RESOURCE AND PATIENT MANAGEMENT SYSTEM

# Laboratory Reference
(LR)

## Laboratorian Guide

Version 5.2 Patch 25
December 2008

Office of Information Technology (OIT)
Division of Information Resources
Albuquerque, New Mexico

# PREFACE

The purpose of this guide is to provide the Lab Manager with documentation that will aid in their use of the enhancements, and/or updates of IHS Lab Patch 25.

# TABLE OF CONTENTS

# 1.0 Introduction

IHS Lab Patch 25 incorporates changes and/or enhancements to the IHS Lab Package that have either corrected issues that had arisen or implemented requests.

This guide provides IHS Laboratorians with descriptions of the changes and/or enhancements and other information.

# 2.0 Interim Report Modifications

The Interim Reports have been modified to address certification concerns.

## 2.1 Modified Interim Report Example 1

```
Printed at:                                                    page 1
      DESKTOP LabDev DB (516)  1313 MOCKINGBIRD HEIGHTS NE  ABQ, NM 87110 (1)


FEMALE,PATIENT                              Date/Time Printed: 05/27/08 16:19 (2)
    HRCN: 111111        SEX: F    DOB: DEC 2,1972     AGE: 35  (3)      LOC: IMA

Accession [UID]: CH 0523 6 [1081440006]
     Provider: PROVIDER,TEST
       REVIEW STATUS: Not Reviewed
     Specimen: BLOOD                     Spec Collect Date/Time: 05/23/08 07:17 (4)

Test name          Result    units      Ref.   range        Site  Result Dt/Time (5)
HEMOGLOBIN A1C          6     %           3.5 -    6        [516]  05/23/08 07:17
       Eval: AS OF 6-6-83(PRIOR RANGE: 5-9)
================================================================================
  KEY: L=Abnormal low, H=Abnormal high, *=Critical value, TR=Therapeutic Range  (6)



[516]  DESKTOP LabDev DB     1313 MOCKINGBIRD HEIGHTS NE     ABQ, NM 87110

FEMALE,PATIENT             111111  05/27/08                 PRESS '^' TO STOP
```

Figure 2.1: Interim Report Example 1

The changes to the Interim Report involve:

1) Add the location of where the report is being printed, based upon the User's DUZ(2) entry in the New Person file.
2) Add the Date/Time the report is sent to the printer
3) Add the Age as well as the DOB to the patient's demographics
4) Add the Specimen Collection Date/time
5) Add the Result Date/Time
6) Modify the "Key" in order to signify when the Reference Range numbers come from the Therapeutic Low and Therapeutic High fields in the Lab Test file.

## 2.2 Modified Interim Report Example 2

The second page of a test's listing has also been modified.

```
Printed at:                                                    page 2
      DESKTOP LabDev DB (516)  1313 MOCKINGBIRD HEIGHTS NE  ABQ, NM 87110 (1)

FEMALE,PATIENT                              Date/Time Printed: 05/27/08 16:19 (2)
    HRCN: 111111        SEX: F    DOB: DEC 2,1972     AGE: 35  (3)      LOC: IMA

Accession [UID]: CH 0328 1 [1080880001] (CONTINUED)
     Specimen: BLOOD                     Spec Collect Date/Time: 05/23/08 07:17  (4)


Test name          Result    units      Ref.   range        Site  Result Dt/Time  (5)
CALCIUM          pending     mg/dL       8.6 - 10.4
Comment: GLUCOSE reported incorrectly as 88 by [408].
         Changed to 81 on 050508@08:03 by [408].
================================================================================
  KEY: L=Abnormal low, H=Abnormal high, *=Critical value, TR=Therapeutic Range (6)


[516]  IHS/OIT LabDev Test Database   111 NOWHERE NE   ALBUQUERUQE, NM 87110

FEMALE,PATIENT           111111  07/11/08                PRESS '^' TO STOP
```

Figure 2.2: Interim Report Example 2

The changes to the Interim Report involve:

1) Adding the location of where the report is being printed, based upon the User's DUZ(2) entry in the New Person file.
2) Adding the Date/Time the report is sent to the printer
3) The addition of the Age as well as the DOB to the patient's demographics
4) Adding the Specimen and its Collection Date/time
5) Adding the Result Date/Time
6) Modify the "Key" in order to signify when the Reference Range numbers come from the Therapeutic Low and Therapeutic High fields in the Lab Test file.

## 2.3 Modified Interim Report Example 3

The following illustrates the display if a Laboratory test has a Therapeutic reference range:

```
Printed at:                                                    page 1
                      IHS/OIT LabDev Test Database (516)
                 111 NOWHERE NE SUITE 201  ALBUQUERUQE, NM 87110

FEMALE,PATIENT                                Date/Time Printed: 07/24/08 15:36
     HRCN: 111111        SEX: M    DOB: MAR 5,1981     AGE: 27   LOC: ER

Accession [UID]: SO 08 1 [6008000001]
     Provider: PROVIDER,TEST
       REVIEW STATUS: Not Reviewed
     Specimen: BLOOD                     Spec Collect Date/Time: 07/24/08 12:22

Test name          Result    units      Ref.   range (1)    Site  Result Dt/Time
VALPROIC ACID         13     ug/mL        50 -  100 (TR)   [516]  07/24/08 12:22
================================================================================
  KEY: L=Abnormal low, H=Abnormal high, *=Critical value, TR=Therapeutic Range



[516]  IHS/OIT LabDev Test Database   111 NOWHERE NE   ALBUQUERUQE, NM 87110

FEMALE,PATIENT             111111  07/24/08                 PRESS '^' TO STOP
```

Figure 2.3: Interim Report Example 3

The illustrated change to the Interim Report

1) Changing the display from (Thera. Range) to (TR) when displaying Therapeutic reference ranges.

## 2.4 Interim Report Routines Modified

### 2.4.1 LRMIPC

Micro Report has site information in the header

### 2.4.2 LRRP1

Modified the columns, header and footer sections to display needed information.

### 2.4.3 LRRP2

Modified the columns, header and footer sections to display needed information.

