F_2-Isoprostanes (F_2-IsoPs)

CPT Codes **82542/82570***
Test Code **906899**
Sample Type **Urine**
Tube Type **Sterile Urine Vial**

F_2-IsoPs levels are increased with:

- Cigarette smoking
- Poor diet (including high red meat intake)
- Sedentary lifestyle

Description

F_2-IsoPs, prostaglandin-like compounds formed from the free radical-mediated oxidation of arachidonic acid, are the 'gold standard' for measuring oxidative stress in the body.[1] F_2-IsoPs also have potent biological effects associated with inflamation and therefore may mediate chronic disease initiation and progression. Additionally, F_2-IsoPs may also act as potent vasoconstrictors[2] via thromboxane formation in the endothelium and promote platelet activation resulting in thrombus formation.[3]

Clinical Use

The F_2-IsoPs test may be performed on individuals at risk of future cardiovascular disease due to lifestyle risks, or those with a family history of cardiovascular disease.

Clinical Significance

- Elevated levels of urinary F_2-IsoPs are seen in conditions associated with increased risk for atherosclerosis[4] and certain forms of cancer.[5,6]
- F_2-IsoPs are elevated in smokers[7] and with increased intake of red meat[8] and are decreased with exercise.[9]

Testing Frequency

Testing of F_2-Isoprostanes is determined by an individual's medical history, but may be performed semi-annually or annually as necessary. If the initial test result is abnormal, then follow-up testing may be performed within 3-6 months following treatment.

Sample Type

The F_2-IsoPs test should be performed on 2.0 mL refrigerated random urine in a sterile urine vial container, no preservatives, labelled "Urine" (1.5 mL minimum).

Commercial Insurance or Medicare Coverage

Coverage guidelines, also known as NCD (National Coverage Determination) or LCD (Local Coverage Determination) have been established or posted by CMS (Medicare & Medicaid). Guidelines should be reviewed for coverage and limitation. Limited information has been provided by the majority of the larger carriers (Aetna, UnitedHealthcare, Cigna, Blues).

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REFERENCE RANGE

F_2-Isoprostanes
(ng/mg)

<0.86 Low	≥0.86 High

Treatment Considerations†

These treatment considerations are for educational purposes only. Specific treatment plans should be provided and reviewed by the treating practitioner.

✓ **Assess smoking habits.**[7]

- Smoking cessation is essential as individuals who smoke are at increased risk of heart disease and blood clots.

✓ **Assess lifestyle habits.**

- Consider diet,[8] weight reduction,[9,10] aerobic and anaerobic exercise,[11,12] as appropriate.
- Consider optimal caloric intake as individuals who exercise a lot may not be taking in enough calories for their activity level. In short, they may be at risk for increased oxidation in their bodies due to lack of nutritional balance.[13]

✓ **Assess omega-3 fatty acid levels.**

- If not at optimal levels, consider fish oil supplements, other dietary supplements, and dietary recommendations for increasing omega-3 fatty acid levels.[14]

✓ **Assess clotting risk.**

- Consider anti-platelet therapy if history of CAD (i.e., myocardial infarction or revascularization) and/or cerebrovascular disease (i.e., transient ischemic attack or stroke).[15]

** The CPT codes provided are based on AMA guidelines and are for informational purposes only. CPT coding is the sole responsibility of the billing party. Please direct any questions regarding coding to the payer being billed.*

† The treatment considerations are provided for informational purposes only and are not intended as medical advice. A physician's test selection and interpretation, diagnosis, and patient management decisions should be based on his/her education, clinical expertise, and assessment of the patient.

References

1. Morrow JD et al. Quantification of Isoprostanes as Indices of oxidant Stress and the Risk of Atherosclerosis in Humans. *Arterioscler Thromb Vasc Biol.* 2005;25:279-286. 2. Morrow JD et al. The F_2-isoprostane, 8-epi-prostaglandin F2alpha, a potent agonist of the vascular thromboxane/endoperoxide receptor, is a platelet thromboxane/endoperoxide receptor antagonist. *Prostaglandins.* 1992; 44: 155-163. 3. Minuz P et al. The F_2-isoprostane 8-epiprostaglandin F2alpha increases platelet adhesion and reduces the antiadhesive and antiaggregatory effects of NO. *Arterioscler Thromb Vasc Biol.* 1998; 18: 1248-1256. 4. Schwedhelm E et al. Urinary 8-iso-prostaglandin F2alpha as a risk marker in patients with coronary heart disease: A matched case-control study. *Circulation.* 2004; 109: 843-848. 5. Rossner P Jr et al. Relationship between urinary 15-F2t-isoprostane and 8-oxodeoxyguanosine levels and breast cancer risk. *Cancer Epidemiol Biomarkers Prev.* 2006; 15: 639-644. 6. Epplein M et al. Association of plasma micronutrient levels and urinary isoprostane with risk of lung cancer: The multiethnic cohort study. *Cancer Epidemiol Biomarkers Prev.* 2009; 18: 1962-1970. 7. Morrow JD et al. Increase in circulating products of lipid peroxidation (F_2-Isoprostanes) in smokers. Smoking as a cause of oxidative damage. *N Engl J Med.* 1995; 332: 1198-1203. 8. Tappel A. Heme of consumed red meat can act as a catalyst of oxidative damage and could initiate colon, breast and prostate cancers, heart disease and other diseases. *Med Hypotheses.* 2007; 68: 562-564. 9. Keaney JF et al. Obesity and Systemic Oxidative Stress. Arterioscler *Thromb Vasc Biol.* 2003;23:434-439. 10. Davi G et al. Platelet activation in obese women: role of inflammation and oxidant stress. *JAMA.* 2002;288(16):2008-14. 11. Shi M et al. Effects of anaerobic exercise and aerobic exercise on biomarkers of oxidative stress. *Environ Health Prev Med.* 2007; 12: 202-208. 12. Nikolaidis MG et al. F_2-Isoprostane formation, measurement and interpretation: The role of exercise. *Prog in Lipid Res.* 2010;50:89-103. 13. Watson TA et al. Antioxidant Restriction and Oxidative Stress in Short Duration Exhaustive Exercise. *Med Sci Sports Exerc.* 2005; 37(1):63-71. 14. Mas E et al. The omega-3 fatty acids EPA and DHA decrease plasma F_2-Isoprostanes: Results from two placebo-controlled interventions. *Free Radical Research.* 2010;44(9):983-90. 15. Minuz P et al. The F2-Isoprostane 8-Epiprostaglandin $F_{2\alpha}$ Increases Platelet Adhesion and Reduces the Antiadhesive and Antiaggregatory Effects of NO. *Arterioscler Thromb Vasc Biol.* 1998;18:1248-1256.

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