Test Name	Test Code	Effective Date
Other – BeaconLBS for MagnaCare	**N/A**	**June 1**

Effective June 1, 2019, MagnaCare will launch a new Laboratory Benefits Management Program administered by BeaconLBS. Before ordering lab tests, providers who treat MagnaCare patients will be required to register with BeaconLBS' Physician Decision Support® (PDS) online platform. Tests that require Prior Authorization (PA) will be identified in the system for the ordering provider's office to submit to the laboratory.

How to Register with BeaconLBS:

1. Go to BeaconLBS.com and select Login.
2. Select Physician Login and then Sign Up for your first time registration.
3. Choose the Ordering Provider account type and provide a Physician NPI.
4. To ensure secure access for initial registration, please be prepared to provide your Federal Tax Identification Number (FTIN) and physician date of birth.
5. To complete the registration process, each account user will be asked to create a unique user name and password.
6. Once an initial user is registered, you can add additional physicians and users to each account and limit user access by account type.

BeaconLBS offers educational webinar training to introduce you to the platform and provide details on how to incorporate it into your office workflow. For a list of webinar dates and times, please visit www.beaconlbs.com/please-register.

Other - Insurance Coverage	**N/A**	**Immediately**

BioReference is pleased to continue to be an in-network provider with major health plans and hundreds of regional plans, including:

- Humana
- United Healthcare - *Included in the UHC Preferred Laboratory Network effective July 1, 2019*
- Aetna
- Cigna
- Anthem

While some national plans have made changes in their network, these changes DO NOT AFFECT BioReference and its specialty divisions, GenPath and GeneDx. BioReference looks forward to providing you and your patients with quality diagnostic services throughout 2019. For a complete list of health plans contracted with BioReference, please visit https://www.bioreference.com/physicians/why-bioreference/insurance-coverage/

Chromagranin A	**TA34**	**May 22**

Chromogranin A will now be performed in house, and the previously used test code 2411 has been retired. Chromogranin A helps in the diagnosis of other neuroendocrine tumors, including pheochromocytomas, medullary thyroid carcinomas, functioning and nonfunctioning islet cell and gastrointestinal amine precursor uptake and decarboxylation tumors, and pituitary adenomas. Please refer to the table below for updated test information.

	Previous Test Information	New Test Information
Specimen Requirements	SST/ RED, PEDR, PEDS, ALQS	ALQS – Aliquot Tube-Serum
Minimum Volume	0.5 mL	
Turn Around Time*	10 days	4 days
Transportation Temp	Refrigerated or Frozen	Strictly Frozen
Stability	14 days Refrigerated/ 45 days Frozen	14 days
Methodology	Enzyme Linked Immune-absorbance	Enzyme Linked Immune-absorbance
Reference Range		21-106 ng/mL

-Test Information Continued On Next Page -

Test Name	Test Code	Effective Date
Collection Instructions	Fill tube, invert gently 5 times, label with patient name, let stand for minimum of 30 minutes, maximum of 1 hr., spin for 10-15 minutes. Transfer serum to a standard transport tube.	ALQS: Place 1-3 mL of serum in transport tube. Label as serum; Specimen must be submitted Frozen
CPT Code(s)**	86316x1	86316x1

Multiple – Prenatal Tests **Multiple – See Below** **May 6**

The below tests will now be performed in-house at GeneDx:

- Reflex To Array (Test Code A592)
- RFX To Array-FISH (Test Code B222)
- RFX To POC Whole Genome Array (Test Code B158)
- Prenatal Targeted Array CGH (Test Code A583)
- Whole Genome Array (Test Code A591)

Additionally, the following codes have been retired and are no longer orderable:

- Parental Sample (Follow up) (Test Code T810)
- Prenatal Targeted Array CGH (for billing only) (Test Code T384)

Multiple – Referral Tests **Multiple – See Below** **Varies**

Due to changes at our reference laboratory, test information for the below tests has been updated. Please refer to pages 4-12 for full test details.