# 3.0 IHS Lab Version & Patch Report

A new report has been added to the IHS Lab Main Support Menu (BLRMENU) that will list the site's Lab Version number and latest patch.

## 3.1 Lab Version and Patch Number

It greatly aides IHS/OIT support to know this information, but it is not often available to Labororatians since it is usually determined by using KIDS build menus. This report will allow Laboratorians to directly report the information to the Help Desk.

## 3.2 LVP Option

The new LVP option will be added to the BLRMENU. It will look similar to the following (the LVP option is bolded):

```
                      IHS Lab Main Support Menu


   LS     Link Transaction Processor Status
   7421   Will restart the 7421 label routine if turned off.
   INQ    Inquire into the IHS LAB Transaction Log
   FLD    Search Transactions for PCC LINK DISABLE Error
   RSN    Requeue by Sequence Number
   RST    Requeue Transaction by Sort Template
   CPT    Enter/edit IHS Lab CPT File
   FAL    Find ALL PCC Link Errors from Lab
   STP    Stop/restart Lab to PCC Transaction Processor
   MSTR   Enter/edit BLR MASTER CONTROL FILE
   POV    Purpose of Visit Compliance Report
   BZY    IHS Taskman Busy Device Rpt
   CLR    CLEAR BLR ERRORS ...
   CUM    IHS CUMULATIVE MENU ...
   ETP    LA7 Message Queue Error Messages to Purgeable
   LOI    IHS Lab Package LOINC Percentage Report
   LVP    IHS Lab Version & Patch Report
   NLO    Lab Tests Without LOINC Entries Report
   RBE    Clear ALL BLR Errors from Error Log
   REFL   Reference Lab Main Menu ...
   SHDR   State Health Dept Report

Select IHS Lab Main Support Menu Option:
```

Figure 3.1 Example of BLRMNEU with new LVP option bolded.

## 3.3 IHS Lab Version & Patch Report Example

When the LVP option is selected the report is displayed. It will look similar to the following:

```
                          IHS/OIT LabDev Test Database
Date:07/10/08                   IHS LAB Package                      Time:2:06 PM
                         Current VERSION & PATCH Report
------------------------------------------------------------------------------
                                Lab Version 5.2

                       Latest IHS Lab Patch: LR*5.2*1024

          Latest IHS Lab Patch Install Date/Time: JUL 08, 2008 3:44 PM


Press RETURN Key:
```

Figure 3.2 Example of the new IHS Lab Version & Patch Report

## 3.4 BLRVPTCH Routine

The BLRVPTCH routine was written to display the information.

# 4.0 IHS TaskMan "Busy Device" Report

A new report has been added to the IHS Lab Main Support Menu (BLRMENU) that will determine if the Lab Module has not successfully started the Lab's HL7 daemon (HLZTCP) via the HLLP routine.

## 4.1 "BUSY DEVICE" TaskMan Message

If the HLLP routine does not start the HLZTCP daemon, it usually returns a message to TaskMan. Laboratorians do not normally have access to TaskMan and thus are not aware of any issues other than messages are not leaving the Lab Module. This report will greatly aid in the diagnostic process when calling the Help Desk.

## 4.2 BZY Option

The new BZY option will be added to the BLRMENU. It will look similar to the following (the BZY option is bolded):

```
                          IHS Lab Main Support Menu


   LS     Link Transaction Processor Status
   7421   Will restart the 7421 label routine if turned off.
   INQ    Inquire into the IHS LAB Transaction Log
   FLD    Search Transactions for PCC LINK DISABLE Error
   RSN    Requeue by Sequence Number
   RST    Requeue Transaction by Sort Template
   CPT    Enter/edit IHS Lab CPT File
   FAL    Find ALL PCC Link Errors from Lab
   STP    Stop/restart Lab to PCC Transaction Processor
   MSTR   Enter/edit BLR MASTER CONTROL FILE
   POV    Purpose of Visit Compliance Report
   BZY    IHS Taskman Busy Device Rpt
   CLR    CLEAR BLR ERRORS ...
   CUM    IHS CUMULATIVE MENU ...
   ETP    LA7 Message Queue Error Messages to Purgeable
   LOI    IHS Lab Package LOINC Percentage Report
   LVP    IHS Lab Version & Patch Report
   NLO    Lab Tests Without LOINC Entries Report
   RBE    Clear ALL BLR Errors from Error Log
   REFL   Reference Lab Main Menu ...
   SHDR   State Health Dept Report

Select IHS Lab Main Support Menu Option:
```

Figure 4.1 Example of the new IHS Lab Version & Patch Report

## 4.3 IHS TaskMan "Busy Device" Report Example

When the BZY option is selected the report is displayed. It will look similar to the following when there are NO "BUSY DEVICE" errors for HLLP:

```
Number of tasks that were examined = 18


          Press RETURN Key:
```

Figure 4.2 Example of the new IHS TaskMan "Busy Device" Report when there are no errors

The report will similar to the following when there are "Busy Device" errors for HLLP:

```
                          IHS/OIT LabDev Test Database
Date:07/10/08                   TASKMAN Listing                     Time:2:37 PM
                              'BUSY DEVICE' Tasks

Task #      Date    Time      Routine   Description
-------------------------------------------------------------------------------
49283     07/10/08  2:32 PM   HLLP      HL7 Message Processor for Lab Interface


Number of tasks that were rescheduled = 1


          Press RETURN Key:
```

Figure 4.3 Example of the new IHS TaskMan "Busy Device" Report when there are errors

## 4.4 "Busy Device" Error Implications

A task that has been resubmitted due to a "Busy Device" error usually indicates:

- That the IP address is incorrect or blocked; or
- The Port Number of the LABDATA-IM-TCP device in the DEVICE (# 3.5) FILE is incorrect or blocked.

## 4.5 BLRPCCBD Routine

The BLRPCCBD routine was written to display the TaskMan messages, if they exist.

# 5.0 Lab Description File Abbreviation Report

A new report has been added to the IHS Lab Main Support Menu (BLRMENU) that will print the abbreviations from the LAB DESCRIPTIONS (# 62.5) file used in the Micro reports.

