COVER PAGE for November 2016 MDR

The FDA received this Medical Device Report (MDR) from Magellan Diagnostics on May 8, 2017, after learning through information requests that the company had tried to submit the report in November 2016. The MDR, which is characterized as a follow-up to the April 2015 report, adds a second testing device, the LeadCare II Testing System. The MDR states that Magellan determined the root cause of the problem involved exposure of the blood samples to a curing agent found in the rubber caps of the venous collection tubes. The MDR states that a 4-hour delay in processing venous samples completely mitigates the problem for LeadCare II.

Magellan originally attempted to submit the follow-up MDR in paper form. FDA returned it with a request to submit the MDR electronically, as our regulations requiring electronic submission of MDRs went into effect in August 2015 (with a compliance grace period until February 2016). Magellan had registered for an electronic submission account in February 2016 but never completed the process, in spite of assistance from the Agency.

Regulations specify when a manufacturer must submit a MDR to the FDA, including when a manufacturer must report a death, serious injury, or product malfunction. The FDA typically receives between 800,000 and 1,000,000 MDRs per year. The majority involve device "malfunctions," which FDA regulations define as a failure of the device to meet its performance specifications or otherwise perform as intended. The FDA routinely uses malfunction reports to conduct trend analysis and identify potential safety issues. Additional information regarding medical device reporting requirements can be found at https://www.fda.gov/MedicalDevices/Safety/ReportaProblem/ucm2005291.htm#overview.

FDA RECEIVED THIS REPORT ON MAY 8, 2017

Form Approved: OMB No. 0910-0291, Expires: 6/30/2015
See OMB statement on reverse.

U.S. Department of Health and Human Services
Food and Drug Administration

MEDWATCH

FORM FDA 3500A (2/13)

For use by user-facilities, importers, distributors and manufacturers for MANDATORY reporting

Mfr Report # 1218996-2015-00001 A

UF/Importer Report #

FDA Use Only

PLEASE TYPE OR USE BLACK INK

A. PATIENT INFORMATION

1. Patient Identifier	2. Age at Time of Event: or Date of Birth:	3. Sex	4. Weight
In confidence		☐ Female ☐ Male	____ lbs or ____ kgs

B. ADVERSE EVENT OR PRODUCT PROBLEM

1. ☐ Adverse Event and/or ☑ Product Problem *(e.g., defects/malfunctions)*

2. Outcomes Attributed to Adverse Event *(Check all that apply)*
- ☐ Death: _____ *(mm/dd/yyyy)*
- ☐ Disability or Permanent Damage
- ☐ Life-threatening
- ☐ Congenital Anomaly/Birth Defect
- ☐ Hospitalization - initial or prolonged
- ☑ Other Serious (Important Medical Events)
- ☐ Required Intervention to Prevent Permanent Impairment/Damage (Devices)

3. Date of Event *(mm/dd/yyyy)*	4. Date of This Report *(mm/dd/yyyy)*
	11/7/2016

5. Describe Event or Problem

11/15/2014 (ULTRA) Initial Risk Analysis Hazard/Risk Score Total = 1 None/Negligible which is a Non Recall Status The medical decision points of treating lead is per CDC guidelines (see attached letter dated Nov. 29) factored into the decision initially not to file.

3/23/2015(ULTRA) Based on new information a second Risk Analysis was performed which changed our score from a Total Hazard/Risk Score from a 1 to a overall score of 6 which is Low; Recall Class III. Thus we felt that even though we have mitigated the issue completely through our pending labeling change and Customer Letter, it was in compliance with FDA and our internal recall procedure that we chose to file this MDR with FDA.

10/15/2016 (LeadCare II) Once root cause was found LeadCare II was investigated and found to have the same problem but at lesser impact

Please see attached #B.5.Description of event or Problem of LeadCare II

(Continue on page 3)

6. Relevant Tests/Laboratory Data, Including Dates

(Continue on page 3)

7. Other Relevant History, Including Preexisting Medical Conditions *(e.g., allergies, race, pregnancy, smoking and alcohol use, hepatic/renal dysfunction, etc.)*

Medical Decision points of treating lead is per CDC guidelines (see attached letter dated Nov. 29) factored into the decision initially not to file.
The LeadCare Ultra intended use is to test for lead levels in whole blood for occupational and pediatric testing. "Based on the prevalence of elevated blood lead levels from the CDC, approximately 2.5% of your patient results may cross the medical decision point of 5 ug/dL."

