VibrantWellness
1360 Bayport Ave, Ste B. San Carlos, CA 94070
1(866) 364-0963 | support@vibrant-wellness.com | www. vibrant-wellness.com

| | | | |
|---|---|---|---|
| **Final Report Date:** | 03-03-2019 11:02 | **Specimen Collected:** | 11-30-2015 |
| **Accession ID:** | 1512010000 | **Specimen Received:** | 12-01-2015 00:00 |

| LAST NAME | FIRST NAME | GENDER | DATE OF BIRTH | ACCESSION ID | DATE OF SERVICE |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | MALE | 1997-02-23 | 1512010000 | 11-30-2015 |

## PATIENT

Name: PATIENT TESTNAME
Date of Birth: 1997-02-23
Gender: Male
Age: 22
Height: 6'1" Weight: 169.0 lbs

Telephone #: 000-001-0002
Street Address: 1021 HOWARD AVENUE SUITE B
City: San Carlos
State: CA Zip #: 94070

Fasting: FASTING No. of hours: 12.0

## PROVIDER

Practice Name: Vibrant IT4 Practice
**Provider Name: Vibrant IT4, MD (999999)**
Street Address: 999999 PRACTICE STREET AVE
City: SAN CARLOS
State: CA
Zip #: 94404
Telephone #: 666-666-6662
Fax #: 111-222-0000

For doctor's reference

**Vibrant Wellness** is pleased to present to you, '**Mycotoxins**', to help you make healthy lifestyle, dietary and treatment choices in consultation with your healthcare provider. It is intended to be used as a tool to encourage a general state of health and well-being.

**The Vibrant Mycotoxins** is a test to identify the presence or absence of a large set of mycotoxins from both food and environmental molds. The panel is designed to give a complete picture of an individual's levels of these mycotoxins in urine.

**Interpretation of Report:** The mycotoxins are listed along with the corresponding species and their absolute levels in pg/ml in a tabular form to enable a quick overview. The Mycotoxin is scored as "Detected" or "Not Detected" depending on its level in the urine of the individual being tested. The previous value is also indicated to help check for improvements every time the test is ordered.

The Vibrant Wellness platform provides tools for you to track and analyze your general wellness profile. Testing for Mycotoxins offered by Vibrant Wellness is performed by Vibrant America LLC, a CLIA certified lab CLIA#:05D2078809. Vibrant Wellness provides and makes available this report and any related services pursuant to the Terms of Use Agreement (the "Terms") on its website at www.vibrant-wellness.com. By accessing, browsing or otherwise using the report or website or any services, you acknowledge that you have read, understood, and agree to be bound by these terms. If you do not agree to accept these terms, you shall not access, browse or use the report or website. The statements in this report have not been evaluated by the Food and Drug Administration and are only meant to be lifestyle choices for potential risk mitigation. Please consult your Physician/Dietitian for medication, treatment or life style management. This product is not intended to diagnose, treat, or cure any disease.

Please Note - It is important that you discuss any modifications to your diet, exercise and nutritional supplementation with your physician before making any changes.

**To schedule an appointment with Vibrant Clinical Dietitians please call: Toll-Free 866-364-0963.**

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# Mycotoxins Summary

## Mycotoxins - High

| Test Name (pg/ml) | Species Name | In Control | Moderate | High | Current Level | Previous Level (08/20/2015) |
|---|---|---|---|---|---|---|
| Aflatoxin M1 | Aspergillus | ≤35.0 | 35.1~70.0 | ≥70.1 | >5928.0 | <5.0 |
| Roridin E | Fusarium, Myrothecium, Stachybotrys | ≤25.0 | 25.1~50.0 | ≥50.1 | 4897.0 | <5.0 |
| diacetoxyscirpenol (DAS) | Fusarium | ≤18.0 | 18.1~36.0 | ≥36.1 | 5341.0 | <5.0 |
| T-2 toxin | Fusarium | ≤10.0 | 10.1~20.0 | ≥20.1 | 21.0 | <5.0 |
| Satratoxin H | Stachybotrys chartarum | ≤10.0 | 10.1~20.0 | ≥20.1 | 22.0 | <5.0 |
| Enniatin B1 | Fusarium | ≤20.0 | 20.1~40.0 | ≥40.1 | >5928.0 | <5.0 |
| Fumonisins B2 | Fusarium | ≤50.0 | 50.1~100.0 | ≥100.1 | >5928.0 | <5.0 |