## 5.1 MMR Option

The new MMR option will be added to the BLRMENU. It will look similar to the following (the MMR option is bolded):

```
                          IHS Lab Main Support Menu


   LS     Link Transaction Processor Status
   7421   Will restart the 7421 label routine if turned off.
   INQ    Inquire into the IHS LAB Transaction Log
   FLD    Search Transactions for PCC LINK DISABLE Error
   RSN    Requeue by Sequence Number
   RST    Requeue Transaction by Sort Template
   CPT    Enter/edit IHS Lab CPT File
   FAL    Find ALL PCC Link Errors from Lab
   STP    Stop/restart Lab to PCC Transaction Processor
   MSTR   Enter/edit BLR MASTER CONTROL FILE
   POV    Purpose of Visit Compliance Report
   BZY    IHS Taskman Busy Device Rpt
   CLR    CLEAR BLR ERRORS ...
   CUM    IHS CUMULATIVE MENU ...
   ETP    LA7 Message Queue Error Messages to Purgeable
   LOI    IHS Lab Package LOINC Percentage Report
   LVP    IHS Lab Version & Patch Report
  MMR   Lab Description Abbreviation Report
   NLO    Lab Tests Without LOINC Entries Report
   REFL   Reference Lab Main Menu ...
   SHDR   State Health Dept Report

Select IHS Lab Main Support Menu Option:
```

Figure 5.1 Example of the new IHS Lab Description Abbreviation Report Display

## 5.2 Lab Description File Abbreviation Report Example

When the MMR option is selected, the BLRMMRPT routine will first sort the abbreviations and then ask if the user wants to print the report. The screen will look similar to the following:

```
                          IHS/OIT LabDev Test Database
Date:07/21/08             LAB DESCRIPTION FILE REPORT              Time:10:46 AM
                          MICRO SCREEN VARIABLES ONLY

------------------------------------------------------------------------------


LAB DESCRIPTION FILE WILL BE SORTED FIRST


Number of abbreviations Sorted = 63



Produce Report? YES//
```

Figure 5.2 Example initial screen of the new IHS Lab Description Abbreviation Report

If the user answers YES to the prompt, the report will ask for a device and then print.

```
Produce Report? YES// YES
DEVICE: HOME//   VIRTUAL    Right Margin: 80//
```

Figure 5.3 Example prompt response of the new IHS Lab Description Abbreviation Report

The report itself will be similar to the following:

```
                          IHS/OIT LabDev Test Database
Date:07/21/08             LAB DESCRIPTION FILE REPORT                    Page 1
Time:11:59 AM             MICRO SCREEN VARIABLES ONLY

NAME                SYNONYM   IEN       EXPANSION
------------------------------------------------------------------------------
ASTR                          78        Alpha Streptococcus
BSGA                          79        Beta Strep Group A
BSGB                          80        Beta Strep Group B
BSNAB                         81        Beta Strep, not Groups A or B
COCCI                         91        Cocci Spherules Observed
COCCI?                        92        Colony Suggestive of C. immitis.  ID t
FBYO                          108       Few Budding Yeast Observed
FBYP                          109       Few Budding Yeast with Pseudohyphae
FEPI                          117       Few Epithelial Cells
FGCC                          120       Few Gram Positive Cocci in Clusters
FGPC                          115       Few Gram Positive Cocci
FGPC                          118       Few Gram Positive Cocci
FGPCCP                        119       Few Gram Positive Cocci in Chains and
FWBC                          116       Few WBCs


Enter RETURN to continue or '^' to exit:
```

Figure 5.4 Example of the Lab Description Abbreviation Report

## 5.3 BLRMMRPT Routine

The BLRMMRPT routine was written to display the data from the Lab Description file.

# 6.0 PCC VISIT DATE set to Collection Date when Using FAST BYPASS

The PCC Visit creation process during the use of the FAST BYPASS option has been modified to use the Collection Date as the PCC VISIT DATE. This was done to ensure that the FAST BYPASS option created PCC visits the same as the regular BYPASS option.

## 6.1 BLRPCCVC and LRORD Routines Modified

The LRORD routine was modified to store the FAST BYPASS mnemonic in the BLR MASTER CONTROL file and the BLRPCCVC routine was modified to use the Collection Date when the FAST BYPASS mnemonic was present.

# 7.0 Created By User & User Last Update PCC Visit File Fields

The Lab to PCC daemon that takes information from the Lab module and creates and/or modifies PCC visits is initiated by various triggers in the Lab Module. The daemon's default user is whoever triggers the event, thus the Created By User and User Last Update fields in the PCC visit files often do not reflect the person who is accessioning and/or verifying the results of a lab test.

The BLRLINK2 and BLRLINK3 routines have been modified to rectify that issue.

## 7.1 Description of Change

The BLRLINK2 and BLRLINK3 routines will now use the IHS Lab Transaction Log file's VERIFIER field to determine the person who is either creating the Visit and/or modifying the visit. The field is populated by the Lab Module prior to calling the PCC routines, which should ensure greater accuracy.

# 8.0 Barcoded UID Label Routines for Intermec PC41 and 7421 Printers

A new pair of routines for the Intermec PC41 (also the Intermec 7421) label printer that will use the UID instead of the Accession number to create a barcoded (code 128) label were created. This allows sites the option of using the UID as their unique identifier for instruments.

## 8.1 Long Accession Number

In order to utilize the UID on the barcode, it is necessary to change the TYPE OF ACCESSION NUMBER field in the Accession file to LONG for all accessions in the file that will be barcoded. This will allow the UID to be sent across as the identifier in the HL7 OBR segment.

The UID, which will always 10 digits long, will replace the Accession number that is being sent across to the Interface Engine. If the Interface Engine as been defined to accept only identifiers less than 10 characters long, it will have to be adjusted. Consult with the manufacturer for guidance on how to accomplish that task.

## 8.2 Barcode 128

The new routines will print the barcode in Code 128 format instead of the previous 3 of 9 format.

## 8.3 Manual Query Requires Full UID

Manual querying will require the use of the entire UID since that will be the unique identifier in the HL7 OBR segment.