- Hypersensitivity Pneumonitis Extended Panel (Test Code 8906) (Effective May 20)
- Inhalants Metabolites Panel, Urine (Test Code 2499) (Effective August 5)
- Organic Acids, Comprehensive, Quantitative, Urine (Code 1312) (Effective Immediately)
- Warfarin Sensitivity, CYP2C9 + VKORC1, 3 Variants (Test Code J685) (Effective May 20)

Reverse T3 **T397** **May 24**

Following the completion of an in-house study, reference ranges for **Reverse T3** have been updated:

	Previous Test Information	New Test Information
Reference Range	10.0-28.0 ng/dL	7.0-24.0 ng/dL

Syphilis serology **Multiple (See Below)** **N/A**

Please refer to the below table with regards to uses for **syphilis** testing options:

Test Name	Test Code	Use
RPR serology/titer	0142	Screening test, if positive, automatically reflexes to T. Pallidum (CIA) for confirmation
RPR (post treatment)	R733	RPR serology used to follow patients treated for syphilis (titer provided, no confirmation)
Syphilis (reverse algorithm)	J275	T. Pallidum by chemiluminescent immunoassay (CIA) run first as a screening assay. IF positive, the test reflexes to a standard RPR. IF the RPR is negative, TPPA is added for confirmation (0654)
T. Pallidum Ab (CIA)	0334	This test is used to confirm a previously obtained positive screening result (i.e.RPR or similar). It is also the first test performed in the Reverse Algorithm
Serodia TPPA (Treponema Pallidum Particle Agglutination)	0654	Can be used to confirm a previously obtained positive RPR. It is NOT to be used as an initial screen

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Test Name	Test Code	Effective Date
Human Telomerase Reverse Transcriptase (hTERT)	**TF89**	**June**
Human Telomerase Reverse Transcriptase - Tech Only	**TF87**	
Urine Cytology, if Atypical, reflex to hTert	**TG28**	

Human Telomerase Reverse Transcriptase (hTERT) testing by Immunohistochemistry (IHC) for urothelial carcinoma is now available. Urothelial carcinoma (UC) represents the vast majority of bladder cancer cases. Urothelial carcinomas are treatable, but do have a high risk of recurrence; therefore, continual surveillance is an important part of disease management. The hTERT test may be used in conjunction with urine cytology and identifies hTERT expression in urothelial cells.

The test provides urologists with additional clinical information with respect to recurrent bladder cancer. The combined result nearly doubles the sensitivity of using cytology alone while maintaining a very high specificity and can help to clarify atypical results and/or confirm **positive** results. Please refer to the table below for test details.

	New/Alternate Test Information
Specimen Requirements	Urine in ThinPrep Cytolyt Solution
Minimum Volume	N/A
Turn Around Time*	1-2 Days
Transportation Temperature	Room temperature
Stability	21 Days
Methodology	Immunohistochemistry (IHC)
Reference Range	N/A
Collection Instructions	TPC: Collect specimen swish in Cytolyte vial, label with patient name
Profile Components	N/A
CPT Code(s)**	88342

NOTES:

Client updates are also available to be received via email instead of fax. To subscribe to receive client updates via email, please visit http://bit.ly/BRLIGoGreen

