint pain, and cognitive symptoms following a history of tick exposure several years prior. Previous standard Lyme serology is inconclusive.

The ND orders C3a and C4a as adjunctive markers of immune activation. Results show elevated C4a, suggesting ongoing inflammatory activity. While this does not confirm a diagnosis, it supports the clinical impression of persistent immune activation.

The ND uses this information to guide treatment aimed at reducing inflammatory burden and arranges referral to a physician for further evaluation and consideration of additional diagnostic testing. Serial measurement is used to monitor response to treatment over time.

I. Additional Considerations (Optional)

- C3a/C4a are not diagnostic for Lyme disease or autoimmune conditions and should not replace standard testing
- Reference ranges and assay methods may vary between laboratories
- These markers are best used adjunctively, not in isolation

- Over-reliance without clinical correlation may lead to misinterpretation
- More research is needed to establish standardized clinical applications

Naturopathic Doctors also need access to other tick born illness to access a Lyme case in a more robust and accurate process.

Why Naturopathic Doctors Need Access to Tick-Borne Co-Infection Testing

1. *Diagnostic Accuracy in Complex Presentations*

Tick exposure can transmit multiple pathogens simultaneously, including infections such as:

- Babesia spp.
- Bartonella spp.
- Anaplasma phagocytophilum
- Ehrlichia spp.

Patients often present with non-specific, overlapping, multi-system symptoms (fatigue, neurological symptoms, joint pain, dysautonomia, psychiatric changes).

Testing for co-infections allows the ND to:

- refine differential diagnosis
- distinguish between persistent infection vs immune dysregulation vs alternative etiologies
- avoid incomplete or inaccurate clinical assessment

Without access, there is a risk of under-recognizing clinically relevant contributors to patient illness.

2. *Appropriate Referral and Shared-Care Decisions*

Many tick-borne infections require prescription pharmacotherapy (e.g., antimicrobials, antiprotozoals) that are outside naturopathic prescribing scope in Ontario.

Access to testing enables the ND to:

- identify when a condition requires escalation to medical care
- support timely referral to physicians or specialists
- communicate objective findings to other providers

This aligns directly with RHPA obligations for safe, collaborative care.

3. *Prevention of Delayed or Missed Diagnoses*

Certain co-infections can lead to significant morbidity if untreated, including:

- hemolytic anemia (Babesia)
- neurological or psychiatric manifestations (Bartonella)
- systemic inflammatory syndromes

NDs frequently see patients with chronic, unresolved symptoms after initial care. Access to appropriate testing reduces:

- prolonged diagnostic delay
- inappropriate or ineffective treatment trials
- risk of progression to more severe disease

Monitoring and Clinical Management Within Scope

While definitive antimicrobial treatment may require referral, NDs manage:

- immune modulation
- inflammatory burden
- symptom support
- recovery and rehabilitation

Testing allows the ND to:

- assess whether ongoing symptoms may be infection-related vs post-infectious
- monitor trends over time (when clinically appropriate)
- adjust supportive care strategies

4. *Alignment with Primary Care Scope*

Ontario NDs are trained to:

- take comprehensive exposure histories (including tick exposure risk)
- recognize patterns of infectious and post-infectious illness
- order and interpret laboratory testing
- determine when referral or co-management is required

Access to tick-borne infection testing supports core primary care functions, not specialist practice.

5. *Epidemiologic Relevance in Ontario and Canada*

Tick-borne illnesses are increasing in prevalence in Canada, particularly in Ontario. In addition to Lyme disease, co-infections—while less commonly diagnosed—are clinically relevant and likely under-recognized.

NDs practicing in endemic or emerging regions require appropriate tools to respond to shifting public health patterns.

D-DIMER (DD)

Specimen Type: Blood

Alias: fragment D-Dimer, fibrin degradation fragment

B. Clinical Purpose and Indications

D-DIMER (DD) is a protein fragment that's made when a blood clot dissolves in your body. DD isn't usually found in your blood unless your body is making or breaking up blood clots. The D-DIMER test assesses the level of D-DIMER in the blood. In naturopathic clinical practice, D-Dimer testing is used to support exclusion of thromboembolic events, guide triage and referral decisions, and monitor conditions associated with coagulation and inflammation, rather than to independently diagnose acute thrombotic disease (DD#1).

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. DD is the final degradation product of fibrin by plasmin. Its presence indicates that thrombosis has occurred i.e. activation of clotting, fibrin formation, fibrin stabilization by factor-XIIIa and finally fibrin degradation by plasmin (fibrinolytic system). Increased DD can occur in non-pathologic situations such as age >50y, cigarette smoking, pregnancy, puerperium, immobility and recent surgery. Race and ethnicity also affect the results. Pathologic conditions that are associated with an increase in DD include:

    - Congestive heart failure (CHF)
    - Stroke

- Acute coronary syndromes
- Infection
- Liver or renal disease
- Pregnancy, pre-eclampsia
- Peripheral arteriopathy
- DIC
- Hemorrhage
- Arterial and venous thromboembolism
- Thrombolytic agents
- Malignancy

2. D-dimer and fibrinogen are sensitive, but nonspecific, biomarkers used for the diagnosis of venous thromboembolism (VTE). D-dimer to fibrinogen ratio may be a better predictor for the diagnosis and the outcomes of VTE, with a higher specificity than D-dimer alone.[xxiii]

3. There are many factors that increase the risk of thromboembolisms and the rate of thromboembolisms is on the rise and is a significant concern in healthcare.[xxiv]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Acutely the DD test is used to help exclude the likelihood of a blood clot in appropriate clinical contexts and to inform timely referral when results or symptoms are concerning. D-Dimer is not used as a standalone diagnostic test, and elevated or concerning results necessitate referral for definitive medical evaluation. A DD test may also be used to monitor the effectiveness of treatments for a blood clotting disorder like disseminated intravascular coagulation (DIC), CHF, arterial and venous thromboembolism and/or recovery from surgery and other acute conditions.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☐ Yes

☑ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

NDs have the knowledge and skill to recognize the risk factors and symptoms of a blood clot and when referral is necessary for blood clots and or risk of pulmonary embolism. The DD test is a critical test for both acute diagnosis of specific conditions and as a guide to monitoring the response to treatment for chronic conditions. It is common for NDs to provide essential auxiliary support for patients that are recovering from acute episodes (i.e., stroke, infections, thrombosis, etc.) and/or dealing with chronic and progression conditions (CHF, arterial and venous thromboembolism, DIC) that can be effectively monitored using DD.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

DD would be used primarily under three situations. It can be used acutely when a patient's symptoms warrant assessment of thromboembolic risk, particularly to support exclusion of acute clotting events and to guide timely referral when symptoms are concerning. It would also be used to assess treatment for a patient that historically have a chronically high DD and a known history of chronic CHF, arterial and venous thromboembolism, or DIC in the context of monitoring disease activity or recovery under shared or collaborative care. It can also be used to monitor recovery from stroke or other cardiovascular-related acute infections. It would also be a valuable test when providing preventive care and monitoring of patients that have a family history of early stroke, arterial and venous thromboembolism, DIC or other fibrin-related disorders.

