# Urate testing in gout: why, when and how

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**ABSTRACT**

Urate is a frequently measured blood test in people with gout and those at risk of gout. Although gout is potentially curable with long-term urate lowering therapy, confusion about the details of urate measurement has contributed to suboptimal care. In this article, we provide recommendations regarding urate testing in gout, focusing on the use of this test in clinical practice.

Urate (uric acid) is a frequently measured blood test in people with gout and those at risk of gout. Aotearoa New Zealand has a very high prevalence of gout, affecting 3.8% of those aged 20 years and over, and with an age-standardised prevalence of >10% in Māori and Pacific men.[1] Therefore, understanding the role of this test is important. In this article, we provide recommendations regarding urate testing in gout, focusing on the use of this test in clinical practice.

## Why test urate?

Urate is often tested when a diagnosis of gout is under consideration. Gout is a chronic disease of monosodium urate crystal deposition; these crystals form in presence of supersaturating concentrations of urate (above 0.41mmol/L at 37°C and physiological pH).[2] For gout diagnosis, an elevated urate level in an individual with arthritis increases the likelihood of gout, but is not diagnostic.[3] For accurate diagnosis, a complete clinical assessment is required and ideally, microscopic confirmation of urate crystals from a joint aspirate or tophus.[4] The presence of a blood urate concentration consistently below 0.36mmol/L substantially reduces the likelihood of gout. In a recent large multinational study of people presenting with at least one swollen joint or subcutaneous nodule, only 7% of those with crystal-proven gout had urate levels consistently below 0.36mmol/L.[3]

Urate testing is essential for monitoring of gout treatment. Long-term urate lowering is required for effective management of gout. For all people with gout on urate-lowering therapy, the target concentration is less than 0.36mmol/L. This target is recommended by both the American College of Rheumatology and the European League Against Rheumatism,[5,6] and is required to achieve urate crystal dissolution *in vivo*, prevent gout flares, and allow regression of tophi. The velocity of tophus regression is inversely related to the blood urate concentration,[7] and for this reason, a lower target of less than 0.30mmol/L may be required for those with severe tophaceous disease. Monitoring of urate concentration is crucial to ensure that patients are achieving the relevant treatment target and to guide intensification of urate-lowering therapy to achieve the target. In this context, urate testing should be seen as much a part of the management of gout as HbA1c monitoring is for the management of diabetes.

While elevated blood urate (hyperuricaemia) is the central risk factor for development of gout, with increased risk of incident gout with increased serum urate concentrations,[8] 'screening' people by measuring urate is not recommended.[9] Most people with hyperuricaemia do not have gout. At present, drug treatment of isolated hyperuricaemia in the absence of clinical features of gout or urate nephrolithiasis is not recommended.[6,10] Although some observational and laboratory data

have implicated urate in the pathogenesis of various conditions—including hypertension, metabolic syndrome and chronic kidney disease—there are insufficient clinical trial data to advocate treatment of these conditions with urate-lowering therapy at present. In those with established gout, diabetes and cardiovascular disease frequently coexist.[11] For people with a family history of gout, discussion about ways to reduce risk factors for cardiovascular disease and diabetes is prudent, along with formal cardiovascular risk assessment for those in the relevant age and ethnic group. However, no specific interventions have been shown to prevent development of gout in people with elevated urate. Careful consideration must be given to urate testing in individuals who do not have suspected or confirmed gout, and routine urate screening of 'high-risk' groups without gout is not recommended.

## When should urate be tested?

No clinically important diurnal variation exists for urate, and it can be measured non-fasting at any time of the day.[12] Up to 40% of patients with an acute gout flare may have urate within the normal range at that time.[13] Hence, if the urate is not elevated at the time of a flare of arthritis, and the diagnosis of gout remains a possibility, testing should be repeated after the flare has resolved to help establish the diagnosis of gout.

For individuals with confirmed gout, urate should be measured frequently (eg, monthly) during initiation and escalation of urate-lowering therapy. Once the target urate is achieved, it should be tested every 6–12 months to ensure ongoing maintenance of urate control.

## How should urate be tested?

Urate should be measured using an accurate, reliable and precise method, as clinical decisions about gout management are made based on these test results. Most commonly, urate is tested on venous blood in an accredited chemical pathology laboratory, using an uricase assay, a method with high reliability and precision.[14] The uricase assay is also available using the portable Reflotron™ system, with capillary blood test strips.

Various small point-of-care test meters using electrochemical methodology are commercially available for finger prick testing. Such mobile systems have the potential advantage of real-time urate monitoring, which would facilitate immediate adjustments in treatment depending on the test results. Point-of-care testing may also prevent the inevitable drop-out of patients attending a community laboratory for a venous sample. However, marked variation in the quality and performance of these meters has been reported.[15] Collaboration with local laboratories is required to ensure appropriate training, record keeping, calibration and quality control prior to widespread community use of point-of-care test meters, as recommended by the New Zealand Best Practice Guidelines for Point-of-Care Testing.[16] If quality is assessed as being adequate in a local situation, ongoing maintenance and assessment of calibration is necessary to ensure appropriate results are driving clinical decision making. A further key recommendation of the New Zealand Best Practice Guidelines for Point-of-Care Testing is that point-of-care testing should only be carried out by healthcare staff who have undergone appropriate training and competency certification and who have their competency levels regularly assessed. This is of particular relevance for point-of-care urate testing, as inadequate training may lead to false reassurance during an acute gout flare, or anxiety and fear about the long-term health risks of an elevated urate level in those without gout.

## Patient understanding about treatment targets and urate testing

In order to ensure effective gout management, patient understanding about the rationale for urate testing, the role of urate-lowering therapy and the urate target is essential. We currently recommend the Ministry of Health patient resource that firmly focuses on urate lowering as the core

strategy for effective gout management: "To STOP GOUT, you need to bring your uric acid levels down" (http://www.health.govt.nz/system/files/documents/topic_sheets/to-stop-gout.pdf).

## Summary

Gout is a chronic condition with considerable impact on the lives of patients and their families.[17] Although potentially curable with urate lowering therapy, confusion about the details of urate measurement has contributed to suboptimal care. The central strategy for effective gout management is long-term urate lowering therapy to maintain the urate below 0.36mmol/L. This approach requires regular urate testing and adjustment of urate lowering therapy to achieve and maintain this target. The gold standard is a venous sample at an accredited laboratory, and point-of-care urate testing requires training and calibration with an approved laboratory. We hope that these recommendations will clarify the role of urate testing in clinical practice, and ultimately lead to improved gout management in Aotearoa New Zealand.

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