(Continue on page 3)

Submission of a report does not constitute an admission that medical personnel, user facility, importer, distributor, manufacturer or product caused or contributed to the event.

C. SUSPECT PRODUCT(S)

1. Name *(Give labeled strength & mfr/labeler)*
- #1 Lead Care Ultra Test System (original MedWatch)
- #2 LeadCare II (Ammendment to original MedWatch)

2. Dose, Frequency & Route Used	3. Therapy Dates *(If unknown, give duration) from/to (or best estimate)*
#1	#1
#2	#2

4. Diagnosis for Use *(Indication)*
- #1 to measure lead in whole blood
- #2

5. Event Abated After Use Stopped or Dose Reduced?
- #1 ☐ Yes ☐ No ☑ Doesn't Apply
- #2 ☐ Yes ☐ No ☑ Doesn't Apply

6. Lot #	7. Exp. Date
#1	#1
#2	#2

8. Event Reappeared After Reintroduction?
- #1 ☐ Yes ☐ No ☑ Doesn't Apply
- #2 ☐ Yes ☐ No ☑ Doesn't Apply

9. NDC# or Unique ID

10. Concomitant Medical Products and Therapy Dates *(Exclude treatment of event)*
None.

(Continue on page 3)

D. SUSPECT MEDICAL DEVICE

1. Brand Name: LeadCare II Test System

2. Common Device Name	2b. Procode
LeadCare II Analyzer	DOF

3. Manufacturer Name, City and State
101 Billerica Ave., Bldg 4
Billerica, Ma. 01862

4. Model #	Lot #	5. Operator of Device
70-6762	N/A	☑ Health Professional
Catalog #	Expiration Date *(mm/dd/yyyy)*	☐ Lay User/Patient
70-6762	N/A	☐ Other:
Serial #	Unique Identifier (UDI) #	
N/A	00850355006000	

6. If Implanted, Give Date *(mm/dd/yyyy)*	7. If Explanted, Give Date *(mm/dd/yyyy)*

8. Is this a Single-use Device that was Reprocessed and Reused on a Patient?
☐ Yes ☑ No

9. If Yes to Item No. 8, Enter Name and Address of Reprocessor

10. Device Available for Evaluation? *(Do not send to FDA)*
☑ Yes ☐ No ☐ Returned to Manufacturer on: _____ *(mm/dd/yyyy)*

11. Concomitant Medical Products and Therapy Dates *(Exclude treatment of event)*

(Continue on page 3)

E. INITIAL REPORTER

1. Name and Address
No Complaints registered through complaint system or Product Support. This Ammendment to the MedWatch 1218996-2015-00001 resulted from an internal investigation.

Phone #	Email Address
	rdaoust@magellandx.com

2. Health Professional?	3. Occupation	4. Initial Reporter Also Sent Report to FDA
☐ Yes ☑ No	Administrator/Supervisor	☐ Yes ☑ No ☐ Unk.

MEDWATCH

FORM FDA 3500A (2/13) *(continued)*

FDA USE ONLY

F. FOR USE BY USER FACILITY/IMPORTER *(Devices Only)*

1. **Check One** ☐ User Facility ☐ Importer
2. **UF/Importer Report Number**
3. **User Facility or Importer Name/Address**
4. **Contact Person**
5. **Phone Number**
6. **Date User Facility or Importer Became Aware of Event** *(mm/dd/yyyy)*
7. **Type of Report** ☐ Initial ☐ Follow-up # ____
8. **Date of This Report** *(mm/dd/yyyy)*
9. **Approximate Age of Device**
10. **Event Problem Codes** *(Refer to coding manual)*
Patient Code ____ - ____ - ____
Device Code ____ - ____ - ____
11. **Report Sent to FDA?** ☐ Yes ____ *(mm/dd/yyyy)* ☐ No
12. **Location Where Event Occurred** ☐ Hospital ☐ Outpatient Diagnostic Facility ☐ Home ☐ Ambulatory Surgical Facility ☐ Nursing Home ☐ Outpatient Treatment Facility ☐ Other: ____ *(Specify)*
13. **Report Sent to Manufacturer?** ☑ Yes ____ *(mm/dd/yyyy)* ☐ No
14. **Manufacturer Name/Address**
Magellan Diagnostics
101 Billerica Ave, Bldg. 4
North Billerica, Ma. 01864