After assessing for the causal factors of the relevant condition(s), naturopathic treatment options may include, but are not limited to, dietary recommendations, lifestyle counselling to limit the risks associated with this condition, addressing relevant environmental or infectious factors; nutritional

support such as fish oils or enzymes. Homeopathic remedies and acupuncture may also be effective, especially in chronic conditions. Results outside of normal values may lead to referral and co-management.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Historically high DD levels can be a chronic state for a patient that is managed with naturopathic care. Acute abnormal DD levels often require immediate referral for definitive medical assessment, while historically elevated levels may be monitored over time as part of chronic disease management. For patients where their ND is their primary care provider or when patients are unable to gain access to their medical doctor, this test is critical when a patient presents with symptoms of a blood clotting disorder, such as deep vein thrombosis (DVT) such as:

- Leg pain or tenderness
- Leg swelling
- Redness or darkening of the skin on the leg
- Skin that feels warm

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

NDs have the training and knowledge to provide support for conditions that are assessed using the DD test. They are also aware of the risks associated with a high DD and know when referral is necessary.

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☑ Occasional

☐ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 30%

Typical patient populations: Middle-age and older adults, especially those with a history of thrombosis or a family history of DIC, CHF, arterial and venous thromboembolism and or stroke.

H. Clinical Example

Brief clinical example: *(A short, realistic vignette showing how this test informs clinical decision-making)*

A 34 year-old female, 5 foot 5 inches, 208 pounds had symptoms of a blood clot (tennis-ball size area of heat and swelling on the lateral side of her lower leg leg) during a flight last fall. She reached out to her Naturopathic Doctor the following day and was advised to go to emergency where she was assessed (now 2 days after the flight) and prescribed 81 mg of aspirin while flying. Significant results of the labs done in emergency indicated hemoglobulin at 155, hematocrit 0.46, RBC 5.4, LDH 186, AST 20, ALT 28 and Fibrinogen 3.9. A DD test was not conducted. A number of the markers were high normal, but none were specific for an acute deep vein thrombosis (DVT).

The patient's job involves flying every couple of months and the patient is very nervous about the risk of a blood clot, especially as her father had a DVT in his 30s. The patient is also trying to get pregnant and complains of heavy legs and headaches which can be worse when flying. There are many metabolic factors that may need to be addressed in this situation. The DD test would be valuable in assessing thromboembolic risk and supporting exclusion of active clotting, while helping determine whether urgent referral or further medical evaluation is required prior to the scheduled flight.

I. Additional Considerations (Optional)

METHYLMALONIC ACID (MMA)

Specimen Type: Blood and Urine

B. Clinical Purpose and Indications

Methylmalonic Acid (MMA) testing, performed on both blood and urine samples, is crucial for diagnosing vitamin B12 deficiency. While serum vitamin B12 levels are commonly measured, about 50% of patients with subclinical deficiency may present with normal levels. Measuring MMA and homocysteine levels provides a more sensitive screening method, as both are typically elevated in early vitamin B12 deficiency. These markers can indicate tissue-level vitamin B12 deficiency before any

hematologic signs appear, aiding in diagnosis when serum B12 levels seem normal or elevated, yet clinical symptoms of deficiency persist. (OAND #38)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Vitamin B12 plays a crucial role in the conversion of methylmalonyl-CoA to succinyl-CoA, a step in the breakdown of certain amino acids and fatty acids. When vitamin B12 levels are low, the body's ability to convert methylmalonyl-CoA to succinyl-CoA is compromised, leading to an accumulation of MMA. As a result, measuring MMA in either urine or blood may be useful for assessing vitamin B12 deficiency.

   Active B12 (metabolically active component of vitamin B12) may be used instead of MMA as a marker of vitamin B12 deficiency. Active B12 measurement provides a more direct assessment of the functional availability of vitamin B12 for cellular functions.

   Increased production of MMA in newborn babies may suggest one of the inherited problems collectively known as methylmalonic acidaemias. Babies with this disease are unable to convert methylmalonyl CoA to succinyl CoA; therefore, increased production of MMA occurs.[xxv]

2. "The concentration of total homocysteine (tHcy) in serum and plasma is elevated in both folate and cobalamin deficiencies, whereas methylmalonic acid (MMA) in serum, plasma, or urine is a specific marker of cobalamin function. The combined measurement of both metabolites is useful for the diagnosis and follow-up of these deficiency states."[xxvi]

3. "Combined methylmalonic acidemia and homocystinuria, cblC type is an inborn error of intracellular cobalamin metabolism and the most common one. The age of onset ranges from prenatal to adult. The disease is characterised by an elevation of methylmalonic acid (MMA) and homocysteine and a decreased production of methionine. The aim is to review existing scientific literature of all late onset cblC patients in terms of clinical symptoms, diagnosis, and outcome."[xxvii]

4. Serum cobalamin currently remains the first-line test, with additional second-line plasma methylmalonic acid to help clarify uncertainties of underlying biochemical/functional deficiencies. Plasma homocysteine may be helpful as a second-line test, but is less specific than methylmalonic acid.[xxviii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

When MMA levels are elevated (typically alongside homocysteine) and clinical symptoms of vitamin B12 deficiency are present, treatment options for vitamin B12 replacement will be discussed with the patient.

This test is used to diagnose early or mild vitamin B12 deficiency.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑Yes

☐ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Assessing patients for Vitamin B12 deficiency is a foundational aspect of naturopathic care. As Homocysteine in already within scope, it would provide for a more accurate diagnosis to be able to utilize MMA when the symptom picture warrants further investigation for Vitamin B12 deficiency.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

When MMA levels are elevated (typically alongside homocysteine) and clinical symptoms of vitamin B12 deficiency are present. This would provide treatment direction for the ND and determine if their treatment plan is effective.

After assessing for the causal factors of the low Vitamin B12, naturopathic treatment options may include, but are not limited to, dietary recommendations including increasing foods high in folate and vitamin B12, increasing lean protein and vegetables; nutritional support such as folic acid, vitamin B12 and betaine HCL.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

The addition of MMA testing would provide for a more accurate diagnosis of Vitamin B12 deficiency.