## Mycotoxins - Moderate

| Test Name (pg/ml) | Species Name | In Control | Moderate | High | Current Level | Previous Level (08/20/2015) |
|---|---|---|---|---|---|---|
| Deoxynivalenol (Vomitoxin/DON) | Fusarium | ≤80.0 | 80.1~160.0 | ≥160.1 | 99.0 | <5.0 |

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|---|---|---|---|---|---|
| TESTNAME | PATIENT | MALE | 1997-02-23 | 1512010000 | 11-30-2015 |

# LIFESTYLE MODIFICATIONS

## Prevention

### Foodborne Exposure

It is important to note that mycotoxins can grow on a variety of different crops and foodstuff and can penetrate deep into food and do not just grow on the surface. Mold usually does not grow in properly dried and stored foods, so efficient drying of commodities and maintenance of the dry state, or proper storage, is an effective measure against mold growth and the production of mycotoxins.

To minimize the health risk from mycotoxins, it is advised to:

- Inspect whole grains (especially corn, sorghum, wheat, rice), dried figs and nuts such as peanuts, pistachio, almond, walnut, coconut, Brazil nuts and hazelnuts which are all regularly contaminated with aflatoxins for evidence of mold, and discard any that look moldy, discolored, or shriveled;
- Avoid damage of grains before and during drying, and in storage, as damaged grain is more prone to invasion of molds and therefore mycotoxin contamination;
- Buy grains and nuts as fresh as possible;
- Make sure that foods are stored properly – kept free of insects, dry, and not too warm;
- Not keep foods for extended periods of time before being used
- Ensure a diverse diet – this not only helps to reduce mycotoxins exposure, but also improves nutrition.

### Airborne Exposure

Airborne exposure is likely the most significant route of exposure in water-damaged indoor environments; however, transdermal and potentially foodborne exposure through contact with indoor mycotoxins can also occur in these settings.

- Avoidance of further exposure to water-damaged environments and items contaminated by those environments is advised as ongoing exposure will thwart any efforts at detoxification and perpetuate a reactive state.[22]
- Unfortunately, common building remediation techniques have not been found to be successful in removing mold and mycotoxins from contaminated materials. Studies showed that boron, and ammonium-chloride-based chemicals were the most successful but also peroxide, hot air, flaming, drying, steam, UV light, and sodium-hypochlorite-based chemicals were successful in reducing contaminated mycotoxins.[22]
- It is important to be aware that disturbing contaminated material can significantly increase exposure to spores and mycotoxin-contaminated fragments, dramatically worsening exposure during attempts of remediation or packing of items. The potential for dermal penetration of mycotoxins is also important to keep in mind during any contact with contaminated materials.[22]
- In addition to avoidance of further exposure to contaminated items, it is recommended to decrease exposure to other chemical xenobiotic agents including pesticides, heavy metals, volatile organic compounds and fragrances, vinyl chloride, plastics, perflourinates (nonstick cookware), and other toxins in an effort to reduce total load and improve the ability to detoxify from the exposure to a water-damaged environment.[22]
- Mold development can be controlled by installing proper ventilation systems for showers, laundry, air conditioning etc. to minimize the water leakage and wet environments. Humidity control should be properly maintained to minimize mold development.[22]

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# LIFESTYLE MODIFICATIONS

## Treatment

Oltipraz, an antischistosomal drug, has shown to decrease the metabolism of aflatoxin B1 to its carcinogenic form and increase the detoxification pathways of its metabolites.[23-24]

Several Sequestering agents have shown specific efficacy in lowering mycotoxin levels. They have the potential to bind medications, vitamins, and nutrients and should be taken several hours apart from medications and vitamins and ideally on an empty stomach.[22]