** TAT is based upon receipt of the specimen at the laboratory*

***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.*

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	Old Test Information	New Test Information
Hypersensitivity Pneumonitis Extended Panel (Test Code 8906) (Effective May 20)		
Profile Components	Allergen, Animal, Feather Mix IgE Allergen, Interp, Immunocap Score IgE A. fumigatus #1 Ab, Precipitin A. fumigatus #6 Ab, Precipitin A. pullulans Ab, Precipitin Pigeon Serum Ab, Precipitin M. faeni Ab, Precipitin T. vulgaris #1 Ab, Precipitin Allergen, Food, Beef IgE A. flavus Ab, Precipitin A. fumigatus #2 Ab, Precipitin A. fumigatus #3 Ab, Precipitin S. viridis Ab, Precipitin T. candidus Ab, Precipitin *T. sacchari Ab, Precipitin* Allergen, Fungi/Mold, Phoma betae IgE Allergen, Food, Pork IgE	Allergen, Animal, Feather Mix IgE Allergen, Interp, Immunocap Score IgE A. fumigatus #1 Ab, Precipitin A. fumigatus #6 Ab, Precipitin A. pullulans Ab, Precipitin Pigeon Serum Ab, Precipitin M. faeni Ab, Precipitin T. vulgaris #1 Ab, Precipitin Allergen, Food, Beef IgE A. flavus Ab, Precipitin A. fumigatus #2 Ab, Precipitin A. fumigatus #3 Ab, Precipitin S. viridis Ab, Precipitin T. candidus Ab, Precipitin Allergen, Fungi/Mold, Phoma betae IgE Allergen, Food, Pork IgE
Inhalants Metabolites Panel, Urine (Test Code 2499) (Effective August 5)		
Test Name	Inhalants Metabolites Panel, Urine	Aromatic Solvents Metabolites Panel, Urine
Reference Range	*Analysis by Gas Chromatography (GC)* **o-Cresol** The mean concentration in the urine of the general population is approximately 0.1 mg o-Cresol/L Units: mg/L Reporting Limit: 0.50 **o-Cresol (Creatinine corrected)** Biological Exposure Index (ACGIH) for monitoring exposure to Toluene: 0.3 mg o-Cresol/g Creatinine measured in an end of shift urine specimen. Units: mg/g creat Reporting Limit: 0.50 **Phenol - Total** Less than 10 mg/L in unexposed individuals. Less than 30 mg/L when chronically exposed to 0.5 to 4.0 ppm Benzene in air. Average 200 mg/L during chronic exposure to 25 ppm Benzene in air. Units: mg/L Reporting Limit: 1.0 **Phenol - Total (Creatinine corrected)** Biological Exposure Index (ACGIH): 250 mg Phenol/g Creatinine measured in an end of shift urine. Units: mg/g Creat Reporting Limit: 1.0 *Analysis by High Performance Liquid Chromatography/Tandem Mass Spectrometry (LC-*	*Analysis by Gas Chromatography (GC)* **o-Cresol** The mean concentration in the urine of the general population is approximately 0.1 mg o-Cresol/L Units: mg/L Reporting Limit: 0.50 **o-Cresol (Creatinine corrected)** Biological Exposure Index (ACGIH) for monitoring exposure to Toluene: 0.3 mg o-Cresol/g Creatinine measured in an end of shift urine specimen. Units: mg/g Creat Reporting Limit: 0.10 **Phenol - Total** Less than 10 mg/L in unexposed individuals. Less than 30 mg/L when chronically exposed to 0.5 to 4.0 ppm Benzene in air. Average 200 mg/L during chronic exposure to 25 ppm Benzene in air. Units: mg/L Reporting Limit: 1.0 **Phenol - Total (Creatinine corrected)** Biological Exposure Index (ACGIH): 250 mg Phenol/g Creatinine measured in an end of shift urine. Units: mg/g Creat Reporting Limit: 0.20 *Analysis by High Performance Liquid Chromatography/Tandem Mass Spectrometry (LC-*

	Old Test Information	New Test Information
	MS/MS) **Phenylglyoxylic Acid** Phenylgloxylic acid is not usually detected in the non-exposed general population. Units: g/L Reporting Limit: 0.0010 **Phenylglyoxylic Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.0010 **Mandelic Acid** The detection of significant amounts of mandelic acid in non-occupationally exposed populations is unlikely; however, a background level up to 0.005 g/L has been reported. Units: g/L Reporting Limit: 0.0050 **Mandelic Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.0050 **Mandelic Acid Plus Phenylglyoxylic Acid (Creatinine g/g Creat corrected)** Following exposure to styrene the ACGIH Biological Exposure Index (BEI) for mandelic acid plus phenylglyoxylic acid is 0.4 g/g creatinine measured in an end of shift urine specimen. Following exposure to ethylbenzene the ACGIH Biological Exposure Index (BEI) for mandelic acid plus phenylglyoxylic acid is 0.15 g/g creatinine measured in an end of shift urine specimen. Units: g/g Creat Reporting Limit: 0.0050 **Hippuric Acid** Normal for unexposed populations is generally less than 1.6 g/L. Units: g/L Reporting Limit: 0.020 **Hippuric Acid (Creatinine corrected)** Normal for unexposed populations is generally less than 1.5 g/g creatinine. Units: g/g Creat Reporting Limit: 0.020 **2-Methylhippuric Acid** Methylhippuric acids are not usually detected in the non-exposed general population. Units: g/L Reporting Limit: 0.0050 **2-Methylhippuric Acid (Creatinine corrected)** Units: g/g Creat	*MS/MS)* **Phenylglyoxylic Acid** Phenylgloxylic acid is not usually detected in the non-exposed general population. Units: g/L Reporting Limit: 0.0010 **Phenylglyoxylic Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.00020 **Mandelic Acid** The detection of significant amounts of mandelic acid in non-occupationally exposed populations is unlikely; however, a background level up to 0.005 g/L has been reported. Units: g/L Reporting Limit: 0.0050 **Mandelic Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.0010 **Mandelic Acid Plus Phenylglyoxylic Acid (Creatinine g/g Creat corrected)** Following exposure to styrene the ACGIH Biological Exposure Index (BEI) for mandelic acid plus phenylglyoxylic acid is 0.4 g/g creatinine measured in an end of shift urine specimen. Following exposure to ethylbenzene the ACGIH Biological Exposure Index (BEI) for mandelic acid plus phenylglyoxylic acid is 0.15 g/g creatinine measured in an end of shift urine specimen. Units: g/g Creat **Hippuric Acid** Normal for unexposed populations is generally less than 1.6 g/L. Units: g/L Reporting Limit: 0.020 **Hippuric Acid (Creatinine corrected)** Normal for unexposed populations is generally less than 1.5 g/g creatinine. Units: g/g Creat Reporting Limit: 0.0040 **2-Methylhippuric Acid** Methylhippuric acids are not usually detected in the non-exposed general population. Units: g/L Reporting Limit: 0.0050 **2-Methylhippuric Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.0010