Does the profession have the knowledge, skills, and judgment to interpret this test?
☑ Yes
☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

NDs have the training and skill to assess for and treat Vitamin B12 deficiency.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☐ Occasional
☑ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 50%

Typical patient populations: Patients across their lifespan when Vitamin B12 deficiency is suspected.

H. Clinical Example

A 42-year old male seeks naturopathic care for his ongoing annoying symptoms. The patient states that over the last few years he has been on a bit of health kick which has included working out regularly, limiting red meat and gluten, no sugar and eating more of a raw-food diet. Initially he felt better, but over the last six months or so he has been feeling worse even though he has been strict with his diet. His symptoms include progressive fatigue, sense of weakness, periodic headaches, indigestion including nausea and loos stools, tingling in the hands and feet, unexplained shortness of breath and difficulty concentrating.

His blood work is fairly unremarkable, with normal kidney and liver function, electrolytes and minerals. His RBC, hemoglobulin, WBC and platelets are within normal range. His MCV and RDW are both high normal. His Vitamin B12 level is 300 (low normal). Based on his symptoms and his avoidance of red meat, it would be prudent to further Vitamin B12 levels using MMA as it is more specific than homocysteine.

I. Additional Considerations (Optional)

OXALIC ACID (OXALATE)

Specimen Type: 24-hour Urine

B. Clinical Purpose and Indications

Oxalic Acid (oxalate) testing, performed via a 24-hour urine collection, is useful in the evaluation and management of kidney stones (calculi). It helps monitor hyperoxaluria, a significant risk factor for renal lithiasis, and is the most effective diagnostic tool for nephrolithiasis prophylaxis. (OAND #39)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. The kidney stone risk panel is a group of tests that measure the amounts of substances in urine that are commonly associated with kidney stone formation. In an individual who has already had kidney stones, an increased concentration of one or more of these substances can indicate both an elevated risk for developing additional stones and the likely type of stones that would form.

   Kidney stone is a term for solid aggregates of minerals and salts that form in the kidneys. Typical kidney stones are composed of calcium oxalate, calcium phosphate, uric acid or mixtures of these. Cystine stones are less common.

   Kidney stones can form for several reasons, but the most common is because the person does not drink enough water and the urine is very concentrated. Often there is a high concentration of a particular substance or substances in the urine that precipitate and form crystals. The composition of the stone depends upon the substances present in excess. It may be all one compound or have different compounds in different layers. The majority of stones, about 75%, will contain calcium.

   Kidney stone risk panels are intended to evaluate the risk of forming stones by testing for high concentrations of common stone-forming substances or low concentrations of stone-inhibiting substances. The specific tests included in a panel may vary somewhat from laboratory to laboratory but will typically include the following:
   - Urine calcium
   - Urine oxalate (oxalic acid)
   - Urine uric acid (urate)
   - Urine creatinine (does not cause stones but is used to tell if all urine was collected and help identify how concentrated the urine is)
   - Urine citrate (citric acid; this substance helps to inhibit the formation of stones)
   - Urine volume (to assess if someone is drinking enough fluids)

   Additional tests that may be part of some kidney stone risk panels and/or requested separately include:
   - Urine cystine (or amino acid screen)
   - Urine phosphorus (phosphate)
   - Urine magnesium (helps to inhibit stone formation)
   - Urine sodium (does not directly cause stones but affects the amount of calcium in urine and thus its ability to form stones)

A high concentration of one or more of these substances in the urine can occur when a person produces and/or excretes an excess amount of the substance. Also, urine will be generally concentrated if the person is chronically dehydrated (not drinking enough fluids).[xxix]

2. Higher 24-hour urinary oxalate excretion may be a risk factor for CKD progression and ESRD in individuals with CKD stages 2 to 4.[xxx]

3. "Excretion of oxalate and other key factors related to urolithiasis was differentially associated with eGFR, urinary protein, and pathological changes in CKD patients. The influence of these intrinsic traits of the underlining kidney disease should be considered when evaluating urolithiasis risk in patients with CKD."[xxxi]

4. "Results show that of stone formers patients with type II diabetes mellitus excrete significantly greater urinary oxalate and significantly lower urine pH than those without diabetes mellitus. These findings are important for treating nephrolithiasis since they may influence dietary counseling, medical management and stone prevention."[xxxii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Testing for Oxalic acid through a 24-hour urine collection is a valuable assessment of current and future risk of nephrolithiasis and it can assess the effectiveness of naturopathic care for the treatment of nephrolithiasis.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

The assessment, diagnosis and treatment of nephrolithiasis falls within the scope of naturopathic care. Assessing for oxalic-acid based nephrolithiasis is prudent for patients with a family history of nephrolithiasis, diabetes and/or chronic kidney disease.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Positive Results: In stone-forming patients, high urinary oxalate levels, even within the upper normal range, would guide treatment strategies to reduce the risk of stone formation, including dietary modifications and other interventions. In non-stone-forming patients, elevated oxalate levels would prompt a referral to the patient's GP for a comprehensive hyperoxaluria workup. This may indicate conditions such as secondary hyperoxaluria (e.g., due to fat malabsorption), primary hyperoxaluria (related to enzyme deficiencies), idiopathic hyperoxaluria, or excessive dietary oxalate or vitamin C intake.

Impact on patient care: (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Assessing for oxalic-acid based nephrolithiasis is prudent for patients with a family history of nephrolithiasis, diabetes and/or chronic kidney disease. It will assist in targeting naturopathic care recommendations, for preventing the recurrence of nephrolithiasis and for the decreasing the risks associated with nephrolithiasis.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

The assessment, diagnosis and treatment of nephrolithiasis falls within the scope of naturopathic care and is part of the foundational aspect of naturopathic education and training.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☑ Occasional
☐ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 30%

Typical patient populations: Middle-age and older adults, generally males more so than females. Any patient with a family history of nephrolithiasis, with signs of nephrolithiasis or with a family history of complications due to diabetes and/or kidney disease.

H. Clinical Example

A 48-year old male sought naturopathic care as he was concerned that he had kidney stones. A month ago he had an episode of blood in his urine for one day. Concurrently he was having difficulty passing urine and he had sudden back pain that radiated to the front, worse on the left-side. The pain, blood and discomfort only lasted for one day. He did not seek medical care as it appeared to resolve on its own.

He reported that his father frequently suffered with kidney stones and his father ended up with diabetes and kidney disease in his late 60s. A current complaint oriented physical exam was negative for kidney stones. An in-house urinalysis indicated a sg of 1.030, pH of 5 and all other markers negative. The patient reported that the last time he had blood work done was in his early 30s.