## 8.4 BLRP41UI Initialization Routine

The BLRP41UI routine initializes the printer. Both the Barcode and Plain label formats are different from previous formats due to the size of the UID number.

## 8.5 BLRP41UP Print Routine

The BLRP41UP routine prints the lab variables on the Intermec printer.

## 8.6 ZLOAD and ZSAVE the BLRP41UP Routine

The LRLABEL4 routine is the routine used by the Lab system to actually print labels. This routine must be overwritten by the BLRP41UP routine in order for the printer to work correctly. This is accomplished by using the ZLOAD (ZL) command to place the BLRP41UP routine into the system's memory, followed by the ZSAVE (ZS)

command that will save and overwrite the routine in memory to whatever routine name that follows the command.

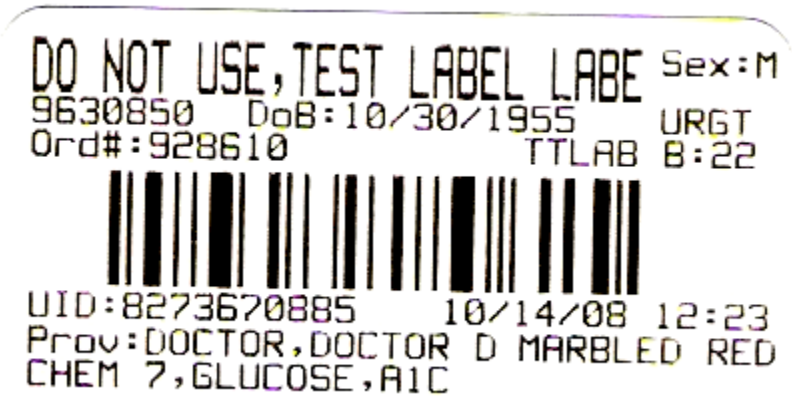
The following two commands accomplish the over-writing of the LRALBEL4 routine. The commands must be done in programmer mode after a successful installation of IHS Lab Patch 1025:

```
ZL BLRP41UP
ZS LRLABEL4
```

Figure 7.1 Example of how to overwrite the LRLABEL4 routine

## 8.7 UID Barcode Label Example

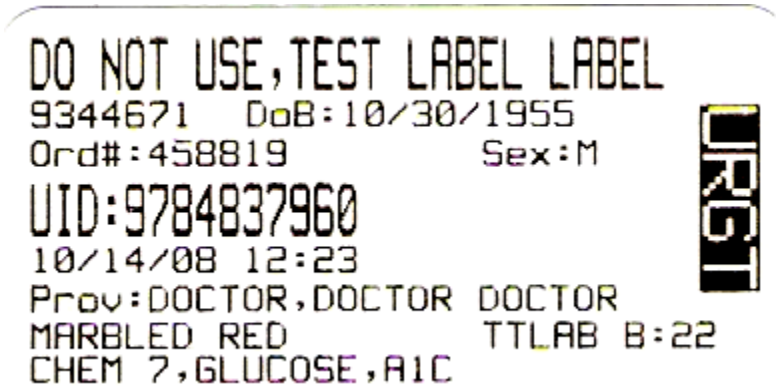
The following is an example of how the new label will look with the UID barcoded:




Picture 7.1 Example of Lab Label with UID barcode

## 8.8 UID Plain Label Example

The following is an example of how the new plain label will look with the UID:




Picture 7.2 Example of Lab Label without UID barcode

## 8.9 Modification of BLR STARTUP FOR INTERMEC 7421 option

It is recommended that the option BLR STARTUP FOR INTERMEC 7421 in the OPTION (# 19) file be modified. Currently, it should be similar to the following:

```
NAME: BLR STARTUP FOR INTERMEC 7421
  MENU TEXT: Will restart the 7421 label routine if turned off.
  TYPE: run routine                    CREATOR: KRING,MICHAEL
 DESCRIPTION:   This option will run the routine BLRBARC to restart the
 Intermec 7421 label printer if it is turned off.
  ROUTINE: BLRBARC                     SCHEDULING RECOMMENDED: YES
  UPPERCASE MENU TEXT: WILL RESTART THE 7421 LABEL RO
```

Figure 7.2 Example of the BLR STARTUP FOR INTERMEC 7421 option

The ROUTINE field should be changed to BLRP41UI. It then should look similar to the following:

```
NAME: BLR STARTUP FOR INTERMEC 7421
  MENU TEXT: Will restart the 7421 label routine if turned off.
  TYPE: run routine                    CREATOR: KRING,MICHAEL
 DESCRIPTION:   This option will run the routine BLRBARC to restart the
 Intermec 7421 label printer if it is turned off.
  ROUTINE: BLRP41U                      SCHEDULING RECOMMENDED: YES
  UPPERCASE MENU TEXT: WILL RESTART THE 7421 LABEL RO
```

Figure 7.3 Example of the BLR STARTUP FOR INTERMEC 7421 option with new routine

This change will allow uses to access the 7421 option on the BLRMENU that will initialize the printer to utilize the UID code to barcode instead of the Accession number.

The BLRMENU should look like the following (the 7421 option is bolded):

```
                          IHS Lab Main Support Menu

   LS     Link Transaction Processor Status
 7421     Will restart the 7421 label routine if turned off.
   INQ    Inquire into the IHS LAB Transaction Log
   FLD    Search Transactions for PCC LINK DISABLE Error
   RSN    Requeue by Sequence Number
   RST    Requeue Transaction by Sort Template
   CPT    Enter/edit IHS Lab CPT File
   FAL    Find ALL PCC Link Errors from Lab
   STP    Stop/restart Lab to PCC Transaction Processor
   MSTR   Enter/edit BLR MASTER CONTROL FILE
   POV    Purpose of Visit Compliance Report
   BZY    IHS Taskman Busy Device Rpt
   CLR    CLEAR BLR ERRORS ...
   CUM    IHS CUMULATIVE MENU ...
   ETP    LA7 Message Queue Error Messages to Purgeable
   LOI    IHS Lab Package LOINC Percentage Report
   LVP    IHS Lab Version & Patch Report
   MMR    Lab Description Abbreviation Report
   NLO    Lab Tests Without LOINC Entries Report
   REFL   Reference Lab Main Menu ...
   SHDR   State Health Dept Report

Select IHS Lab Main Support Menu Option:
```

Figure 7.4 Example of the BLRMENU with the 7421 option bolded

# 9.0 New Lab EHR Point-Of-Care File: BLR BEHO POC CONTROL FILE

A new file has been added to the IHS Lab module: BLR BEHO POC CONTROL File. It will be used with the EHR Point-of-Care option to define and/or restrict access to Lab POC tests.