	Old Test Information	New Test Information
	Reporting Limit: 0.0050 **3- and 4-Methylhippuric Acid** Methylhippuric acids are not usually detected in the non-exposed general population. Units: g/L Reporting Limit: 0.0050 **3- and 4-Methylhippuric Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.0050 **Methylhippuric Acids - Total** Methylhippuric acids are usually not detected in the non-exposed general population. Units: g/L **Methylhippuric Acids - Total (Creatinine corrected)** Following exposure to xylenes, the ACGIH Biological Exposure Index (BEI) for methylhippuric acids is 1.5 g/g creatinine measured in an end of shift urine specimen. Units: g/g Creat *Analysis by Colorimetry (C)* **Creatinine** U.S. Population (10th - 90th percentiles, median) All participants: 335 - 2370 mg/L, median 1180 (n=22,245) Males: 495 - 2540 mg/L, median 1370 (n=10,610) Females: 273 - 2170 mg/L, median 994 (n=11,635) Units: mg/L Reporting Limit: 100	**3- and 4-Methylhippuric Acid** Methylhippuric acids are not usually detected in the non-exposed general population. Units: g/L Reporting Limit: 0.0050 **3- and 4-Methylhippuric Acid (Creatinine corrected)** Units: g/g Creat Reporting Limit: 0.0010 **Methylhippuric Acids - Total** Methylhippuric acids are usually not detected in the non-exposed general population. Units: g/L **Methylhippuric Acids - Total (Creatinine corrected)** Following exposure to xylenes, the ACGIH Biological Exposure Index (BEI) for methylhippuric acids is 1.5 g/g creatinine measured in an end of shift urine specimen. Units: g/g Creat *Analysis by Colorimetry (C)* **Creatinine** U.S. Population (10th - 90th percentiles, median) All participants: 335 - 2370 mg/L, median 1180 (n=22,245) Males: 495 - 2540 mg/L, median 1370 (n=10,610) Females: 273 - 2170 mg/L, median 994 (n=11,635) Units: mg/L Reporting Limit: 100
Organic Acids, Comprehensive, Quantitative, Urine (Code 1312) (Effective Immediately)		
Turn Around Time	16 days	9 days
Stability	Ambient … Refrig 28 DAYS Frozen …	Ambient UNACCEPTABLE Refrig 3 DAYS Frozen 28 DAYS
Reference Range	Lactic: ADULTS: 16-93 mmol/mol creat Glycolic: ADULTS: 43-151 mmol/mol creat 2-Hydroxybutyric: ADULTS: < OR = 1 mmol/mol creat 3-Hydroxypropionic: ADULTS: 3-16 mmol/mol creat 3-Hydroxyisobutyric: ADULTS: 16-130 mmol/mol creat 3-Hydroxybutyric: ADULTS: < OR = 7 mmol/mol creat 2-Hydroxyisovaleric: ADULTS: 2-5 mmol/mol creat	Lactic acid: ADULTS: 1-41 mmol/mol creat Pyruvic acid: ADULTS: 0-14 mmol/mol creat 3OH-Butyric acid: ADULTS: 0-21 mmol/mol creat Acetoacetic acid: ADULTS: 0-0 mmol/mol creat 2OH-Butyric acid: ADULTS: 0-2 mmol/mol creat 2-Oxo-Isocaproic acid: ADULTS: 0-4 mmol/mol creat 2OH-Isocaproic acid: 0-0 mmol/mol creat