- Clay has been extensively studied for its effect on reducing toxicity from aflatoxin exposure, with the sodium montmorilonite clay Novasil being frequently studied.[22]
- Chlorophyll and chlorophyllin, a water-soluble derivative of chlorophyll, have been found to be well studied as anticarcinogenic agents and have beneficial effects against aflatoxin toxicity. Caution should be exercised in the sourcing of marine-based supplements given the unfortunate known contamination of oceans with toxins and heavy metals.[22]
- Cholestyramine (CSM), an anion exchange resin that works as a bile acid sequestering agent, has been widely studied for its role in reducing a variety of toxins including mycotoxins. CSM has generally been found to be safe and well tolerated even in children.[22]
- Activated carbons (charcoal) have shown high affinity to different mycotoxins such as OTA and deoxynivalenol.[22]
- Bentonite and Zeolite clays reduce the bioavailability of aflatoxins and trichothecenes.[25-26]

Antioxidants and nutritional agents are essential for optimal detoxification and recovery.[22]

- Glutathione, a detoxification agent of fat-soluble compounds and an antioxidant, has been used to successfully treat neurocognitive symptoms resulting from exposure to water-damaged buildings.22
- Supplementation with rosmarinic acid and N-acetyl cysteine (NAC) could reduce the Aflatoxin and OTA induced cytotoxicity.27-28
- Animal experiments shows that genotoxicity from aflatoxin can be prevented by supplementation of whey protein, Korean ginseng or their combination. Whey protein supplies cysteine, the rate limiting step in glutathione synthesis.22
- Studies have shown that vitamins A, C, and E exhibits protective effects on human lymphocytes by inhibiting aflatoxin B1-induced reactive oxygen species generation.22
- Animal studies showed that melatonin and licorice extract (Glycyrrhiza glabra) enhanced antioxidant activity against OTA and aflatoxins.22
- Animal studies showed curcumin showed a significant hepatoprotective activity against aflatoxins by elevating the levels of reduced glutathione, superoxide dismutase, catalase, and glutathione peroxidases.22
- Supplementation with common nutritional deficiencies found in patients ill for a prolonged time including vitamin D, magnesium, zinc, coenzyme Q10, and B vitamin would provide optimum mycotoxin detoxification and recovery.22 Consider ordering Vibran t's micronutrient panel for comprehensive assessment.

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|---|---|---|---|---|---|
| TESTNAME | PATIENT | MALE | 1997-02-23 | 1512010000 | 11-30-2015 |

# LIFESTYLE MODIFICATIONS

## Probiotics, Dietary Interventions and Exercise[22]

- Studied showed the use of fermented milk containing Lactobacillus rhamnosus and Lactobacillus casei strain Shirota alone and in combination with chlorophyllin have significant hepatoprotective effect against aflatoxin B1.[22]
- A regular diet including apiaceous vegetables, such as carrots, parsnips, celery, and parsley as well as sulforaphanes, which are found in cruciferous vegetables may be chemo preventive by inhibiting CYP1A2-mediated carcinogen activation of aflatoxins.[29] In addition, a study in China showed that broccoli sprout tea significantly decrease aflatoxin adducts.[29]
- Animal studies showed that pretreatment and intervention with lycopene significantly reduced the toxic effect caused by aflatoxins.[22]
- Phloretin, a natural phenol found in apple leaves, has been shown to have beneficial effects against aflatoxins with a strong chemopreventive effect.[22]
- The identification of food sensitivities and avoidance of sensitive foods are also beneficial. Beneficial effects can be seen from the avoidance of gluten, even in those not found to have celiac disease.22 Consider ordering wheat Zoomer for a comprehensive assessment.
- Sauna and sweat induction have been used safely in many cultures throughout history and have long been studied as a means of reducing the body burden of toxins.[22]

You should consult your physician before initiating any treatment strategy listed above.

| LAST NAME | FIRST NAME | GENDER | DATE OF BIRTH | ACCESSION ID | DATE OF SERVICE |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | MALE | 1997-02-23 | 1512010000 | 11-30-2015 |