The use and setup of the file is described in the EHR Point-of-Care documentation.

## 9.1 FileMan Standard File Description

The FileMan Standard File Description option follows:

```
STANDARD DATA DICTIONARY #90479 -- BLR BEHO POC CONTROL FILE FILE
                                                AUG 14,2008@12:51:12  PAGE 1
STORED IN ^BLRPOC(90479,  *** NO DATA STORED YET ***
SITE: RPMS EHR   UCI: PRD,PRD                                  (VERSION 5.2)

DATA          NAME                  GLOBAL        DATA
ELEMENT       TITLE                 LOCATION      TYPE
---------------------------------------------------------------------
              DD ACCESS: @
              RD ACCESS: @
              WR ACCESS: @
             DEL ACCESS: @
          LAYGO ACCESS: @
          AUDIT ACCESS: @

CROSS REFERENCED BY: NAME(B)

90479,.01     NAME               0;1 POINTER TO LOCATION FILE (#9999999.06)
                                 (Required)

              INPUT TRANSFORM:  S:$D(X) DINUM=X
              LAST EDITED:      FEB 14, 2008
              NOTES:            XXXX--CAN'T BE ALTERED EXCEPT BY PROGRAMMER

              CROSS-REFERENCE:  90479^B
                                1)= S ^BLRPOC(90479,"B",$E(X,1,30),DA)=""
                                2)= K ^BLRPOC(90479,"B",$E(X,1,30),DA)


90479,.02     ENFORCE RESTRICT TO LOCATION 0;2 SET
                                '0' FOR NO;
                                '1' FOR YES;
              LAST EDITED:      FEB 14, 2008

90479,.03     ENFORCE RESTRICT TO USER 0;3 SET
                                '0' FOR NO;
                                '1' FOR YES;
              LAST EDITED:      FEB 14, 2008


90479,1       LAB TEST              1;0 POINTER Multiple #90479.01
```

```
90479.01,.01    LAB TEST              0;1 POINTER TO LABORATORY TEST FILE (#60)
                                     (Multiply asked)

                INPUT TRANSFORM:S DIC("S")="I $$CHKTST^BLRPOC(+Y)" D ^DIC K DIC
                                 S DIC=DIE,X=+Y K:Y<0 X
                LAST EDITED:    FEB 21, 2008
                SCREEN:         S DIC("S")="I $$CHKTST^BLRPOC(+Y)"
                EXPLANATION:    Restricted to CH tests with TYPE set to Both, does

                                not include a panel within a panel, and has
                                an accession area defined.
                NOTES:          XXXX--CAN'T BE ALTERED EXCEPT BY PROGRAMMER

                CROSS-REFERENCE:90479.01^B
                                1)= S ^BLRPOC(90479,DA(1),1,"B",$E(X,1,30),DA)=""
                                2)= K ^BLRPOC(90479,DA(1),1,"B",$E(X,1,30),DA)

90479.01,3      RESTRICT TO LOCATION 3;0 POINTER Multiple #90479.13

90479.13,.01      RESTRICT TO LOCATION 0;1 POINTER TO HOSPITAL LOCATION FILE (#44)
                                     (Multiply asked)

                  LAST EDITED:    FEB 14, 2008
                  CROSS-REFERENCE:90479.13^B
                                1)= S ^BLRPOC(90479,DA(2),1,DA(1),3,"B",$E(X,1,
                                30),DA)=""

                                2)= K ^BLRPOC(90479,DA(2),1,DA(1),3,"B",$E(X,1,
                                30),DA)


90479.01,4      RESTRICT TO USER     4;0 POINTER Multiple #90479.14

90479.14,.01      RESTRICT TO USER     0;1 POINTER TO NEW PERSON FILE (#200)
                                     (Multiply asked)

                    LAST EDITED:  FEB 14, 2008
                    CROSS-REFERENCE:90479.14^B
                                1)= S ^BLRPOC(90479,DA(2),1,DA(1),4,"B",$E(X,1,
                                30),DA)=""

                                2)= K ^BLRPOC(90479,DA(2),1,DA(1),4,"B",$E(X,1,
                                30),DA)


90479,4       AVAILABLE LAB DESCRIPTIONS 4;0 POINTER Multiple #90479.04
                                     (Add New Entry without Asking)

90479.04,.01    AVAILABLE LAB DESCRIPTIONS 0;1 POINTER TO LAB DESCRIPTIONS FILE
                                     (#62.5) (Multiply asked)

                LAST EDITED:      FEB 19, 2008
                CROSS-REFERENCE:  90479.04^B
                                1)= S ^BLRPOC(90479,DA(1),4,"B",$E(X,1,30),DA)=""
                                2)= K ^BLRPOC(90479,DA(1),4,"B",$E(X,1,30),DA)


      FILES POINTED TO                      FIELDS

HOSPITAL LOCATION (#44)           RESTRICT TO LOCATION:RESTRICT TO LOCATION (#.01)

LAB DESCRIPTIONS (#62.5)          AVAILABLE LAB DESCRIPTIONS:AVAILABLE LAB
DESCRIPTIONS (#.01)

LABORATORY TEST (#60)             LAB TEST:LAB TEST (#.01)

LOCATION (#9999999.06)            NAME (#.01)

NEW PERSON (#200)                 RESTRICT TO USER:RESTRICT TO USER (#.01)
```

```
INPUT TEMPLATE(S):

PRINT TEMPLATE(S):

SORT TEMPLATE(S):

FORM(S)/BLOCK(S):
```