	Old Test Information	New Test Information
	2-Methyl-3-Hydroxybutyric: ADULTS: < OR = 11 mmol/mol creat 3-Hydroxyisovaleric: ADULTS: 5-14 mmol/mol creat Methylmalonic: ADULTS: < OR = 3 mmol/mol creat 2-Ethyl-3-hydroxypropionic: ADULTS: < OR = 12 mmol/mol creat 2-Hydroxyisocaproic: ADULTS: < OR = 1 mmol/mol creat 3-Hydroxyvaleric: ADULTS: < OR = 1 mmol/mol creat 2-Hydroxy-3-methylvaleric: 0 mmol/mol creat Octanoic: ADULTS: < OR = 1 mmol/mol creat Ethylmalonic: ADULTS: < OR = 8 mmol/mol creat Phenylacetic: ADULTS: < OR = 2 mmol/mol creat Succinic: ADULTS: 2-12 mmol/mol creat Methylsuccinic: ADULTS: 1-4 mmol/mol creat Uracil: ADULTS: 3-33 mmol/mol creat Fumaric: ADULTS: < OR = 5 mmol/mol creat Propionylglycine: ADULTS: < OR = 1 mmol/mol creat 5-Hydroxyhexanoic: ADULTS: < OR = 3 mmol/mol creat Glutaric: ADULTS: 1-3 mmol/mol creat 3-Methylglutaric: ADULTS: < OR = 2 mmol/mol creat 3-Methylglutaconic: ADULTS: 1-10 mmol/mol creat Glutaconic: ADULTS: < OR = 3 mmol/mol creat Isovalerylglycine: ADULTS: < OR = 4 mmol/mol creat Glyoxylic: ADULTS: 0 mmol/mol creat Malic: ADULTS: 1-10 mmol/mol creat 3-Hydroxyadipic: ADULTS: 2-8 mmol/mol creat Adipic:	3OH-Isobutyric acid: ADULTS: 0-97 mmol/mol creat 2OH-Isovaleric acid: ADULTS: 0-1 mmol/mol creat 2-Oxo-3-Methylvaleric acid: ADULTS: 0-3 mmol/mol creat 2-Oxo-Butyric acid: 0-0 mmol/mol creat 2-Oxo-Isovaleric acid: 0-0 mmol/mol creat 3OH-2-Methylbutyric acid: ADULTS: 0-4 mmol/mol creat 2OH-3-Methylvaleric acid: 0-0 mmol/mol creat 3OH-2-Methylvaleric acid: 0-0 mmol/mol creat Succinic acid: ADULTS: 0-16 mmol/mol creat Fumaric acid: ADULTS: 0-1 mmol/mol creat Malic acid: ADULTS: 0-3 mmol/mol creat 5-Oxo-Proline: ADULTS: 8-69 mmol/mol creat 2-Oxo-Glutaric acid: ADULTS: 0-33 mmol/mol creat Citric acid: ADULTS: 24-1174 mmol/mol creat Isocitric acid: ADULTS: 10-131 mmol/mol creat Aconitic acid: ADULTS: 8-143 mmol/mol creat 2OH-Phenylacetic acid: 0-0 mmol/mol creat Phenyllactic acid: 0-0 mmol/mol creat Phenylpyruvic acid: 0-0 mmol/mol creat Phenylacetic acid: 0-0 mmol/mol creat 4OH-Phenylacetic acid: ADULTS: 1-27 mmol/mol creat 4OH-Phenylpyruvic acid: ADULTS: 0-6 mmol/mol creat 4OH-Phenyllactic acid: ADULTS: 0-3 mmol/mol creat Succinylacetone: 0-0 mmol/mol creat