G. ALL MANUFACTURERS

1. **Contact Office (and Manufacturing Site for Devices)**
Name: Magellan Diagnostics
Address: 101 Billerica Ave, Bldg. 4
North Billerica, Ma. 01864
Email Address: rdaoust@magellandx.com
2. **Phone Number**: 978-248-4811
3. **Report Source** *(Check all that apply)* ☐ Foreign ☐ Study ☐ Literature ☐ Consumer ☐ Health Professional ☐ User Facility ☑ Company Representative ☐ Distributor ☐ Other:
4. **Date Received by Manufacturer** *(mm/dd/yyyy)*: Initial Ultra compl
5. (A)NDA # ____ IND # ____ BLA # ____ PMA/510(k) # K123563
Combination Product ☐ Yes
Pre-1938 ☐ Yes
OTC Product ☐ Yes
6. **If IND, Give Protocol #**
7. **Type of Report** *(Check all that apply)* ☐ 5-day ☐ 30-day ☐ 7-day ☐ Periodic ☐ 10-day ☑ Initial ☐ 15-day ☑ Follow-up # 1
8. **Adverse Event Term(s)**
9. **Manufacturer Report Number**: 1218996-2015-00001

H. DEVICE MANUFACTURERS ONLY

1. **Type of Reportable Event** ☐ Death ☐ Serious Injury ☑ Malfunction
2. **If Follow-up, What Type?** ☐ Correction ☑ Additional Information ☐ Response to FDA Request ☐ Device Evaluation
3. **Device Evaluated by Manufacturer?** ☐ Not Returned to Manufacturer ☑ Yes ☐ Evaluation Summary Attached ☐ No *(Attach page to explain why not)* or provide code:
4. **Device Manufacture Date** *(mm/yyyy)*: 09/2016
5. **Labeled for Single Use?** ☐ Yes ☑ No
6. **Event Problem and Evaluation Codes** *(Refer to coding manual)*

Patient Code				
Device Code	13	31	36	
Method	31			
Results	57	78	75	
Conclusions	150	160		

7. **If Remedial Action Initiated, Check Type** ☐ Recall ☑ Notification ☐ Repair ☐ Inspection ☐ Replace ☐ Patient Monitoring ☐ Relabeling ☐ Modification/Adjustment ☐ Other: Letter to Customer
8. **Usage of Device** ☑ Initial Use of Device ☐ Reuse ☐ Unknown
9. **If action reported to FDA under 21 USC 360i(f), list correction/removal reporting number:**
10. ☑ **Additional Manufacturer Narrative** and / or 11. ☐ **Corrected Data**

See Section B.5 attachment. LeadCare II

Please note that once we discovered the root cause for the LeadCare Ultra originally filed with this MedWatch in 2014, we immediately started internal investations to our LeadCare II product line.

Underestimation of a blood lead result at immediate incubation times could indicate that a larger population of samples would appear to have lead levels below the medical decision point and possibly not be retested or treated. Based on these new data, the Risk Assessment was updated. The Total Hazard/Risk Score was increased from a score of 1 (None/Negligible) to an overall score of 6 (Low) and a Recall Class III. With this increased level of risk and in compliance with Magellan's Adverse Events procedure and FDA 820.30, Magellan is filing this MDR with FDA. Please note the treatment reagent is the primary difference between LC Ultra and LC II. See B5 further explanation.

Please note that with the Customer Letter requiring a 4 hour incubation period the Total Hazard/Risk Score is reduced to 1.

Delete Page

(CONTINUATION PAGE)
For use by user-facilities,
importers, distributors, and manufacturers
for MANDATORY reporting

MEDWATCH
FORM FDA 3500A (2/13) *(continued)*

Back to Item B.5

B.5. **Describe Event or Problem** *(continued)*

See attached B.5 Document.

Back to Item B.6

B.6. **Relevant Tests/Laboratory Data, Including Dates** *(continued)*

Back to Item B.7

B.7. **Other Relevant History, Including Preexisting Medical Conditions** *(e.g., allergies, race, pregnancy, smoking and alcohol use, hepatic/renal dysfunction, etc.) (continued)*

Back to Item C.10

Concomitant Medical Products and Therapy Dates *(Exclude treatment of event) (For continuation of C.10 and/or D.11; please distinguish)*

Back to Item D.11

Other Remarks

See Attached:
1. Section B.5
2. Customer Letter dated November 4, 2016
3. Reference Original MedWatch filed on the LeadCare Ultra

SECTION B5

Description of Problem and Events:

Description of Problem: Internal studies have shown that the LeadCare II is also affected by the below mentioned "incubation effect" as exhibited and previously submitted for the LeadCare Ultra in MedWatch Report 218996-2015-00001.