Figure 9.1 FileMan Standard Data Dictionary Listing - File #90479 -- BLR BEHO POC CONTROL FILE

# 10.0 National Kidney Disease Foundation's Latest EGFR

## 10.1 National Kidney Disease Education Program (NKDEP)

The NKDEP has produced a Suggestions for Laboratories pamphlet. The following is taken from that pamphlet and is considered valid fair use:

> The National Kidney Disease Education Program (NKDEP) strongly encourages clinical laboratories to automatically report eGFR when serum creatinine is reported. An eGFR calculated from serum creatinine is a practical way to detect, evaluate, and manage people with chronic kidney disease (CKD), especially people with risk factors for CKD—diabetes, hypertension, cardiovascular disease, or family history of kidney disease—in whom CKD might otherwise go undetected and untreated.
>
> In adults ages 18 years and older the Modification of Diet in Renal Disease (MDRD) Study equation has been shown to be reliable in estimating GFR from serum creatinine, when the patient's age, gender, and race are also known.
>
> The NKDEP Laboratory Working Group report states that the MDRD Study equation should only be used in individuals age 18 and older. The report also notes that the MDRD Study equation has not been validated for use with the elderly (over 70 years of age), pregnant women, patients with serious comorbid conditions, or persons with extremes of body size, muscle mass, or nutritional status. Application of the equation to these patient groups may lead to errors in GFR estimation. GFR estimating equations have poorer agreement with measured GFR for ill hospitalized patients and for people with near normal kidney function than for the subjects in the MDRD Study.

## 10.2 Original MDRD Study Equation

This equation should be used with creatinine methods that have not been calibrated to be traceable to IDMS.

The equation requires four variables:

1) Serum, or plasma, creatinine (Scr)
2) Age in years (18 years or older)
3) Gender
4) Race (African American or not

There are two versions of the original MDRD Study equation.

### 10.2.1 Creatinine is in mg/dl (conventional Units)

eGFR (mL/min/1.73 m2) = 186 x (Scr)-1.154 x (Age)-0.203 x (0.742 if female) x (1.210 if African American)

### 10.2.2 Creatinine is in µmol/L (SI units)

eGFR (mL/min/1.73 m2) = 186 x (Scr/88.4)-1.154 x (Age)-0.203 x (0.742 if female) x (1.210 if African American)

## 10.3 IDMS-Traceable MDRD Study Equation

This equation should be used with creatinine methods that have been calibrated to be traceable to IDMS.

The equation requires four variables:

1) Serum, or plasma, creatinine (Scr)
2) Age in years (18 years or older)
3) Gender
4) Race (African American or not)

There are two versions of the IDMS-Traceable MDRD Study equation.

### 10.3.1 Creatinine is in mg/dl (conventional Units)

eGFR (mL/min/1.73 m2) = 175 x (Scr)-1.154 x (Age)-0.203 x (0.742 if female) x (1.210 if African American)

### 10.3.2 Creatinine is in µmol/L (SI units)

eGFR (mL/min/1.73 m2) = 175 x (Scr/88.4)-1.154 x (Age)-0.203 x (0.742 if female) x (1.210 if African American)

## 10.4 Delta Checks

IHS Lab Patch 1025 will install 4 Delta Checks, one for each of the MDRD Study equations, into the Delta Check dictionary (#62.1).

### 10.4.1 Delta Check for Original MDRD Study Equation where Creatinine is in mg/dl (conventional Units)

The GFRSE1CU delta check will look similar to the following in the DELTA CHECKS (# 62.1) file:

```
NAME: GFRSE1CU
  XECUTABLE CODE: S %X="" X:$D(LRDEL(1)) LRDEL(1) W:$G(%X)'="" "  Calculated GFR
:",%X S:LRVRM>10 LRSB($$GETDNAM^BLREXEC2("EST GFR"))=%X K %,%X,%Y,%Z,%ZZ
  OVERFLOW 1: S %ZZ=$$GETDNAM^BLREXEC2("CREATININE (NKDF)") X:LRVRM>10 "F %=%ZZ
S %X(%)=$S(%=LRSB:X,$D(LRSB(%)):+LRSB(%),1:0)" X:LRVRM>10 "F %=%ZZ S %X(%)=$S($D
(LRSB(%)):LRSB(%),1:0)" S %X=$$GFRSE1CU^BLREXEC2(X)
 DESCRIPTION:   This delta check, when added to a test named CREATININE (NKDF),
 will calculate an estimated Glomerular Filtration Rate (GFR) using the
 standard MDRD Study Equation 1 with conventional Units and stuff the result
 into the test called EST GFR
SITE NOTES DATE: JUL 24, 2008
 TEXT:   Created by IHS Lab Patch 1025
```

Figure 10.1: GFRSE1CU entry in the DELTA CHECKS file

### 10.4.2 Delta Check for Original MDRD Study Equation where Creatinine is in µmol/L (SI units)

The GFRSE1SI delta check will look similar to the following in the DELTA CHECKS (# 62.1) file:

```
NAME: GFRSE1SI
  XECUTABLE CODE: S %X="" X:$D(LRDEL(1)) LRDEL(1) W:$G(%X)'="" "  Calculated GFR
:",%X S:LRVRM>10 LRSB($$GETDNAM^BLREXEC2("EST GFR"))=%X K %,%X,%Y,%Z,%ZZ
  OVERFLOW 1: S %ZZ=$$GETDNAM^BLREXEC2("CREATININE (NKDF)") X:LRVRM>10 "F %=%ZZ
S %X(%)=$S(%=LRSB:X,$D(LRSB(%)):+LRSB(%),1:0)" X:LRVRM>10 "F %=%ZZ S %X(%)=$S($D
(LRSB(%)):LRSB(%),1:0)" S %X=$$GFRSE1SI^BLREXEC2(X)
 DESCRIPTION:   This delta check, when added to a test named CREATININE (NKDF),
 will calculate an estimated Glomerular Filtration Rate (GFR) using the
 standard MDRD Study Equation 1 with SI Units and stuff the result into the
 test called EST GFR
SITE NOTES DATE: JUL 24, 2008
 TEXT:   Created by IHS Lab Patch 1025
```