	Old Test Information	New Test Information
	ADULTS: 1-5 mmol/mol creat Pyruvic: ADULTS: 2-9 mmol/mol creat 5-Oxoproline: ADULTS: 15-59 mmol/mol creat 2-Oxoisovaleric: 0 mmol/mol creat 3-Methylcrotonylglycine: 0 mmol/mol creat Tiglylglycine: ADULTS: < OR = 2 mmol/mol creat Mevalonic: ADULTS: < OR = 1 mmol/mol creat 2-Hydroxyglutaric: ADULTS: 2-8 mmol/mol creat 3-Hydroxyglutaric: ADULTS: < OR = 4 mmol/mol creat Acetoacetic: ADULTS: < OR = 5 mmol/mol creat Phenyllactic: ADULTS: 0 mmol/mol creat 3-Hydroxy-3-methylglutaric: ADULTS: < OR = 5 mmol/mol creat 2-Oxo-3-Methylvaleric: ADULTS: < OR = 3 mmol/mol creat 2-Oxoisocaproic: ADULTS: < OR = 4 mmol/mol creat Hexanoylglycine: 0 mmol/mol creat 4-Hydroxyphenylacetic: ADULTS: 4-24 mmol/mol creat 2-Hydroxyadipic: ADULTS: < OR = 1 mmol/mol creat Octenedioic: ADULTS: < OR = 1 mmol/mol creat Suberic: ADULTS: < OR = 2 mmol/mol creat Aconitic: ADULTS: 11-76 mmol/mol creat Orotic: ADULTS: < OR = 1 mmol/mol creat Phenylpropionylglycine: 0 mmol/mol creat Homovanillic: ADULTS: 1-5 mmol/mol creat Isocitric: ADULTS: 41-122 mmol/mol creat Citric:	4OH-Cyclohexylacetic acid: ADULTS: 0-1 mmol/mol creat N-Acetyltyrosine: ADULTS: 0-4 mmol/mol creat Methylmalonic acid: ADULTS: 0-2 mmol/mol creat Malonic acid: 0-0 mmol/mol creat 3OH-Propionic acid: ADULTS: 0-8 mmol/mol creat 4OH-Phenylpropionic acid: 0-0 mmol/mol creat Methylcitric acid: ADULTS: 0-14 mmol/mol creat 3OH-Isovaleric acid: ADULTS: 0-72 mmol/mol creat 3OH-Valeric acid: 0-0 mmol/mol creat Propionylglycine: 0-0 mmol/mol creat Isobutyrylglycine: ADULTS: 0-3 mmol/mol creat 2-Methylbutyrylglycine: 0-0 mmol/mol creat 2-Ethyl-3OH-Propionic acid: ADULTS: 0-8 mmol/mol creat Isovalerylglycine: ADULTS: 0-3 mmol/mol creat Crotonylglycine: 0-0 mmol/mol creat Trans-cinnamoylglycine: ADULTS: 0-48 mmol/mol creat N-Valerylglycine: 0-0 mmol/mol creat 3-Methylcrotonylglycine: ADULTS: 0-7 mmol/mol creat Tiglylglycine: ADULTS: 0-7 mmol/mol creat Butyrylglycine: 0-0 mmol/mol creat Ethylmalonic acid: ADULTS: 0-6 mmol/mol creat Methylsuccinic acid: ADULTS: 0-3 mmol/mol creat Adipic acid: ADULTS: 0-4 mmol/mol creat Suberic acid: ADULTS: 0-2 mmol/mol creat