Even though the patient does not appear to be in an acute state, it would be valuable to include Oxalic Acid as part of a full workup for this patient.

I. Additional Considerations (Optional)

HUMAN PAPILLOMA VIRUS (HPV)

Specimen Type: Tissue

B. Clinical Purpose and Indications

Use to screen for HPV and cervical cancer as part of Public Health recommendations for patients already in naturopathic care and particularly for those without access to a primary care provider.

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. The test is looking for evidence of infection by certain types of human papilloma virus (HPV), a virus that can cause skin warts and genital warts (also called condylomata). These types of HPV (high-risk HPV or HR-HPV) can cause cervical, penile, anal, and other forms of genital cancer.[xxxiii]

2. The Ontario Cervical Screening Program's implementation of HPV testing on March 3, 2025. HPV testing will be used with reflex cytology in cervical screening and as a co-test with cytology in colposcopy for the management of screening-related abnormalities.

   Advantages of HPV Testing:

   - HPV testing has a higher sensitivity, which means it is better at detecting cervical pre-cancer or cancer than cytology testing alone.
   - HPV testing is objective, which means results are highly consistent and reproducible.
   - HPV testing has a high negative predictive value, which means it is more likely that negative results will correctly identify people who do not have a cervical pre-cancer or cancer and who will not develop a cervical cancer in the next 5 years.
   - HPV testing allows for earlier and more appropriate discharge from colposcopy.[xxxiv]

3. "New Canadian Cancer Statistics report suggests Canada may fall short of its 2040 goal to eliminate cervical cancer"[xxxv]

4. "Cervical cancer is almost always caused by HPV. The new screening test, which has replaced the Pap test, is better at helping prevent cervical cancer. It checks for types of HPV that can cause cervical cancer and may also detect cell changes in the cervix caused by these types of HPV. Someone can have HPV for many years and not know it unless they get the cervical screening

test. Cell changes in the cervix caused by some types of HPV can turn into cervical cancer over time if they are not treated.

The cervical screening test feels like getting a Pap test. A family doctor, nurse practitioner or midwife uses a small, soft brush to take cells from the cervix, which are then tested in a lab for types of HPV and abnormal cell changes. The new cervical screening test is more accurate, allowing most people to go longer between screenings." Cervical cancer is on the rise in older women who have not receive the HPV vaccine.[xxxvi]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☐ Yes

☑ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Regular screening as per Ontario guidelines provide context for health promotion and prevention discussions to prevent HPV transmission and associated risks, e.g. smoking cessation, safer sex practices, referral for immunization.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Conducting PAPs are within the scope of practice for NDs. As part of that assessment, it is essential to be able to assess for HPV.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

PAP Smear sample collection and requisition is already within scope of practice. As part of that assessment, it is essential to be able to assess for HPV.

Best practices in women's health includes HPV screening. Lack of access to HPV testing leads to unnecessary referrals when a PAP smear is already collected. (OAND#45)

Testing for HPV is an important aspect of a PAP exam. The results would determine is referral is necessary and it would guide naturopathic care.

Does the profession have the knowledge, skills, and judgment to interpret this test?
☑ Yes
☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*
NDs have the training and education to conduct PAP smears. Adding HPV testing to an existing PAP is in line with that training.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☑ Occasional
☐ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 50%

Typical patient populations: Females between the ages of 20 and 65 years of age.

H. Clinical Example

A 52-year old patient seeks naturopathic care as she is going through perimenopause and has been

diagnosed with an abnormal PAP in the past, the last time being three years ago. Although she was advised to have a yearly PAP, her medical doctor is on maternity-leave, and she has been unable to find another medical doctor. Her friend had a similar concern and after naturopathic care her PAPs were normal and her perimenopausal symptoms went away. The patient would prefer to work with a naturopathic doctor. The patient is still having periods, although they are very irregular with heavy bleeding (menorrhagia) and pain. The patient reports that were first cousin recently died of cervical cancer.

Conducting a PAP screen is within the scope of naturopathic care. Based on the patient's age and history, it would be prudent to add the HPV screen to the PAP.

I. Additional Considerations (Optional)

HUMAN CHORIONIC GONADOTROPIN (HCG) - QUANTITATIVE AND QUALITATIVE

Specimen Type: hCG Blood

B. Clinical Purpose and Indications

Current scope includes hCG urine which can be helpful to indicate pregnancy, but quantitative and qualitative hCG blood work is required to confirm pregnancy, to monitor the progression of pregnancy, especially high-risk pregnancies and to support a patient when there is has been a pregnancy loss. HCG is also used a tumor marker for certain cancers. (OAND#46)

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Human chorionic gonadotrophin (hCG) is a hormone produced in the placenta of a pregnant woman. hCG starts to be produced around 6 days after fertilisation. The hCG test can confirm or exclude pregnancy.

During the early weeks of pregnancy, hCG is important in maintaining function of the corpus luteum (which is formed from the ruptured ovarian follicle following ovulation). Production of hCG increases steadily during the first trimester of a normal pregnancy, peaking around the 10th week after the last menstrual cycle. Concentrations then fall slowly during the remainder of the pregnancy.

hCG is also produced by some germ cell tumours and increased levels are seen in trophoblastic disease.[xxxvii]

2. "Human chorionic gonadotropin (hCG) is a hormone produced by trophoblast tissue, which is typically found in early embryos and eventually develops into part of the placenta. Measuring hCG levels can help distinguish between normal and abnormal pregnancies and is also useful for monitoring after a pregnancy loss. In addition, hCG testing can aid in the diagnosis of certain cancers, such as choriocarcinoma and some extra-uterine malignancies. Exogenous administration of hCG as a bolus is standard practice for in vitro fertilization transfer care."[xxxviii]

3. "Low serum levels such as dual of estradiol and progesterone or estradiol alone at 7-9 weeks, β-HCG or progesterone combing estradiol at 5-6 weeks of gestation can be used better to predict miscarriage in first trimester."[xxxix]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?

☑ Yes

☐ Sometimes

☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

Within scope of NDs to screen for pregnancy and provide adjunct fertility care, pregnancy loss, as well as perinatal care.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?

☑ Yes

☐ Yes, with referral/shared care

☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Within scope of NDs to screen for pregnancy and provide adjunct fertility care, pregnancy loss, as well as perinatal care.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Current scope includes hCG urine which can be helpful to indicate pregnancy, but quantitative and qualitative hCG blood work is required to confirm pregnancy, to monitor the progression of pregnancy and to support a patient when there is has been a pregnancy loss.