## Aflatoxin

| Test Name (pg/ml) | Species Name | In Control | Moderate | High | Current Level | Previous Level (08/20/2015) |
|---|---|---|---|---|---|---|
| Aflatoxin M1 | Aspergillus | ≤35.0 | 35.1~70.0 | ≥70.1 | >5928.0 | <5.0 |
| Aflatoxin B1 | Aspergillus | ≤35.0 | 35.1~70.0 | ≥70.1 | <5.0 | <5.0 |
| Aflatoxin B2 | Aspergillus | ≤35.0 | 35.1~70.0 | ≥70.1 | 8.0 | 7.9 |
| Aflatoxin G1 | Aspergillus | ≤35.0 | 35.1~70.0 | ≥70.1 | 11.0 | <5.0 |
| Aflatoxin G2 | Aspergillus | ≤35.0 | 35.1~70.0 | ≥70.1 | 8.0 | <5.0 |

### Comments

### Aflatoxin M1

Aflatoxins are secondary metabolites produced by different strains Aspergillus species, widely found as contaminants in a great variety of crops—cereals, oilseeds, tree nuts and spices. Among these toxins, Aflatoxin M1 (AFM1) is the principal hydroxylated aflatoxin metabolite of Aflatoxin B1 (AFB1), the most recurrent and most harmful aflatoxin present in the milk of dairy cows fed a diet contaminated with AFB1. Carry-over of AFB1 as AFM1 in the milk of dairy cows has been established to range from 0.3% to 6.2%. Due to the high stability of AFM1 towards milk processing technologies, such as pasteurization, ultra-high temperature heating (UHT), and other processing methods, this mycotoxin can be found not only in milk, but also in dairy products, usually at higher concentration than that found in raw milk. In addition, AFM1 is found in human breast milk too. This mycotoxin has become a real public health concern, especially for infants and young children. It is considered that infants are more exposed to AFM1 contamination by breast milk intake than that using infant formula.[1] Moreover, international agency for research on cancer (IARC) classified AFB1 and AFM1 as human carcinogens belonging to Group 1 and Group 2B, respectively.[2]

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|---|---|---|---|---|---|
| TESTNAME | PATIENT | MALE | 1997-02-23 | 1512010000 | 11-30-2015 |

## Trichothecenes

| Test Name (pg/ml) | Species Name | In Control | Moderate | High | Current Level | Previous Level (08/20/2015) |
|---|---|---|---|---|---|---|
| Roridin E | Fusarium, Myrothecium, Stachybotrys | ≤25.0 | 25.1~50.0 | ≥50.1 | 4897.0 | <5.0 |
| Verrucarin A | Stachybotrys, Fusarium, Myrothecium | ≤31.0 | 31.1~62.0 | ≥62.1 | <5.0 | <5.0 |
| Deoxynivalenol (Vomitoxin/DON) | Fusarium | ≤80.0 | 80.1~160.0 | ≥160.1 | 99.0 | <5.0 |
| Nivalenol (NIV) | Fusarium | ≤15.0 | 15.1~30.0 | ≥30.1 | 5.0 | <5.0 |
| diacetoxyscirpenol (DAS) | Fusarium | ≤18.0 | 18.1~36.0 | ≥36.1 | 5341.0 | <5.0 |
| T-2 toxin | Fusarium | ≤10.0 | 10.1~20.0 | ≥20.1 | 21.0 | <5.0 |
| Satratoxin G | Stachybotrys chartarum | ≤10.0 | 10.1~20.0 | ≥20.1 | 6.0 | <5.0 |
| Satratoxin H | Stachybotrys chartarum | ≤10.0 | 10.1~20.0 | ≥20.1 | 22.0 | <5.0 |
| Isosatratoxin F | Stachybotrys chartarum | ≤10.0 | 10.1~20.0 | ≥20.1 | <5.0 | 6.4 |
| Roridin A | Stachybotrys chartarum | ≤25.0 | 25.1~50.0 | ≥50.1 | <5.0 | <5.0 |
| Roridin H | Stachybotrys chartarum | ≤25.0 | 25.1~50.0 | ≥50.1 | <5.0 | <5.0 |
| Roridin L-2 | Stachybotrys chartarum | ≤25.0 | 25.1~50.0 | ≥50.1 | 9.0 | <5.0 |
| Verrucarin J | Stachybotrys chartarum | ≤31.0 | 31.1~62.0 | ≥62.1 | 5.0 | <5.0 |