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	Old Test Information	New Test Information
	ADULTS: 143-765 mmol/mol creat Methylcitric: ADULTS: < OR = 2 mmol/mol creat VMA: ADULTS: 1-3 mmol/mol creat Sebacic: ADULTS: < OR = 1 mmol/mol creat Decadienedioic: 0 mmol/mol creat 4-Hydroxyphenyllactic: ADULTS: < OR = 2 mmol/mol creat 2-Oxoglutaric: ADULTS: < OR = 68 mmol/mol creat Phenylpyruvic: ADULTS: < OR = 2 mmol/mol creat 2-Oxoadipic: 0 mmol/mol creat Hydroxydecanedioic: 0 mmol/mol creat Dodecanedioic: 0 mmol/mol creat N-Acetyltyrosine: ADULTS: < OR = 1 mmol/mol creat Suberylglycine: 0 mmol/mol creat 4-Hydroxyphenylpyruvic: ADULTS: < OR = 1 mmol/mol creat Succinylacetone: 0 mmol/mol creat Malonic: ADULTS: < OR = 2 mmol/mol creat 4-Hydroxybutyric: 0 mmol/mol creat Isobutyrylglycine: ADULTS: < OR = 2 mmol/mol creat 2-Methylbutyrylglycine: ADULTS: < OR = 2 mmol/mol creat 4-Hydroxycyclohexylacetic: ADULTS: < OR = 1 mmol/mol creat 2-Methylacetoacetic: 0 mmol/mol creat N-Acetylaspartic: ADULTS: < OR = 15 mmol/mol creat 3-Hydroxysebacic: ADULTS: < OR = 3 mmol/mol creat	Sebacic acid: ADULTS: 0-0 mmol/mol creat Octanoic acid: ADULTS: 0-19 mmol/mol creat 5OH-Hexanoic acid: ADULTS: 0-0 mmol/mol creat Hexanoylglycine: 0-0 mmol/mol creat 2-Oxo-Adipic acid: ADULTS: 0-0 mmol/mol creat 2OH-Adipic acid: 0-0 mmol/mol creat 3OH-Adipic acid: ADULTS: 0-7 mmol/mol creat Phenylpropionylglycine: 0-0 mmol/mol creat Suberylglycine: ADULTS: 0-3 mmol/mol creat Dodecanedioic acid: 0-0 mmol/mol creat Decadieneoic acid: 0-0 mmol/mol creat 2-Decenedioic acid: 0-0 mmol/mol creat 2-Octenoic acid: ADULTS: 0-10 mmol/mol creat 2-Octenedioic acid: 0-0 mmol/mol creat 3OH-Dodecanedioic acid: 0-0 mmol/mol creat 3OH-Dodecanoic acid: 0-0 mmol/mol creat 3OH-Sebacic acid: ADULTS: 0-3 mmol/mol creat Glutaric acid: ADULTS: 0-1 mmol/mol creat 3-Methylglutaric acid: ADULTS: 0-3 mmol/mol creat 3OH-3-Methylglutaric acid: ADULTS: 0-4 mmol/mol creat 2-Methylglutaconic acid: 0-0 mmol/mol creat 3-Methylglutaconic acid: ADULTS: 0-20 mmol/mol creat Glutaconic acid: 0-0 mmol/mol creat 2OH-Glutaric acid: ADULTS: 0-7 mmol/mol creat

	Old Test Information	New Test Information
		3OH-Glutaric acid: ADULTS: 0-2 mmol/mol creat N-Acetylaspartic acid: ADULTS: 0-41 mmol/mol creat Homogentisic acid: ADULTS: 0-0 mmol/mol creat Homovanillic acid (HVA): ADULTS: 0-11 mmol/mol creat VMA: ADULTS: 0-5 mmol/mol creat 5-HIAA: ADULTS: 0-5 mmol/mol creat Orotic acid: DULTS: 0-2 mmol/mol creat Uracil: ADULTS: 0-9 mmol/mol creat Thymine: 0-0 mmol/mol creat Glyceric acid: ADULTS: 0-32 mmol/mol creat 4OH-Butyric acid: 0-0 mmol/mol creat Mevalonolactone: 0-0 mmol/mol creat 2-Methylacetoacetic acid: 0-0 mmol/mol creat 1.Creatinine, Random Urine mmol/L Kinetic Alkaline Picrate 2.Creatinine (Non-Reporting) mg/L
Warfarin Sensitivity, CYP2C9 + VKORC1, 3 Variants (Test Code J685) (Effective May 20)		
Name Change	Warfarin Sensitivity, CYP2C9 and VKORC1, 3 Variants	Warfarin Sensitivity (CYP2C8, CYP2C9, CYP4F2, VKORC1) Genotyping
Interpretive Data	**Background Information for Cytochrome P450 2C9, *CYP2C9*, 2 Variants:** **Characteristics:** The cytochrome P450 (CYP) isozyme 2C9 is involved in the metabolism of many drugs such as warfarin, phenytoin, tolbutamide, glipizide, ibuprofen, and phenobarbital. Variants of *CYP2C9* will influence pharmacokinetics of *CYP2C9* substrates, and may predict non-standard dose requirements. **Inheritance:** Autosomal co-dominant. **Cause:** *CYP2C9* gene variants result in decreased or complete deficiency in enzyme activity. **Variants Tested: (**Variants are numbered according to NM_000771 transcript)	**Background Information for Warfarin Sensitivity (CYP2C8, CYP2C9, CYP4F2, VKORC1) Genotyping:** **Characteristics:** Warfarin sensitivity can lead to a life-threatening overdose event such as excessive bleeding. Genetic variation is recognized to explain a large proportion of variability in warfarin dose requirements. This test may predict individual warfarin sensitivity and non-standard dose requirements. The cytochrome P450 (CYP) isozymes 2C8 and 2C9 are involved in the metabolism of many drugs. Variants in the genes that code for CYP2C8 and CYP2C9 may influence pharmacokinetics of substrates such as warfarin, and may predict or explain non-standard dose requirements,