Naturopathic treatment options would include, but not be limited to, dietary and lifestyle counselling, nutritional support with prenatal vitamins and probiotics. Referral to OBGyn would be indicated for co-management. Referral would be indicated for anyone when a positive test was not suspected to indicate pregnancy.

Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Naturopathic Doctors have the knowledge, skill and training to screen for pregnancy and to provide adjunct fertility care, pregnancy loss, as well as perinatal care.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☐ Occasional
☐ Moderate
☑ Frequent

Estimated percentage of Ontario NDs who would order this test: 80%

Typical patient populations: Predominately women of child-bearing age. May also be used to assess for hormone-related cancer risk. Extremely common test in a select patient group.

H. Clinical Example

A 35-year-old female is seeking naturopathic care due to fertility concerns. She had a success pregnancy when she was 29-years old, but has experienced three miscarriages over the last 3 years. All miscarriages have been within the first 8 weeks of pregnancy. She recognizes that she is getting older and this makes it more challenging to have a successful pregnancy.

Due to her family history of cancer, she does not want to do IVF or to take hormones. She would rather work with a naturopathic doctor and is interested in acupuncture, diet and herbs.

For a Naturopathic Doctor to properly and safely monitor the pregnancy and the success of treatment, it would be necessary to requisition a hCG test, as needed.

I. Additional Considerations (Optional)

COTININE

Specimen Type: Blood

B. Clinical Purpose and Indications

Used to determine the exposure to cotinine, a biomarker for exposure to tobacco smoke. (OAND#53).

Testing for Cotinine is usually conducted along with testing for Nicotine. It is a valuable assessment tool when treating patients that are undergoing smoking cessation and those patients with lung cancer, COPD, heart disease or those with a history of stroke or respiratory dysfunction.

C. Evidence Supporting Use

Summary of evidence supporting clinical use of this test: *(Guidelines, peer-reviewed literature, standard-of-care use by other regulated providers)*

Key references:

1. Cotinine is usually the best test to check for tobacco use or exposure to tobacco smoke because it lasts longer in the body and is only produced when nicotine is metabolised. Cotinine has a half-life in the body of between 7 and 40 hours, while nicotine has a half-life of 1 to 4 hours. The half-life can be longer in smokes you use menthol cigarettes. Blood and/or urine cotinine tests are usually requested instead of nicotine tests

   The presence of nicotine and/or cotinine in an individual's sample may indicate the use of tobacco products or exposure to environmental tobacco smoke. Testing may be used in a several situations to evaluate the possible use of tobacco products such as in smoking cessation programs, assessment of prospective employees and evaluations of applicants for health or life insurance.

   Nicotine and cotinine testing may also be requested in cases of suspected nicotine poisoning. Acute overdoses of nicotine, such as may happen if a child ingests nicotine lozenges or gum, are relatively rare but generally require immediate medical attention. Symptoms can include a burning mouth, feeling sick, abdominal pain, salivating (drooling), diarrhoea, sweating, confusion, dizziness, agitation, increased heart rate, rapid or difficult breathing, convulsions, coma, and even death.

   Nicotine or cotinine testing detects evidence of nicotine use and presumed tobacco usage. Testing is often performed on a urine or saliva sample but may also use samples of blood or hair. Nicotine and cotinine testing may be used in a variety of circumstances, including before starting a new insurance policy and to confirm that you have quit using tobacco in a smoking cessation program. [xl]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?
☐ Yes
☑ Sometimes
☐ No

Explanation: *(How does access to this test influence timely diagnosis, treatment initiation, monitoring, or referral?)*

It is a valuable assessment tool when treating patients that are undergoing smoking cessation and those patients with lung cancer, COPD, heart disease or those with a history of stroke or respiratory dysfunction.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?
☑ Yes
☐ Yes, with referral/shared care
☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

NDs are well trained to support patients that are undergoing smoking cessation and those patients with lung cancer, COPD, heart disease or those with a history of stroke or respiratory dysfunction.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Testing for Cotinine is a valuable assessment tool when treating patients that are undergoing smoking cessation and those patients with lung cancer, COPD, heart disease or those with a history of stroke or respiratory dysfunction.

Treatment would involve environmental awareness and education and targeted treatment plan based on type of xenobiotic, route of exposure, metabolism and biological effect. Most cases of exposure are non-

urgent. If the identified persistent organic pollutants are linked to a patient's condition that has been diagnosed and is being treated by a specialist, then the treating specialist would be notified of the findings.
Impact on patient care: *(Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

Treatment recommendations would include smoking cessation and/or a smoking cessation treatment program and supportive care for patients that are undergoing smoking cessation and those patients with lung cancer, COPD, heart disease or those with a history of stroke or respiratory dysfunction.

Does the profession have the knowledge, skills, and judgment to interpret this test?
☑ Yes
☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

NDs have the training, education and clinical experience to treat patients that are undergoing smoking cessation and those patients with lung cancer, COPD, heart disease or those with a history of stroke or respiratory dysfunction.

G. Utilization in Practice

Estimated frequency of use:
☐ Rare
☑ Occasional
☐ Moderate
☐ Frequent

Estimated percentage of Ontario NDs who would order this test: *(Realizing this will be a very difficult one to answer – however – please try to provide a reasonable estimate and rationale)*

Typical patient populations: *(e.g., age groups, clinical presentations, risk factors)*

H. Clinical Example

A 42-year old male is seeking naturopathic care to support his desire to quit smoking. Recently his father-in-law was diagnosed with lung cancer. As a result of this diagnosis, he is concerned with his own health and his wife is very concerned with his smoking.

As part of a full workup, it would be beneficial to include Cotinine as a base-line marker and as an ongoing marker to demonstrate the adherence to his quitting smoking. The results, along with other blood work, would support the naturopathic recommendations that would be made.

I. Additional Considerations (Optional)

LIPOPROTEIN(A) [LP(A)]

Specimen Type: Blood (Serum)

B. Clinical Purpose and Indications

Lipoprotein(a) [Lp(a)] is a genetically determined lipoprotein particle structurally similar to LDL cholesterol but with an additional apolipoprotein(a) protein attached. Elevated Lp(a) is a causal, independent, and dose-dependent risk factor for atherosclerotic cardiovascular disease (ASCVD), including myocardial infarction, stroke, peripheral artery disease, and calcific aortic valve stenosis. Lp(a) levels are more than 90% genetically determined and remain largely stable throughout an individual's adult life, making a single lifetime measurement sufficient for risk stratification.

