

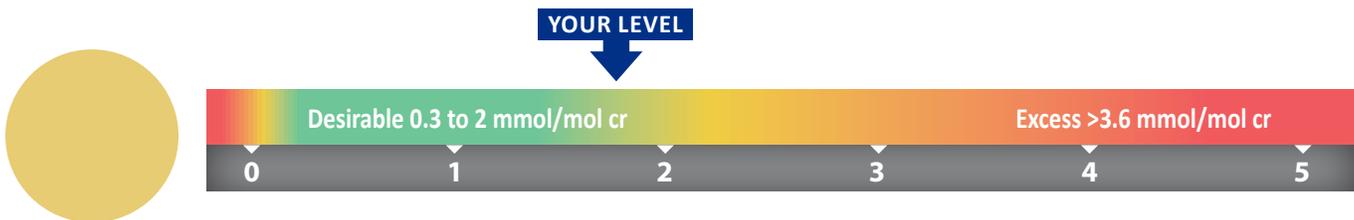
## Urinary Methylmalonic Acid (uMMA) Test – a B12 Status Marker

NAME:  
DOB:  
PATIENT ID: JDoe  
SAMPLE ID:

COLLECTION DATE:  
RESULT DATE:  
PROVIDER:  
ACCOUNT:

### Your uMMA/Creatinine Ratio

Reference Range\*: 0.3-3.6 mmol/mol cr



\* Reference Range is representative of a normal patient population. Visit our FAQ section for more information.

This B12 status test measures the ratio of methylmalonic acid (uMMA) to creatinine (cr) in urine. uMMA is a functional marker of B12 tissue status because B12 is required for MMA to be converted to a different molecule, succinyl-CoA. When there isn't enough B12 available, MMA levels in blood increase and spill over into urine. uMMA is a similar marker to homocysteine; both increase when B vitamins are low and are related to symptoms of B12 insufficiency, like poor neurological health. uMMA in the urine is a stable, sensitive and specific marker of B12 function. Using the ratio, uMMA/cr, accounts for any urine dilution or kidney function issues. As a part of a healthy lifestyle, a uMMA/cr ratio **less than 2.0 mmol/mol cr** may be optimal to support brain, nerve, cellular and maternal health. A uMMA/cr ratio above 3.6 mmol/mol may indicate excessive uMMA i.e. very low functional B12 status, and we recommend consulting with your healthcare provider for further care. Most people can achieve and maintain a desirable uMMA/cr ratio through lifestyle habits like diet and supplementation.

Vitamin B12 is found naturally in animal products, like liver, fish, meat, poultry, eggs and dairy products. It has also been fortified in breakfast cereal and nutritional yeast. For most adults, 4-7 micrograms of B12 per day is enough to maintain adequate B12 status, which is relatively easy to achieve when consuming animal products. However, absorption of B12 can be extremely limited if your stomach does not produce enough of a protein called intrinsic factor, which can be affected by gastric bypass surgery or gastric infections or autoimmune conditions affecting the stomach. Other gut issues, such as Crohn's disease, ileal resectioning or bacterial overgrowth, can also limit B12 absorption. Common medications, like proton-pump inhibitors and metformin, also reduce B12 absorption. All of this means you may be eating enough B12 to meet your needs, but your body can't absorb it and use it, which is why testing is important.

The amount of Vitamin B12 needed to decrease or maintain the uMMA/cr ratio in the desirable range is different for everybody. Many factors – age, sex, genetics, pregnancy status, dietary habits, medications, and other medical conditions – can all influence the body's response to B12. If supplementation is needed due to elevated uMMA/cr, a higher amount of B12 than normal (500-1000 ug per day) or B12 injections may be needed, so please consult with your healthcare provider before making any dietary changes.

*Please consult with your healthcare provider before making any changes to your diet or supplementation regimen. Additional testing may be needed to confirm a B12 deficiency.* If you increase your intake of Vitamin B12 (and/or address any health issues that may be impacting absorption), your uMMA/cr level should respond within 3-4 months. At that time, we recommend that you re-measure your uMMA/cr level while adjusting your intake until you reach the desirable range. Once you reach the desirable range for uMMA/cr, we recommend that you re-test at least yearly. Answers to commonly asked questions about your results can be found in our FAQ section.