	Old Test Information	New Test Information
	Decreased function: *2 (rs1799853, c.430C>T). **Non-functional:** *3 (rs1057910, c.1075A>C). **Negative:** No variants detected is predictive of *1 functional alleles and normal enzymatic activity. **Allele Frequencies:** *CYP2C9* *2: Caucasians 13 percent, Asians <1 percent, African Americans 3 percent. *CYP2C9* *3: Caucasians 7 percent, Asians 4 percent, African Americans 2 percent. **Clinical Sensitivity:** Drug-dependent. **Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring. **Analytical Sensitivity and Specificity:** Greater than 99 percent. **Limitations:** Only the targeted *CYP2C9* variants will be detected by this panel. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with *CYP2C9* substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring. **Background Information for Warfarin Sensitivity by *VKORC1*, 1 Variant:** **Characteristics:** Warfarin sensitivity can lead to a life-threatening overdose event such as excessive bleeding. Genetic variation is recognized to explain a large proportion of variability in warfarin dose requirements. This test may predict individual warfarin sensitivity and non-standard dose requirements. The *VKORC1* test should be performed in combination with the *CYP2C9* test for application to warfarin dose estimates, such as through www.WarfarinDosing.org . **Inheritance:** Autosomal co-dominant. **Cause:** The *VKORC1*2* allele is associated with reduced expression of the warfarin target, vitamin K epoxide reductase (VKOR), and a reduced dose requirement. *CYP2C9* gene variants result in decreased or complete deficiency in enzyme activity that will reduce metabolism and prolong the half-life of warfarin. **Variants Tested:** *VKORC1*2* (rs9923231, c.-1639G>A). (Note: Variant is numbered according to *VKORC1* transcript NM_024006.) **Negative:** No variant detected is predictive of *1 functional allele and normal VKOR expression. **Allele Frequencies:** VKORC1*2: Caucasians 39 percent, Asians 91 percent, African Americans 11 percent.	therapeutic failure or adverse reactions. Variants in the *VKORC1* and *CYP4F2* genes may predict sensitivity to warfarin. Genetic information and non-genetic factors can be used in combination with warfarin dose calculators, such as through www.WarfarinDosing.org. **Inheritance:** Autosomal co-dominant**.** **Cause:** *CYP2C8, CYP2C9* and *CYP4F2* gene variants affect enzyme expression or activity. The *VKORC1*2* allele is associated with reduced expression of the warfarin target, vitamin K epoxide reductase (VKOR), and a reduced dose requirement. **Variants Tested:** See the "Additional Technical Information" document. **Clinical Sensitivity:** Genetic factors and known non-genetic factors account for ~50% of the variability in warfarin dose. **Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring. **Analytical Sensitivity and Specificity:** Greater than 99 percent. **Limitations:** Only the targeted *CYP2C8, CYP2C9, CYP4F2* and *VKORC1* variants will be detected by this panel, and assumptions about phase and content are made to assign alleles. Publically available sources such as the www.pharmvar.org or www.pharmgkb.org provide guidance on phenotype predictions and allele frequencies. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with CYP2C8 or CYP2C9 substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring. See Compliance Statement

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	Old Test Information	New Test Information
	Clinical Sensitivity: Approximately 90 percent of *CYP2C9* and *VKORC1* variants causing warfarin sensitivity in Caucasians are detected when both tests are performed. Less characterized in other populations. **Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring. **Analytical Sensitivity and Specificity:** Greater than 99 percent. **Limitations:** Only the targeted *VKORC1* variant will be detected by this test. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with warfarin may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring. This test does not identify patients at risk for warfarin resistance.	
Profile Components	CYP2C9 Genotype CYP2C9 Phenotype WARF GENO Specimen VKORC1 Genotype Warfarin Predicted Sensitivity	CYP2C8 Genotype CYP2C9 Genotype WARF PAN Specimen CYP4F2 Genotype VKORC1 Genotype WARF PAN Interpretation Doctor Review, WARF PAN

NOTES:

Client updates are also available to be received via email instead of fax. To subscribe to receive client updates via email, please visit http://bit.ly/BRLIGoGreen

**TAT is based upon receipt of the specimen at the laboratory*

***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.*