Alias / alternate names: Lipoprotein a, Lp(a), Lp little a, Lipoprotein (a) Serum

This test is indicated for adults in the following clinical contexts:

- Personal or family history of premature atherosclerotic cardiovascular disease (ASCVD)
- Established or suspected familial hypercholesterolemia (FH)
- Borderline or intermediate 10-year ASCVD risk where additional risk stratification is warranted
- Calcific aortic valve stenosis or unexplained coronary artery disease
- Patients with recurrent cardiovascular events despite optimized LDL cholesterol management
- Cascade screening of first-degree relatives when elevated Lp(a) is identified in a patient
- Any adult for whom lifetime cardiovascular risk assessment and proactive prevention planning are goals of care

C. Evidence Supporting Use

The evidence supporting Lp(a) as a clinically significant cardiovascular risk factor is robust, spanning decades of epidemiological research, genome-wide association studies (GWAS), and Mendelian

randomization analyses that confirm causality rather than simple association. Critically, this evidence is reflected in Canadian national guidelines, providing direct domestic support for ND access to this test.

Key Evidence:

1. The CCS—Canada's national cardiology body—explicitly recommends that Lp(a) measurement be performed once in a patient's lifetime as part of initial lipid screening to assess cardiovascular risk. This is a Canadian guideline recommendation, not merely an American or European import. The CCS guideline further specifies that for all primary prevention patients with Lp(a) ≥50 mg/dL (or ≥100 nmol/L), earlier and more intensive health behaviour modification and management of other ASCVD risk factors is recommended (Strong Recommendation, Expert Consensus) — precisely the interventions that fall within naturopathic scope of practice. The CCS guideline also identifies elevated Lp(a) ≥50 mg/dL (≥100 nmol/L) as a risk modifier that favours more intensive management in intermediate-risk patients.[xli]
2. A 2025 review authored by Canadian physician-scientists from UBC, Western University, and McGill University—published in the European Journal of Preventive Cardiology—provides a comprehensive case for routine Lp(a) screening. The authors confirm that screening of Lp(a) in all individuals is now recommended in the Canadian Lipid Guidelines and by the National Lipid Association, and they explicitly support testing at the time of the first cholesterol profile. They note that when elevated Lp(a) is identified, clinicians should review family history for premature cardiovascular events and work to reduce all other modifiable risk factors—a role well-suited to naturopathic primary care.[xlii]
3. A Canadian clinical review published in CJC Open provides a detailed framework for applying Lp(a) in cardiovascular risk assessment, consistent with the 2021 CCS guideline. The authors outline how Lp(a) results inform risk stratification, shared decision-making, and management intensity in primary prevention — including in patients with borderline or intermediate Framingham Risk Scores where the result would change clinical approach. This framework is directly applicable to naturopathic primary care practice.[xliii]
4. Causal Risk and Dose-Response Relationship: Lp(a) levels above 50 mg/dL (125 nmol/L) are associated with approximately a 40% higher relative risk of ASCVD compared to population medians. Levels of 80–100 mg/dL double the risk, and levels of 180 mg/dL increase risk four-fold—equivalent to the risk conferred by heterozygous familial hypercholesterolemia. This association is continuous, independent of LDL cholesterol and other traditional risk factors, and is consistent across diverse populations.[xliv]
5. 2026 ACC/AHA Guideline on Dyslipidemia Management (Class I, Level B-NR): The most recent joint ACC/AHA dyslipidemia guideline recommends measuring Lp(a) at least once in all adults as part of comprehensive ASCVD risk assessment. This is the highest class of recommendation,

reflecting the strength of evidence supporting its clinical utility, and is consistent with the earlier Canadian CCS recommendation.[xlv]

6. Genetic Determinism and Stability: Unlike most cardiovascular biomarkers, Lp(a) is more than 90% genetically determined. Levels remain stable throughout adult life (with the exception of pregnancy, menopause, and certain disease states), meaning a single measurement provides enduring clinical information without the need for repeated testing.[xlvi]
7. Risk Reclassification Value: Lp(a) functions as a risk enhancer that reclassifies patients from intermediate to high-risk categories. This is particularly valuable when standard risk calculators such as the Framingham Risk Score (the tool recommended by the CCS) generate borderline estimates and a clinician needs additional data to determine the appropriate level of preventive care and when referral for further assessment is warranted.[xlvii]
8. Cardiovascular Disease as a Leading Cause of Death in Canada: Cardiovascular disease remains the second leading cause of death in Canada, accounting for approximately 49,000 deaths annually. Naturopathic doctors (NDs) regularly see patients in primary care settings who are at intermediate or elevated cardiovascular risk, often years before a clinical event occurs. Access to Lp(a) testing directly supports the ND's role in early risk identification, proactive prevention, and timely referral to appropriate providers.[xlviii]

D. Role in Immediate Patient Care Decisions

Is this test required for immediate or time-sensitive patient care decisions?
☐ Yes
☑ Sometimes
☐ No

Lp(a) is not an acute diagnostic test but plays a meaningful role in time-sensitive clinical decision-making in the following scenarios:

- Risk reclassification in patients with borderline ASCVD risk scores: When a 10-year risk calculator places a patient in the intermediate-risk range, an elevated Lp(a) result is sufficient to reclassify that patient to high risk and prompt earlier or more intensive intervention — including immediate referral for pharmacological management.
- Early identification prior to cardiovascular events: Lp(a) identifies patients at substantially elevated lifetime risk who would otherwise be managed conservatively. In this context, the test is "time-sensitive" in the broader sense — identifying risk before an event occurs is the goal of preventive care, and delay in testing delays the opportunity to intervene.
- Guiding urgency of referral: An Lp(a) result above 180 mg/dL, for example, quadruples cardiovascular risk and carries clinical implications equivalent to heterozygous familial

hypercholesterolemia. In such cases, an ND requires this information to appropriately escalate the urgency of referral to a physician for lipid-lowering therapy.

- Family cascade screening: When an elevated Lp(a) is discovered, it carries direct implications for first-degree relatives. Initiating timely cascade testing is a relevant clinical action the ND can take or facilitate.

E. Alignment with Naturopathic Scope of Practice

Are the conditions within scope?
☐ Yes
☑ Yes, with referral/shared care
☐ No

Rationale: (Briefly explain how this test supports assessment, diagnosis, monitoring, or referral decisions already within scope)

Cardiovascular risk assessment and prevention are core competencies of naturopathic primary care. Ontario NDs are trained to assess and manage conditions including dyslipidemia, hypertension, insulin resistance, obesity, metabolic syndrome, and lifestyle-driven cardiovascular risk—all of which are direct contributors to ASCVD. The prevention of cardiovascular disease through lifestyle, nutritional, and risk-stratification approaches is foundational to naturopathic philosophy and training.