Figure 10.2: GFRSE1SI entry in the DELTA CHECKS file

### 10.4.3 Delta Check for IDMS-Traceable MDRD Study Equation where Creatinine is in mg/dl (conventional Units)

The GFRSE2CU delta check will look similar to the following in the DELTA CHECKS (# 62.1) file:

```
NAME: GFRSE2CU
  XECUTABLE CODE: S %X="" X:$D(LRDEL(1)) LRDEL(1) W:$G(%X)'="" "  Calculated GFR
:",%X S:LRVRM>10 LRSB($$GETDNAM^BLREXEC2("EST GFR"))=%X K %,%X,%Y,%Z,%ZZ
  OVERFLOW 1: S %ZZ=$$GETDNAM^BLREXEC2("CREATININE (NKDF)") X:LRVRM>10 "F %=%ZZ
S %X(%)=$S(%=LRSB:X,$D(LRSB(%)):+LRSB(%),1:0)" X:LRVRM>10 "F %=%ZZ S %X(%)=$S($D
(LRSB(%)):LRSB(%),1:0)" S %X=$$GFRSE2CU^BLREXEC2(X)
 DESCRIPTION:   This delta check, when added to a test named CREATININE (NKDF),
 will calculate an estimated Glomerular Filtration Rate (GFR) using the
 standard MDRD Study Equation 2 with conventional Units and stuff the result
 into the test called EST GFR
SITE NOTES DATE: JUL 24, 2008
 TEXT:   Created by IHS Lab Patch 1025
```

Figure 10.3: GFRSE2CU entry in the DELTA CHECKS file

### 10.4.4 Delta Check for IDMS-Traceable MDRD Study Equation where Creatinine is in µmol/L (SI units)

The GFRSE2SI delta check will look similar to the following in the DELTA CHECKS (# 62.1) file:

```
NAME: GFRSE2SI
  XECUTABLE CODE: S %X="" X:$D(LRDEL(1)) LRDEL(1) W:$G(%X)'="" "  Calculated GFR
:",%X S:LRVRM>10 LRSB($$GETDNAM^BLREXEC2("EST GFR"))=%X K %,%X,%Y,%Z,%ZZ
  OVERFLOW 1: S %ZZ=$$GETDNAM^BLREXEC2("CREATININE (NKDF)") X:LRVRM>10 "F %=%ZZ
S %X(%)=$S(%=LRSB:X,$D(LRSB(%)):+LRSB(%),1:0)" X:LRVRM>10 "F %=%ZZ S %X(%)=$S($D
(LRSB(%)):LRSB(%),1:0)" S %X=$$GFRSE2SI^BLREXEC2(X)
 DESCRIPTION:   This delta check, when added to a test named CREATININE (NKDF),
 will calculate an estimated Glomerular Filtration Rate (GFR) using the
 standard MDRD Study Equation 2 with SI Units and stuff the result into the
 test called EST GFR
SITE NOTES DATE: JUL 24, 2008
 TEXT:   Created by IHS Lab Patch 1025
```

Figure 10.4: GFRSE2SI entry in the DELTA CHECKS file

## 10.5 New Laboratory Tests

Before the delta checks can be used two new Lab tests must be created in the Laboratory Test File (# 60): (1) EST GFR and (2) CREATININE (NKDF). These new tests will prevent new data from overwriting existing information.

### 10.5.1 EST GFR

The new lab test, EST GFR, with a new Data Name, EST GFR, should have an entry in the Laboratory Test File similar to the following:

```
LABTEST IEN: 9999020                    NAME: EST GFR
  TYPE: OUTPUT (CAN BE DISPLAYED)
  SUBSCRIPT: CHEM, HEM, TOX, SER, RIA, ETC.
  LOCATION (DATA NAME): CH;516015;1     FIELD: DD(63.04,516015,
  HIGHEST URGENCY ALLOWED: STAT         REQUIRED TEST: YES
  PRINT NAME: eGFR                      DATA NAME: EST GFR
SITE/SPECIMEN: BLOOD
COLLECTION SAMPLE: BLOOD                MAX. ORDER FREQ.: 1
INSTITUTION: IHS/OIT LabDev Test Database
  ACCESSION AREA: CHEMISTRY
```

Figure 10.5: Laboratory Test File entry for EST GFR test

### 10.5.2 New CREATININE Test File 60 Entry

The new CREATININE (NKDF) test should have one of the new delta checks entered into the TYPE OF DELTA CHECK field. The new test should be similar to the following in File 60:

```
LABTEST IEN: 9999021                      NAME: CREATININE (NKDF)
  TYPE: BOTH
  SUBSCRIPT: CHEM, HEM, TOX, SER, RIA, ETC.
  LOCATION (DATA NAME): CH;516017;1       UNIQUE ACCESSION #: NO
  UNIQUE COLLECTION SAMPLE: YES           LAB COLLECTION SAMPLE: BLOOD
  FIELD: DD(63.04,516017,                 HIGHEST URGENCY ALLOWED: STAT
  REQUIRED TEST: YES                      FORCED URGENCY: ROUTINE
  PRINT NAME: SCr                         PRINT ORDER: 14.105
  DATA NAME: CREATININE (NKDF)
SITE/SPECIMEN: BLOOD                      REFERENCE LOW: 0.3
  REFERENCE HIGH: 1.2                     UNITS: mg/Dl
  TYPE OF DELTA CHECK: GFRSE1CU           LOINC CODE: 2160-0
COLLECTION SAMPLE: BLOOD                  FORM NAME/NUMBER: CHEMISTRY
  MIN VOL (in mls.): 1                    MAX. ORDER FREQ.: 1
INSTITUTION: IHS/OIT LabDev Test Database
  ACCESSION AREA: CHEMISTRY
```

Figure 10.6 Laboratory Test file example for new Creatinine test using new GFRSE1CU delta check.

## 10.6 BLREXEC2 Routine

The four MDRD Study Equations used by the four new Delta Checks are in the BLREXEC2 routine.

# 11.0 Modified Routines

Several routines have been modified in order to prevent errors and/or correct issues.

