INFLAMMATORY BOWEL DISEASE
Inflammatory Bowel Disease (IBD) is a chronic disease impacting nearly 1.2 million Americans.\(^1\) Developments in treatment, such as biologics, have greatly improved quality of life for patients and advancements in laboratory testing are helping to support diagnosis and optimize therapy. LabCorp offers leading expertise and comprehensive testing services to support physicians in the management of IBD patients.

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**LabCorp’s IBD test offering supports complete care decisions**

**Inflammation Status**
- CBC
- Metabolic Panel
- C-Reactive Protein
- Sed Rate
- Calprotectin, Fecal
- Stool Lactoferrin

**IBD Diagnosis**
- GI Pathology
- Colonoscopy or Other Endoscopy

**Risk Assessment**
- Co-Morbidity
  - Clostridium difficile
  - Stool Culture
  - CMV
- Crohn’s Prognostic
  - Anti-Glycan Antibodies

**Treatment Decision**
- Biologic
- Thiopurine
- Methotrexate
- Non-Responder
  - Switch treatment
  - Add co-therapy

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LabCorp’s comprehensive IBD test offering supports complete care decisions, ensuring physicians have access to the latest diagnostic tools and expert guidance for managing these complex conditions.
Single-Source Laboratory Solution for the Gastroenterology Specialist

Through specialized GI testing, a national service network, and multiple connectivity options, LabCorp makes it easier for gastroenterologists to manage their laboratory needs.

- Expansive network of managed care health plans
- 1,700 patient service centers located nationwide
- Integrations with more than 700 EMR/EHRs, PWS, and HIE systems
- PhD and MD level client consultation
- Specialized service offerings for IBD, HCV, Celiac Disease, and Pathology

Pre-Treatment Testing
- CBC
- Metabolic Panel
- QuantiFERON Gold TB
- Hepatitis B Screening

- CBC
- TPMT Enzymes and/or TPMT Genetics
- CBC
- Metabolic Panel

Disease Activity
- C-Reactive Protein
- Stool Lactoferin
- Calprotectin, Fecal

Responder
Monitor progress
Adjust dosing if indicated

Treatment Monitoring
- Thiopurine Metabolites
- MTX Polyglutamates
- Biologic Drug Concentration and Antibody Testing

Quantify active drug levels,
Identify immunogenicity,
Adjust dosing and frequency,
Consider co-therapy,
Switch Treatment
**IBD Treatment Monitoring**

Patient response to IBD treatments may be highly variable but new Therapeutic Drug Monitoring (TDM) assays can help optimize therapy using a personalized, patient-specific approach.

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**Monitoring Biologics**

Biologics monitoring assays measure both drug concentration and anti-drug antibodies to support improved clinical outcomes and characterize those patients who may have diminished response to therapy.¹⁹,²⁰

- All biologics have variable pharmacokinetics and the potential to induce an antibody-mediated immune response.¹⁹,²⁰
- TDM helps optimize dosing and frequency of treatment.²⁰-²²
- TDM assists in preventing and managing loss of response due to immunogenicity.²³,²⁴
- TDM has been shown to be cost-effective and may direct more appropriate care.²⁰

<table>
<thead>
<tr>
<th>Biologic Drug Name</th>
<th>LabCorp Test</th>
<th>LabCorp Test No</th>
<th>Proposed Target Trough Concentrations</th>
<th>Anti-Drug Antibodies Quantitative Range/Result Interpretation</th>
</tr>
</thead>
</table>
| **Infliximab**                     | Infliximab Concentration and Anti-Infliximab Antibody | 503870          | 3 – 7 μg/mL²⁰  
5 - 10 μg/mL²²  
> 4.0 μg/mL for mucosal healing²⁵ | 22- 10,000+ng/mL  
Reported as Low, Intermediate, or High Titer |
| **Adalimumab**                     | Adalimumab Concentration and Anti-Adalimumab Antibody | 503890          | ≥ 4.9 μg/mL²⁶  
> 5.85 μg/mL²⁷ | 25-10,000+ ng/mL  
Reported as Low, Intermediate, or High Titer |
| **Vedolizumab**                    | Vedolizumab Concentration and Anti-Vedolizumab Antibody | 504567          | > 30 μg/mL has been associated with greater mucosal healing | 25-10,000+ ng/mL  
Stratification into low to high titer has yet to be determined. |
| **Golimumab**                      | Golimumab Concentration and Anti-Golimumab Antibody  | 504563          | ≥ 4.27 μg/mL correlated with greater response and remission | 20-10,000+ ng/mL  
Stratification into low to high titer has yet to be determined. |