The critical and often underappreciated role of Lp(a) testing in naturopathic practice is not that NDs will independently manage elevated Lp(a) with pharmaceutical agents—that is appropriately the domain of a physician or authorized prescriber. Rather, NDs need access to this test so they can accurately identify when a patient's cardiovascular risk profile exceeds what lifestyle and nutritional interventions can address, and refer promptly and appropriately to the right provider. This is fundamentally a patient safety and care coordination argument.

A patient with an Lp(a) level of 150–200 mg/dL carries a genetic cardiovascular risk that cannot be meaningfully mitigated by diet, exercise, or supplementation alone. Without access to Lp(a) testing, an ND may continue providing appropriate but insufficient naturopathic care, unaware that this patient requires referral for further assessment and management by their physician. Access to this test allows the ND to:

- Accurately identify when a patient's cardiovascular risk profile warrants referral to a physician or cardiologist for further evaluation and consideration of pharmacotherapy
- Make timely, evidence-informed referrals supported by objective laboratory data—ensuring the receiving physician has a clear clinical picture and understands the significance of the Lp(a) result

- Help patients understand that their elevated Lp(a) represents a genetically fixed risk that lifestyle interventions alone are unlikely to fully address, and that pharmacotherapy assessed and managed by their physician may be an important part of their overall cardiovascular care
- Provide the lifestyle, nutritional, and behaviour-change interventions that the CCS guidelines explicitly recommend as the first-line response to elevated Lp(a) — interventions that fall squarely within naturopathic scope and that continue alongside any pharmacotherapy the patient's physician determines is appropriate
- Monitor modifiable cardiovascular risk factors (LDL cholesterol, inflammation, blood pressure, blood sugar, body composition) in an ongoing co-management role, supporting the patient's overall cardiovascular risk reduction plan
- Cardiovascular disease is a leading cause of preventable death in Canada. Naturopathic doctors are frequently the first point of contact for patients seeking proactive health management, particularly those who are health-conscious, preventively motivated, and seen before they have developed overt cardiovascular disease. Withholding access to Lp(a) testing from NDs does not reduce the test's clinical relevance—it delays risk identification, limits appropriate referral, and reduces the quality of care coordination NDs can provide to this population.

F. Use in Naturopathic Clinical Practice

How would this test be used in practice? *(Assessment, differential diagnosis, treatment planning, monitoring, referral, etc.)*

Lp(a) testing would be incorporated into naturopathic practice in the following specific ways:

- Comprehensive cardiovascular risk assessment: Lp(a) would be ordered as part of a complete lipid and metabolic workup for patients presenting with cardiovascular risk factors (dyslipidemia, hypertension, diabetes, obesity, metabolic syndrome, family history of early heart disease or stroke).
- Lifetime risk stratification: Given that Lp(a) is measured once in a lifetime and reflects a fixed genetic risk, it is an efficient and permanent addition to a patient's risk profile. NDs who conduct thorough baseline health assessments are well positioned to capture this information.
- Determining when referral to a physician is indicated: A clearly elevated Lp(a) (>50 mg/dL or >125 nmol/L) signals that a patient's cardiovascular risk profile may warrant pharmacotherapy in addition to lifestyle management. The ND's role is to identify this threshold, communicate the clinical significance clearly to both the patient and the receiving physician, and facilitate timely referral — with prescribing decisions remaining within the physician's scope.

- Patient education and support for physician follow-up: Many patients seen in naturopathic practice are health-conscious but hesitant about conventional medical care. A concrete laboratory result demonstrating genetically elevated, lifestyle-resistant cardiovascular risk provides the objective clinical evidence needed to help patients understand why pharmacotherapy — assessed and managed by their physician — may be an essential part of their care alongside naturopathic treatment. Supporting informed patient engagement with their physician is a key strength of naturopathic practice.
- Monitoring and optimizing modifiable risk factors alongside Lp(a): While Lp(a) itself is not modifiable by lifestyle, the overall cardiovascular risk environment is. NDs can continue to manage LDL cholesterol, inflammation (hsCRP), blood pressure, glycemic control, and body composition — all of which interact with Lp(a) to determine absolute risk. The test informs the intensity and focus of this work.
- Family screening facilitation: When Lp(a) is found to be elevated, NDs can recommend that first-degree relatives be tested — a guideline-recommended action that fits well within the ND's whole-family, preventive-care orientation.

Impact on Patient Care (*Clinical value, safety, quality of care, avoidance of unnecessary referrals or delays)*

- Prevents the clinical gap of managing cardiovascular risk naturopathically without awareness of a genetically elevated Lp(a) that may warrant pharmacotherapy—improving patient safety and ensuring appropriate care is not delayed.
- Facilitates timely referral to a physician for assessment and consideration of pharmacotherapy in patients whose risk profile cannot be adequately addressed by lifestyle interventions alone.
- Enables high-quality interprofessional communication by providing the receiving physician with objective laboratory data and a clear clinical summary of the patient's risk profile.
- Improves patient understanding of their cardiovascular risk, supporting informed engagement with their broader care team and increasing the likelihood of appropriate physician follow-up.
- Supports equitable access to cardiovascular risk assessment for patients who rely on NDs as their primary care providers and may not have timely access to a physician.

Does the profession have the knowledge, skills, and judgment to interpret this test?

☑ Yes

☐ No

Explanation: *(Education, training, clinical experience, similarity to other commonly interpreted tests)*

Ontario NDs receive foundational training in cardiovascular physiology, lipid metabolism, laboratory medicine, and differential diagnosis. Lp(a) is a lipid-adjacent biomarker reported in nmol/L or mg/dL with established reference ranges and clinical thresholds. Its interpretation requires:

- Understanding of cardiovascular risk assessment frameworks (Framingham, PCE, SCORE2) and how Lp(a) functions as a risk enhancer or reclassifier within these frameworks—within the scope of ND training.
- Knowledge of the assay type (isoform-insensitive, WHO/IFCC-standardized, reported in nmol/L) and interpretation of units—comparable in complexity to interpreting other standardized lipid markers already within ND scope.
- Clinical judgment about when a result is sufficient to trigger referral to a physician versus when it primarily informs intensification of naturopathic lifestyle and nutritional management—a core ND competency in shared-care primary care practice.
- Ability to communicate results to patients in accessible language, explain the genetic nature of the risk, and set appropriate expectations about management options aligned with ND strengths in patient education and therapeutic counselling.