==========

Magellan Diagnostics (MDx) has recently determined the root cause of the issue with the LeadCare Ultra blood results being underestimated, as compared to the GFAAS, to be the curing agent found in the rubber caps used in venous blood collection tubes. This issue was previously filed with MedWatch Report # 218996-2015-00001. To date, there have been no customer reports of this issue from LeadCare II users.

Some venous blood collection tubes, including Becton Dickinson (BD) K_2-EDTA Vacutainer® tubes, may introduce a substance into the blood sample that could cause an underestimation of the blood lead result. This substance is believed to be a b(4), TS containing curing agent used in the manufacture of the rubber stopper. In cases of prolonged exposure to the cap (tube placed on a rocker or stored upside down for several hours), the substance can leach into the blood sample. When the blood sample is mixed with treatment reagent and analyzed immediately, the substance can suppress the lead response. MDx did not observe this during the clinical studies prior to product release. It is assumed that there have been changes to the Cap manufacturing process due to RoHS, REACH and other requirements, and that these changes may have led to the phenomenon that is the subject of this report.

On identifying the root cause MDx realized that a very small proportion of our LeadCare II customers (approx. b(4), CCI or 8%) may also be using venous blood collection tubes and transporting samples prior to testing for lead. Internal testing found evidence of a lesser effect on the LeadCare II. While not as long acting as observed for the LeadCare Ultra, it takes a minimum of a 4 hour room temperature incubation of blood/treatment reagent mixture to completely mitigate the underestimation of lead by LeadCare II. MDx has no control over the blood collection tube manufacturer's process and the amount of the substance leaching into the sample varies, depending on the amount in the cap, and also the amount of time the blood touches the cap varies depending on workflow. Therefore MDx has decided that all clinical customers must be contacted out of an abundance of caution, as we work on a mitigation that doesn't affect their workflow.

PLEASE NOTE: Capillary tubes and fingers sticks do NOT exhibit this phenomenon as there are no rubber stoppers to contact the blood and leach the interfering substance.

The difference between the LeadCare II and the LeadCare Ultra is two fold. The LeadCare II uses fresh, non-anticoagulated whole blood and treatment reagent of 0.34M HCl. LeadCare Ultra can use heparin or EDTA anticoagulated blood that has been stored up to 3 days, and the reagent contains 0.34M HCl ***plus*** Carbon. The carbon slows down the reaction with the interferent and therefore takes longer for the lead results to come up to the appropriate levels, *i.e.,* equivalent to the reference GFAAS.

The Total Hazard/Risk Score was calculated to a 6 which is Low, Recall Level III. Based on this level of risk and in compliance with Magellan's Adverse Events procedure and FDA 820.30, Magellan is amending this MedWatch with FDA.

In Magellan's investigational studies it was determined that by allowing the blood-treatment reagent mixture to sit (a process we have termed "incubation"), for a minimum of 4 hours prior to analysis mitigates this problem. This reduces the Total Hazard/Risk Score back to a 1. A customer letter has been issued to inform our clinical customer base of this issue. We have incorporated a Faxback sheet to track the notification of customers. In addition we will modify the labeling for the LeadCare II so future customers will be informed.

Dates of Events

Based on data collected by Magellan, from carefully controlled time course studies, a Customer Letter was issued on 11/04/2016 to all b(4), CCI of LeadCare II customers to recommend that if a sample is collected in a blood collection tube and transported, they incubate the sample in treatment reagent for a minimum of 4 hours at room temperature. This letter was issued with a "Faxback" form and will be tracked in Product Support.

> **Conclusion of Customer Letter**: "These data demonstrate that incubation of the sample- treatment reagent mixture for 4 hours at room temperature prior to analysis minimizes bias and generates results that are comparable to the reference method, GFAAS. We are performing additional validation studies to determine if the 4-hour minimum incubation time can be reduced or eliminated, and will notify you of our final resolution."