### Comments

**Roridin E**
Roridin E is a well-known macrocyclic trichothecene mycotoxin produced by various species of Fusarium, Myrothecium, Trichoderma, Trichothecium, Cephalosporium, Verticimonosporium, and Stachybotrys. They are produced on many different grains like wheat, oats or maize by various Fusarium species. Some molds that produce trichothecene mycotoxins, such as Stachybotrys chartarum, can grow in damp indoor environments and may contribute to health problems among building occupants.[6]

**Deoxynivalenol (Vomitoxin/DON)**
Deoxynivalenol (DON), also known as Deoxynivalenol, a tricothecene mycotoxin, is produced by several species of Fusarium. DON has been associated with outbreaks of acute gastrointestinal illness in humans. The FDA advisory level for DON for human consumption is 1 ppm.

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## diacetoxyscirpenol (DAS)

Diacetoxyscirpenol (DAS), also known as anguidine, is a type A trichothecene mycotoxin primarily produced by Fusarium fungi. Trichothecenes are known as major contaminants of cereals and cereal-containing foods. DAS has been detected in agricultural products worldwide and persists in products after processing. In human as well as in animals, DAS consumption has been shown to induce haematological disorders (neutropenia, aplastic anemia). In the published literature, DAS has mainly been reported in various cereal grains (principally wheat, sorghum, maize, barley and oats) and cereal products, but also in potato products, soybeans and coffee. The highest levels have been reported for wheat, sorghum and coffee. DAS has been found to co-occur with many other mycotoxins in grains and grain-based products, in particular Fusarium toxins including type A and B trichothecenes, and zearalenone.[20]

## T-2 toxin

T-2 Toxin is a tricothecene produced by species of Fusarium and is one of the rare and deadlier toxins. If ingested in sufficient quantity, T-2 toxin can severely damage the entire digestive tract and cause rapid death due to internal hemorrhage. T-2 has been implicated in the human diseases alimentary toxic aleukia and pulmonary hemosiderosis. Damage caused by T-2 toxin is often permanent.

## Satratoxin H

Satratoxin H is a trichothecene mycotoxin that have been recognized as one of the potential etiologic agents in outbreaks of sick building syndromes. satratoxin H, potently inhibit protein synthesis and thymocyte proliferation and also can cause diseases such as an immune dysfunction and idiopathic pulmonary hemorrhage in infants. Recent studies have shown a possible relationship between trichothecenes and disorders of central nervous system including severe neuronal death.[22]

| LAST NAME | FIRST NAME | GENDER | DATE OF BIRTH | ACCESSION ID | DATE OF SERVICE |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | MALE | 1997-02-23 | 1512010000 | 11-30-2015 |

## Other

| Test Name (pg/ml) | Species Name | In Control | Moderate | High | Current Level | Previous Level (08/20/2015) |
|---|---|---|---|---|---|---|
| Ochratoxin A | Aspergillus, Penicillium | ≤32.0 | 32.1~64.0 | ≥64.1 | 25.0 | <5.0 |
| Sterigmatocystin | Aspergillus, Penicillium, Bipolaris | ≤22.0 | 22.1~44.0 | ≥44.1 | 10.0 | <5.0 |
| Zearalenone | Fusarium | ≤30.0 | 30.1~60.0 | ≥60.1 | 10.0 | <5.0 |
| Enniatin B1 | Fusarium | ≤20.0 | 20.1~40.0 | ≥40.1 | >5928.0 | <5.0 |
| Fumonisins B1 | Fusarium | ≤42.0 | 42.1~84.0 | ≥84.1 | 6.0 | 9.9 |
| Fumonisins B2 | Fusarium | ≤50.0 | 50.1~100.0 | ≥100.1 | >5928.0 | <5.0 |
| Fumonisins B3 | Fusarium | ≤70.0 | 70.1~140.0 | ≥140.1 | 23.0 | <5.0 |
| Citrinin | Penicillium | ≤30.0 | 30.1~60.0 | ≥60.1 | 10.0 | 7.8 |
| Patulin | Penicillium | ≤39.0 | 39.1~78.0 | ≥78.1 | 16.0 | <5.0 |
| Gliotoxin | Aspergillus | ≤100.0 | 100.1~200.0 | ≥200.1 | 7.0 | <5.0 |
| Mycophenolic Acid | Penicillium | ≤52.0 | 52.1~104.0 | ≥104.1 | 24.0 | <5.0 |
| Dihydrocitrinone | Aspergillus, Penicillium, Monascus | ≤44.0 | 44.1~88.0 | ≥88.1 | 10.0 | <5.0 |
| Chaetoglobosin A | Chaetomium globosum | ≤63.0 | 63.1~126.0 | ≥126.1 | <5.0 | 10.3 |