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**Optimize Biologics Drug Concentrations**

- Dosing by weight and empiric dose adjustments are inefficient and suboptimal.¹⁹,²⁰
- TDM for Biologics is a valuable tool to evaluate doses and to tailor adjustments to your individual patient.¹⁹,²⁰
- TDM can help differentiate under-treatment from other causes of lack of response.
- Proactive dose optimization using TDM may improve clinical scores and prolong duration of anti-TNF therapy.²¹

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**Evaluate Immunogenicity (Anti-drug Antibody level)**

- Close to half of IBD patients on biologic therapy may develop anti-drug antibodies.²³,²⁸,²⁹
- Anti-drug antibodies can adversely affect the amount of drug in the body.²⁸
- Sufficient drug levels (e.g. infliximab >3μg/mL), concomitant use of immunomodulating agents, and regular dosing may protect against the risk of developing anti-drug antibodies.³⁰-³²
Optimize Biologics Drug Concentrations

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- TDM for Biologics is a valuable tool to evaluate doses and to tailor adjustments to your individual patient.
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- Proactive dose optimization using TDM may improve clinical scores and prolong duration of anti-TNF therapy.

Monitoring Immunomodulators

Monitoring drug levels for Immunomodulators supports dosing decisions, assessing patient compliance, and determining effectiveness of treatment.

- Utilize during treatment to help reach and maintain therapeutic goal.
- Assists with evaluating unresponsive patients.
- Thiopurine drugs monitoring helps avoid potential toxicity in responsive patients.
- Approximately 30% – 40% of RA patients do not adequately respond to methotrexate treatment.

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>LabCorp Test</th>
<th>LabCorp Test No</th>
<th>Target Concentrations</th>
</tr>
</thead>
</table>
| Purinethol® Azasan® Imuran® Tabloid® | Thiopurine Metabolites | 503800          | **Suboptimal dosing:** <235 pmol 6-TG/8x10⁸ RBC  
**Optimal dosing:** 235-450 pmol 6-TG/8x10⁸ RBC  
**Increasing risk for myelotoxicity and leukopenia:** >450 pmol 6-TG/8x10⁸ RBC  
**Hepatotoxicity risk:** >5700 pmol 6-MMP/8x10⁸ RBC |
| Rasuvo® Rheumatrex® DosePack® Otrexup® Trexall® | Methotrexate Polyglutamates | 504104         | The minimal concentrations of MTX-polyglutamates associated with a significantly decreased disease activity score (DAS28) at three months were:  
  - 20 nmol/L MTX-PG3  
  - 50 nmol/L Total-PGS (MTX-PG 1–5)  
  85% of patients having a significant reduction (-2) grades of their DAS did so prior to reaching a:  
    - Total MTX-PG (1–5) of 150 nmol/L  
    - MTX-PG2 of 22 nmol/L  
    - MTX-PG3 of 60 nmol/L  
  15% of eventual responders required higher levels. |

TPMT genetic and TPMT activity testing is additionally available to assess dosing prior to Thiopurine treatment, as well as to identify patients who may be at risk for drug toxicity.
Overcome Diagnostic Challenges

The markers examined in LabCorp’s IBD Expanded Diagnostic Profile may help clarify diagnosis and expedite therapeutic decisions.2-7

- Aid in the prompt recognition of IBD6
- Aid in differentiating between IBD and non-IBD1 forms of colitis
- Assist in the differential diagnosis of UC vs CD in both adults and children6
- Assist in the evaluation of patients with indeterminate colitis or IBD unclassified8,9

Support Crohn’s Disease Prognosis and Treatment Decisions

The markers examined in LabCorp’s IBD Expanded Diagnostic profile have been shown to be highly specific predictors of aggressive disease behavior in Crohn’s Disease.2,3,6,10-17 Our profile may help physicians:

- Gain prognostic insight by identifying CD patients at risk for progression to complicated disease2,3,6,10-17
- Stratify patients into disease severity/phenotypic subtypes2,3,6,10-17
- Evaluate candidates for colectomy or IPAA and their postsurgical prognosis9,18
Non-invasive biomarkers may be useful in assessing and monitoring disease activity in Inflammatory Bowel Disease.