Interpretation of Lp(a) is comparable in complexity to other lipid markers already within ND scope (e.g., LDL, HDL, triglycerides, apolipoprotein B, homocysteine). NDs currently interpreting advanced lipid panels are well positioned to incorporate Lp(a) without additional specialized training beyond standard continuing education.

G. Utilization in Practice

Estimated frequency of use:

☐ Rare

☐ Occasional

☑ Moderate

☐ Frequent

Estimated percentage of Ontario NDs who would order this test: 40–60%

Typical patient populations: Adults 30 years and older with one or more cardiovascular risk factors; patients with a personal or family history of premature ASCVD or hypercholesterolemia; midlife and perimenopausal/menopausal

Rationale:

Cardiovascular disease risk management is among the most common clinical areas in naturopathic primary care. The 2026 ACC/AHA guideline now recommends universal Lp(a) screening for all adults, which theoretically makes every adult patient a candidate for a single lifetime measurement. In practice, utilization will be concentrated among NDs who:

- Conduct comprehensive preventive health assessments and routine blood work
- See patients with cardiovascular risk factors (dyslipidemia, hypertension, diabetes, metabolic syndrome)
- Have a clinical focus on midlife health, menopause, or cardiometabolic wellness
- Provide care to patients with a family history of premature cardiovascular disease or familial hypercholesterolemia
- Work in primary care models where they are the patient's primary provider

Given the broad prevalence of cardiovascular risk factors in the adult population, and the once-in-a-lifetime nature of the test, an estimated 40–60% of Ontario NDs who order laboratory testing would incorporate Lp(a) into their cardiovascular risk assessment panels, with the majority ordering it at low-to-moderate frequency (once per qualifying patient, not repeatedly).

Typical patient populations: Adults 30 years and older with one or more cardiovascular risk factors; patients with a personal or family history of premature ASCVD or hypercholesterolemia; midlife and perimenopausal/menopausal individuals (among whom cardiovascular risk rises significantly); patients seeking comprehensive preventive health assessment.

H. Clinical Example

A 47-year-old female presents to her naturopathic doctor for a comprehensive preventive health assessment. She is perimenopausal, non-smoker, and reports a healthy Mediterranean-style diet and regular exercise. She has no prior cardiovascular events. Her blood pressure is 128/82 and her BMI is 26. Standard lipid panel shows total cholesterol 5.6 mmol/L, LDL 3.2 mmol/L, HDL 1.4 mmol/L, and triglycerides 1.1 mmol/L—all within or borderline reference ranges. Her fasting glucose is normal. Her maternal grandfather died of a myocardial infarction at age 52; her mother was diagnosed with coronary artery disease at 61.

Using a standard cardiovascular risk calculator, her estimated 10-year ASCVD risk falls in the intermediate range. Standard lipid values do not clearly indicate whether statin therapy is warranted. The ND orders Lp(a) as a risk-enhancing biomarker to clarify the clinical picture.

Results return Lp(a) of 165 nmol/L (approximately 75 mg/dL)—significantly above the 125 nmol/L threshold associated with elevated ASCVD risk. This result reclassifies the patient from intermediate to high risk. The ND explains to the patient that this level of Lp(a) is genetically determined, cannot be reduced by diet or exercise, and substantially increases her lifetime cardiovascular risk in a way that lifestyle interventions alone cannot adequately address.

The ND:

- Initiates an evidence-based lifestyle and nutritional plan to optimize modifiable cardiovascular risk factors (LDL cholesterol, inflammation, blood pressure, insulin sensitivity)
- Refers the patient to her family physician with a clinical summary documenting the Lp(a) result and its risk implications, noting that this level of Lp(a) reclassifies her to high risk and warrants physician evaluation for
- Recommends that the patient's first-degree relatives (particularly her siblings and adult children) be tested for Lp(a) in keeping with guideline-recommended cascade screening
- Provides patient education to help the patient understand that her Lp(a) level represents a genetically fixed cardiovascular risk that lifestyle changes alone are unlikely to fully address, and that pharmacotherapy assessed by her physician may be an important part of her overall plan — complementary to, not instead of, her ongoing naturopathic care

Without access to Lp(a) testing, the ND would have managed this patient as intermediate risk, providing lifestyle counselling that — while appropriate and valuable — would have been insufficient to address her actual cardiovascular risk. The Lp(a) result was the clinical information required to ensure she received the right care, from the right provider, at the right time.

I. Additional Considerations

- Lp(a) is measured once in a lifetime under stable conditions. This makes it a low-burden, high-yield test with lasting clinical relevance—a practical fit for comprehensive ND health assessments.
- The test should be performed using isoform-insensitive assays and results reported in nmol/L, in accordance with WHO/IFCC standardization recommendations. NDs should be aware of unit differences (nmol/L vs mg/dL) when interpreting results from different laboratories.
- Lp(a) is not modifiable by current diet or exercise interventions. This does not diminish its clinical utility—rather, it strengthens the argument for early identification. When Lp(a) is significantly elevated, the appropriate naturopathic response is to intensify all modifiable risk factor management within scope and refer the patient to their physician for assessment and consideration of pharmacotherapy. Both roles are necessary and complementary.

- Emerging pharmacological therapies specifically targeting Lp(a) are in advanced clinical trials and may receive regulatory approval within the next several years. Access to Lp(a) testing now ensures that patients with elevated levels have an established result on file, and that their physicians are aware of the finding when these therapies become available.
- Lp(a) levels may transiently increase during menopause and certain inflammatory or kidney disease states. NDs caring for perimenopausal and menopausal patients—a population for whom cardiovascular risk rises significantly in midlife—have a particularly relevant patient population for this test.
- The cardiovascular risk associated with elevated Lp(a) is substantially mitigated by a healthy lifestyle studies suggest a 67% reduction in ASCVD events in genetically high-Lp(a) individuals who maintain healthy behaviours. This reinforces the clinical case for ND access: NDs provide exactly the lifestyle, nutritional, and behaviour-change interventions that the CCS guideline explicitly recommends as the primary response to elevated Lp(a). Access to the test also ensures NDs can recognize when those interventions should be accompanied by referral for physician assessment and consideration of pharmacotherapy—so the patient receives a complete and coordinated plan of care.

SUMMATION

The Ontario Association of Naturopathic Doctors (OAND) appreciates the opportunity to provide additional information in support of Council's review. The OAND trusts that the clarifications and supporting details submitted for each laboratory test demonstrate alignment with the framework requirements and support their inclusion among the laboratory tests that Naturopathic Doctors are authorized to requisition.

The OAND remains committed to ongoing collaboration and is pleased to provide any further information or clarification the Council may require. The Association can be reached at info@oand.org

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