The following actions have been taken to inform customers of this issue:

1. Letter to Customer 11/4/2016
2. Faxback Form for Tracking 11/4/2016
3. Updated Package Insert for new kits 11/7/2016
4. Insert to LeadCare II Kit's to alert them of the change 11/7/2016
5. Internal training for Product Support and Sales / Customer facing personnel

The Total Hazard/Risk Score was originally calculated to a 6 which is Low, Recall Level III. Based on this level of risk and in compliance with Magellan's Adverse Events procedure and FDA 820.30, Magellan is amending this MDR with FDA.

After the 4 hour incubation, the effect of the rubber caps was completely mitigated. The Risk Assessment was performed again the Total Hazard/Risk Score was re-calculated to be 1 (None/Negligible). Again to emphasize this only affects a very small percentage of our customer base. Most customers are in a CLIA waived environment and use only capillary tubes.

Magellan
DIAGNOSTICS

Notice to Customers

November 4, 2016

Dear Customer:

This letter is to inform customers that analyze **venous** blood with the LeadCare® II Blood Lead Testing System of a discovery that could potentially impact patient results. This discovery does not impact customers that analyze capillary blood collected from a fingerstick.

We have discovered that some venous collection tubes, including Becton Dickinson (BD) K_2-EDTA Vacutainer® tubes, may introduce a substance into the blood sample that could produce an underestimation of the LeadCare II blood lead result. The substance is believed to be a sulfur-containing curing agent used in the manufacture of the rubber stopper. In cases of prolonged exposure to the stopper (tube placed on a rocker or stored upside down for several hours), the substance can leach into the blood sample.

When a venous blood sample that may have been exposed to this substance is mixed with treatment reagent and analyzed immediately, the substance can suppress the lead response. In such cases where the lead response is suppressed, we have determined that allowing the blood-treatment reagent mixture to sit (incubate) at room temperature mitigates the suppression of the lead response.

If you are receiving venous samples collected at other sites, and therefore cannot assess the extent to which the blood sample has been in contact with the rubber cap, we recommend that the blood-treatment reagent mixtures sit at room temperature for 4 hours to allow complete release of the lead. We have determined that this length of time is sufficient to mitigate the effects of rubber stopper exposure. This notification is made out of an abundance of caution, as we have no way of determining the absence or presence, nor the quantity of this substance, in individual lots of blood collection tubes.

To ensure optimal performance, we advise all customers receiving venous samples from outside sites to implement a 4-hour room temperature incubation of the blood-treatment reagent mixture prior to analysis with the LeadCare II system.

This correspondence is being tracked for notification purposes. To acknowledge receipt of this notice, please complete the enclosed form and fax it to our Quality Assurance Department.

Upon completion of further studies, we will update the package insert if necessary and provide you with any required documentation.

We sincerely apologize for this issue and assure you of our commitment to providing as complete and rapid a resolution as possible.

Please contact **Product Support at 1-800-275-0102** if you have any questions.

101 Billerica Ave, Building 4, North Billerica, Massachusetts 01862 • Telephone: 978.856.2345 • Fax: 978.856.2335 • www.Magellandx.com

FAX FORM RECORD

Notification on the LeadCare II System

The enclosed notification is intended to alert your facility regarding an issue identified with the LeadCare® II System where the instrument may underestimate the blood lead result in venous samples when the sample-treatment reagent mixture is not allowed to incubate for a period of time prior to analysis.

This is being tracked for notification purposes. Please complete this fax form record acknowledging receipt of the notification and fax the signed copy to the indicated fax number.

Contact Magellan Diagnostics with any questions.
1-800-275-0102

Please return via fax to **978-600-1480** or **888-789-8040**

Institution Name _____

Street Address _____

City _____ State/Province _____

Country _____ Zip/Postal Code _____ Date _____

Email _____

Please verify with a check (√) that the following actions were taken by your facility:

☐ We read and understand the notification and the recommended protocol:

- **Magellan Diagnostics recommends NO CHANGE for testing capillary samples.**
- **Magellan Diagnostics recommends a minimum 4-hour incubation of the blood-treatment reagent mixture prepared from venous samples prior to analysis on the LeadCare II System to ensure complete recovery of the lead result.**
- **This notification was reviewed with the laboratory staff.**

Sample types analyzed by your facility: ☐capillary only ☐venous only ☐capillary and venous

Tube types (if applicable) _____

Name (please print) _____ Title _____

Email _____

Signature _____ Phone No. _____

Please fax this record back to:

Attention: Reba Daoust, Quality Assurance
Phone: 978-856-2345 (for transmission problems only)