### Comments

**Enniatin B1**
Mycotoxin enniatin B (ENN B) is a secondary metabolism product by Fusarium fungi. It is a well-known antibacterial, antihelmintic, antifungal, herbicidal, and insecticidal compound. It has been found as a contaminant in cereal grains, animal feeds and several food commodities worldwide, co-occurring with other mycotoxins. Moreover, they are commonly found in fish, dried fruits, nuts, spices, cocoa, coffee products, etc. Food processing techniques such as cooking, baking, frying, roasting, etc. do not affect their chemical structure; so, detoxification strategies to mitigate the risks of ENNs presence in foods and feed may be difficult. Several in vitro and in vivo studies have revealed that ENN B toxicity involves the inhibition of acyl-CoA: cholesterol acyl transferase (ACAT) activity and oxidative stress. ENN B also exerts cytotoxic activities by inducing mitochondrial modifications and cell cycle disruption, finally resulting in apoptotic cell death. Moreover, it produces adrenal endocrine toxicity. A recent study reports a potential anticancer activity. Nevertheless, regulatory limits have not yet been defined, due to a lack of complete toxicity data.[8]

**Fumonisins B2**
Fumonisin B2 is a mycotoxin produced by Fusarium growing on moldy corn (maize) grain. FB2 and Fumonisin B3 (FB3) occur in lower concentrations than FB1. FB1 and FB2 are approximately equal in structure and toxicity but naturally occur in a ratio of about 3:1 for FB1/FB2, thus has less toxicity than FB1.[9]

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## Key Terms/Glossary

| | |
|---|---|
| **Mycotoxin** | A toxic substance produced by a fungus |
| **Antibacterial Compound** | A compound active against bacteria to kill or remove them from body |
| **Antihelmintic Compound** | A group of antiparasitic drugs that expel parasitic worms (helminths) and other internal parasites from the body by either stunning or killing them and without causing significant damage to the host. |
| **Antifungal** | A pharmaceutical fungicide or fungistatic used to treat and prevent mycosis. |
| **Detoxification** | Physiological or medicinal process of removal of toxic substances from a living organism, including the human body |
| **Sick building syndrome** | Medical condition where people in a building suffer from symptoms of illness or feel unwell for no apparent reason |
| **Hepatocarcinoma** | The most common primary liver tumor |
| **Antischistosomal** | An agent capable of affecting the viability of schistosomes |
| **Sequestering agent** | Nonabsorbable material capable of binding toxins in the gastrointestinal tract and reducing enterohepatic recirculation and ultimately the body burden of toxins. |

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## Risk and Limitations

This test has been developed and its performance characteristics determined by Vibrant America LLC., a CLIA and CAP certified lab. These assays have not been cleared or approved by the U.S. Food and Drug Administration.

Mycotoxins do not demonstrate absolute positive and negative predictive values for mold related illnesses. Clinical history must be incorporated into the diagnostic determination. Quantification of mycotoxins in urine is not FDA-recognized diagnostic indicator of mold exposure.

Mycotoxins testing is performed at Vibrant America, a CLIA certified laboratory and utilizes ISO-13485 developed technology. Vibrant America has effective procedures in place to protect against technical and operational problems. However, such problems may still occur. Examples include failure to obtain the result for a specific mycotoxin due to circumstances beyond Vibrant's control. Vibrant may re-test a sample in order to obtain these results but upon re-testing the results may still not be obtained. As with all medical laboratory testing, there is a small chance that the laboratory could report incorrect results. A tested individual may wish to pursue further testing to verify any results.

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