## 11.1 BLRALBA

Modified to prevent <UNDEFINED> error when reference ranges end with a period.

## 11.2 BLRLINK2

Modified to correctly set the CREATED BY USER field in the Visit file.

## 11.3 BLRLINK3

Modified to correctly set the USER LAST UPDATE field in the Visit file and to use the Print Code field format (if it exists) of a Lab Test to transfer formatted results to the Visit file.

## 11.4 BLRLINKP

Modified to correctly quit with a PCC error when it is determined there is an invalid V LAB visit, thus preventing an <UNDEFINED> error from occurring.

## 11.5 BLRPCCVC

Modified to use set the PCC VISIT DATE to the Collection Date when the FAST BYPASS option is used.

## 11.6 BLRPST

Modified to ensure the Link Status will show that the linker has been stopped.

## 11.7 BLRTNB

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.8 BLRTNM

Modified to ensure an EDIT CODE exists for the transaction, thus preventing an <UNDEFINED> error. Also modified to prevent <SUBSCRIPT>LOOKDRG+2^BLRTNM errors caused by non-existent Drug Nodes in the ANTIMICROBIAL SUSCEPTIBILITY dictionary.

## 11.9 LREXPD

Modified to correctly increment a counter, thus preventing an <UNDEFINED> error.

## 11.10 LRMIPC

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.11 LRMISEZB

Modified to prevent an undefined variable from causing a <SUBSCRIPT> error.

## 11.12 LRMISR1

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.13 LRMITSPE

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.14 LRORD

Modified to allow FAST BYPASS option variable to be passed to PCC routines.

## 11.15 LRORDK

Modified to restore commented out command.

## 11.16 LRRP1

Interim Report routine modified to display site and test information.

## 11.17 LRRP2

Interim Report routine modified to display site and test information.

## 11.18 LRSORC1A

The Critical Value Report routine modified to ensure the site information will be printed on the header.

## 11.19 LRTT5P1

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.20 LRUPAD

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.21 LRWLST

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.22 LRWRKLS1

Modified to prevent naked syntax from causing an <UNDEFINED> error.

## 11.23 LRX

Modified to prevent untimed locking of ^LRO global during UID creation.

# 12.0 New Routines

Several routines will be added to the IHS Lab module.

## 12.1 BLREXEC2

New eGFR routines.

## 12.2 BLRMENU

Lab Menu Headers.

## 12.3 BLRMMRPT

Lab Description File Abbreviation Report routine.

## 12.4 BLRP25PC

IHS Lab Patch 1025 Post install Checksum checker.

## 12.5 BLRP41UI

Initialization routine for Intermec PC41 printers to allow the printing of UID barcoded on the lab label instead of the Accession Number.

## 12.6 BLRP41UP

Print routine for Intermec PC41 printers to print the UID barcoded on the lab label instead of the Accession Number.

## 12.7 BLRPCCBD

IHS TaskMan "Busy Device" Report routine.

## 12.8 BLRPOC

Routine that will be used by the Electronic Health Record (EHR) Point-of-Care (POC) option.

## 12.9 BLRPRE25

IHS Lab PATCH 1025 Environment/Post Install Routine.

## 12.10 BLRUTIL3

IHS Lab utility routine.

## 12.11 BLRVPTCH

Lab Version and Latest Patch report routine.

## 12.12 LRVRPOCU

VA Point of Care Utility routine that will be used by the EHR POC option.

# 13.0 Glossary

**Term**

Definition

**Barcode**

A printed series of lines of varying width, as on a container or product, that can be read by an optical scanner.

**Caché**

A multidimensional database that uniquely combines robust objects and robust SQL, thus eliminating object-relational mapping.

**Caché ObjectScript**

A variant of MUMPS specifically designed for the Caché environment.

**Code 128 Barcode**

An Alpha-numeric barcode with three character sets. Supports Code-128, GS1-128 (formerly known as UCC/EAN-128) and ISBT-128.

**Code 3 of 9 Barcode**

An alpha-numeric barcode that encodes uppercase letters, numbers and some symbols; it is also referred to as Barcode 39, the 3 of 9 Code and LOGMARS Code.

**daemon**

A program that runs continuously and exists for the purpose of handling periodic service requests that a computer system expects to receive. The daemon program forwards the requests to other programs (or processes) as appropriate.

**EHR**

Electronic Health Record. An Electronic Medical Record that utilizes a technical infrastructure originally developed for the VHA that displays various clinical functions via a graphical user interface (GUI).

**File**

A set of related records or entries treated as a single unit.

**FileMan**

The database management system for RPMS.

### Global

In MUMPS, global refers to a variable stored on disk (global variable) or the array to which the global variable may belong (global array).

### IEN

Internal Entry Number. A unique number used to identify an entry within a file.

### IHS

Indian Health Service.

### Locking

A method of synchronizing potentially concurrent uses of a database or other common resource. Typically, a lock is of temporary duration and when the resource is no longer required, it is freed for locking and use by the next sharer in a queue.

### Menu

A list of choices for computing activity. A menu is a type of option designed to identify a series of items (other options) for presentation to the user for selection. When displayed, menu-type options are preceded by the word "Select" and followed by the word "option" as in Select Menu Management option: (the menu's select prompt).

### MUMPS

Massachusetts General Hospital Utility Multiprogramming System. It is a procedural, interpreted general-purpose programming language oriented towards database applications.

### Naked Syntax

In MUMPS, a shorthand form of specifying the most recently referenced global node.

### OIT

Office of Information Technology

### POC

Point Of Care. A Laboratory test that is performed at the site of care (examination, treatment, diagnosis, etc.).

### RPMS

Resource and Patient Management System. A suite of software applications used at IHS facilities to support administrative, clerical, and clinical functions.

# 14.0 Contact Information

If you have any questions or comments regarding this distribution, please contact the OIT Help Desk (IHS).

**Phone:** (505) 248-4371 or (888) 830-7280 (toll free)

**Fax:** (505) 248-4363

**Web:** http://www.ihs.gov/GeneralWeb/HelpCenter/Helpdesk/index.cfm

**Email:** support@ihs.gov