Fax: 978-600-1480
or **888-789-8040**

Product Bulletin

Effect of Rubber Cap Interference on the LeadCare® II System

LeadCare® II

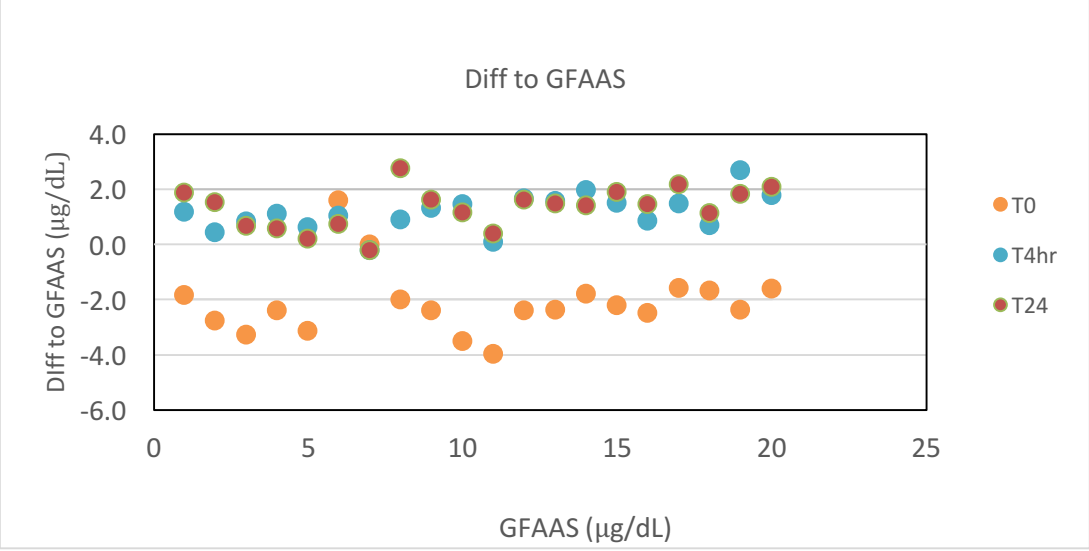
November 11, 2016

We have discovered that some venous blood collection tubes, including Becton Dickinson (BD) K_2-EDTA Vacutainer® tubes, may introduce a substance into the blood sample that can produce an underestimation of the LeadCare II blood lead result. The substance is believed to be a sulfur-containing curing agent used in the manufacture of the rubber cap. In cases of prolonged exposure to the rubber cap (e.g. tube placed on a rocker or stored upside down for several hours), the substance can leach into the blood sample.

When a venous blood sample that may have been exposed to this substance is mixed with treatment reagent and analyzed immediately, the substance can suppress the lead response. In such cases where the lead response is suppressed, we have determined that allowing the blood-treatment reagent mixture to stand (incubate) at room temperature mitigates the suppression of the lead response.

Study Parameters & Results

The graph below demonstrates the mitigation afforded by increased incubation time. In this study, 20 occupational health blood samples were shipped to Magellan Diagnostics from 5 different locations. These venous bloods were pipetted into treatment reagent, mixed and assayed immediately, and after allowing the blood-treatment reagent mixture to stand for 4 hours and 24 hours.



Magellan
DIAGNOSTICS
A Meridian Bioscience® Company

101 Billerica Ave, Bldg. 4, N. Billerica, MA 01862 ■ Phone: (800) 275-0102 ■ www.Magellandx.com

Product Bulletin

Effect of Rubber Cap Interference on the LeadCare® II System

LeadCare® II

Summary

We have discovered that some venous blood collection tubes may introduce a substance into the blood sample that can cause an underestimation of the LeadCare II blood lead result. If you are receiving venous samples collected at other sites, and therefore cannot assess the extent to which the blood sample has been in contact with the rubber cap, we recommend that the blood-treatment reagent mixtures stand at room temperature for 4 hours to allow complete release of the lead. We have determined that this length of time is sufficient to mitigate rubber cap exposure.

Recommendations

- **For capillary samples:** Magellan Diagnostics recommends NO CHANGE.
- **For venous samples that are shipped or rocked:** Magellan Diagnostics recommends a minimum 4-hour room temperature incubation of the blood-treatment reagent mixture prior to analysis.
- **For venous samples that are drawn and analyzed immediately:** Magellan Diagnostics recommends NO CHANGE.

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