A meta-analysis of CRP, fecal calprotectin and stool lactoferrin yielded the pooled sensitivities and specificities, odds ratios, and positive and negative predictive values listed in the chart below. Based on these findings, a negative fecal calprotectin in patients with symptoms consistent with IBD may rule out endoscopically active disease with a NPV of 86%. Conversely, a positive CRP result may rule in endoscopically active disease with a PPV of 86%.

### Diagnostic Accuracy for Endoscopically Active Disease

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>LabCorp Test No</th>
<th>Optimum Cut-off</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV*</th>
<th>NPV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-reactive Protein (CRP), quant.</td>
<td>006627</td>
<td>5.0 mg/L</td>
<td>0.49</td>
<td>0.92</td>
<td>0.86</td>
<td>0.64</td>
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<tr>
<td>Calprotectin, fecal</td>
<td>123255</td>
<td>50 μg/g</td>
<td>0.88</td>
<td>0.73</td>
<td>0.76</td>
<td>0.86</td>
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<tr>
<td>Lactoferrin, fecal quant.</td>
<td>123016</td>
<td>7.25 mg/L</td>
<td>0.82</td>
<td>0.79</td>
<td>0.80</td>
<td>0.82</td>
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</tbody>
</table>

*where average pre-test probabilities of endoscopically active disease are 50%.

### IBD and Related Testing

<table>
<thead>
<tr>
<th>Test Number</th>
<th>Test Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>503890</td>
<td>Adalimumab Concentration and Anti-Adalimumab Antibody</td>
</tr>
<tr>
<td>006627</td>
<td>C-Reactive Protein (CRP), Quantitative</td>
</tr>
<tr>
<td>123255</td>
<td>Calprotectin, Fecal</td>
</tr>
<tr>
<td>183988</td>
<td>Clostridium difficile Toxin Gene, NAA</td>
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<tr>
<td>005009</td>
<td>Complete Blood Count (CBC) With Differential</td>
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<tr>
<td>162020</td>
<td>Crohn's Prognostic Profile</td>
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<tr>
<td>504563</td>
<td>Golimumab Concentration and Anti-Golimumab Antibody</td>
</tr>
<tr>
<td>006510</td>
<td>Hepatitis B Surface Antigen</td>
</tr>
<tr>
<td>016881</td>
<td>Hepatitis B Core Antibody, IgM</td>
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<tr>
<td>162045</td>
<td>IBD Expanded Diagnostic Profile</td>
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<tr>
<td>503870</td>
<td>Infliximab Concentration and Anti-Infliximab Antibody</td>
</tr>
<tr>
<td>322000</td>
<td>Metabolic Panel (14), Comprehensive</td>
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<tr>
<td>504104</td>
<td>Methotrexate Polyglutamates</td>
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<tr>
<td>182873</td>
<td>QuantiFERON®-TB Gold</td>
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<tr>
<td>005215</td>
<td>Sedimentation Rate, Modified Westergren</td>
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<tr>
<td>008144</td>
<td>Stool Culture</td>
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<tr>
<td>503800</td>
<td>Thiopurine Metabolites</td>
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<tr>
<td>510750</td>
<td>Thiopurine Methyltransferase (TPMT), Enzyme Activity</td>
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<tr>
<td>504142</td>
<td>Thiopurine Methyltransferase (TPMT) Genotyping</td>
</tr>
<tr>
<td>504567</td>
<td>Vedolizumab Concentration and Anti-Vedolizumab Antibody</td>
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References


If you have any questions, please contact your local LabCorp representative at 888-522-2677, or visit www.LabCorp.com.