BAR CODE MEDICATION ADMINISTRATION (BCMA)

TECHNICAL MANUAL/SECURITY GUIDE

Version 3.0
February 2004

(Revised January 2009)

Department of Veterans Affairs
Office of Enterprise Development

Revision History

Each time this manual is updated, the Title Page lists the new revised date and this page describes the changes. If the Revised Pages column lists "All," replace the existing manual with the reissued manual. If the Revised Pages column lists individual entries (e.g., 25, 32), either update the existing manual with the Change Pages Document or print the entire new manual.

Date	Revised Pages	Patch Number	Description
01/2009	i-ii, iv, 6-7, 13-14, 18-19, 21	PSB*3*28	- Updated Table of Contents to include Remote Procedure Calls. (p. iv) - Increased the total for the BCMA V .3.0 routines to 85 and files to 6. (p.6-7) - Updated the files and "BCMA V.3.0 Routines Installed onto VistA Server" Example. (p.7) - Updated the Mail Group Types in BCMA V.3.0 to include scanning failures. (p. 13) - Updated Security Keys to include PSB UNABLE TO SCAN. (p. 14) - Added list of Remote Procedure Calls (RPCs). (p. 18) - Added new Glossary entry for LIMITED ACCESS BCMA. (p.19) - Added new Glossary entry for PSB UNABLE TO SCAN. (p. 21) REDACTED
03/2008	6-7, 9-10, C-1, C-2, C-4, C-5, C-7, C-9	PSB*3*2	Description of [PSBO BZ] functionality added, code strings updated (p. C-1.) - Updated Intermec Printer Team Type Codes Information, Intermec Barcode Label Field Position Map, Intermec printer Sample Terminal Type File code descriptions updated (pp. C-4, C-5, C-7.) - Barcode samples updated – references to "Dosage" changed to "Dose" and space between colon and dose measurement deleted (p. C-9.) REDACTED
09/2007	6-7	PSB*3*32	− Increased the total for the BCMA V. 3.0. routines to 68. (p.6) − Updated the "BCMA V. 3.0 Routines Installed onto VistA Server" example to include the following routine: PSBO XA. (p. 7) REDACTED
08/2006	6-7, 9, 13	PSB*3*13	− Increased the total for the BCMA V. 3.0. routines to 68. (p.6) − Updated the "BCMA V. 3.0 Routines Installed onto VistA Server" example to include the following routine: PSBO XA. (p. 7) − Updated Manager Menu [PSB MGR] options list to include Missing Dose Follow-up (correction) and Unknown Action Status Report (new with this patch). (p. 9) − Added description of the "Unknown Actions" mail group parameter. (p. 13) REDACTED
08/2006	iv, 6, C1-C10	PSB*3*2	**Note**: The functionality listed below will be activated with the release of PSB*3*2. − Updated Table of Contents to include new Appendix C. (p. iv) − Added reference to new Unit Dose label printing functionality and Appendix C. (p. 6) − Added Appendix C: Interfacing with the Bar Code Label Printer. (p. C1-C10) REDACTED

Revision History

12/2005	6-7	PSB*3*16	– Increased the total for the BCMA V. 3.0. routines to 67. (p.6)
			– Updated the "BCMA V. 3.0 Routines Installed onto VistA Server" example to include the following routines: PSBCSUTL, PSBCSUTX, PSBCSUTY. (p. 7)
			<mark>REDACTED</mark>
01/2005	6-7, 14, 20-21	PSB*3*4	– Increased the total for the BCMA V. 3.0. routines to 64. (p.6)
			– Updated the "BCMA V. 3.0 Routines Installed on to VistA Server" example to include the PSBOPF routine. (p. 7).
			– Added description for new PSB READ ONLY security key. (p.14)
			– Added new Glossary entries for PSB READ ONLY and Read-Only BCMA. (p. 20-21)
			<mark>REDACTED</mark>
10/2004	6-7	PSB*3*3	– Increased the total for the BCMA V. 3.0 routines to 63. (p. 6)
			– Updated the "BCMA V. 3.0 Routines Installed on to VistA Server" example to reflect the inclusion of routines PSBML2, PSBML3, and PSBMLLKU to the VistA Server. (p. 7)
			<mark>REDACTED</mark>
02/2004			Original Released BCMA V. 3.0 Technical Manual/Security Guide
			<mark>REDACTED</mark>

Table of Contents

Table of Contents

Implementation and Maintenance

Minimum Required Packages

Before installing BCMA V. 3.0, make sure that your system includes the following Department of Veterans Affairs (VA) software packages and versions (those listed or higher).

Example: Minimum Required Packages and Versions

Package	Minimum Version Needed
Inpatient Medications	5.0
Kernel	8.0
MailMan	8.0
Nursing	4.0
Order Entry/Results Reporting	3.0
Pharmacy Data Management	1.0
RPC Broker (32-bit)	1.1
Toolkit	7.3
VA FileMan	22.0
Vitals/Measurements	5.0

Installation Time Estimates

On average, it takes approximately two minutes to install BCMA V. 3.0. This estimate was provided by a few of our BCMA V. 3.0 Beta Test sites. Actual times may vary, depending on how your site is using its' system resources.

Suggested time to install: non-peak requirement hours. During the install process, PC Client users should not be accessing the Client Software.

IMPORTANT:

You should install and test BCMA in your test accounts *before* installing in your production accounts.

Implementation and Maintenance

Resource Requirements

TIP:

The approximate size for ^PSB was calculated using a "normal" medication pass for a Unit Dose and an IV medication order. This is only an estimated number; it serves as the "mean."

This section summarizes the (approximate) number of resources required to install BCMA V. 3.0.

- Routines   85
- Globals   1 (^PSB)
- Files   6 (53.66-53.79)
- ^PSB Size (in bytes)   Unit Dose = 300 x # of Medications Administered
  IV = 2100 x # of IV Bags Administered
- FTEE Support   .2
- FTEE Maintenance   .2

Response Time Monitor

BCMA V. 3.0 does not include Response Time Monitor hooks.

Laptops and Bar Code Scanners

The approximate requirements for laptops and bar code scanners depend on the number of Inpatient areas, at your site, that use BCMA V. 3.0 for administering active medication orders. The BCMA Development Team recommends that your site have a minimum of three laptops and three scanners for each ward.

Printers

Your site should provide printers for creating patient wristbands and medication bar code labels, and for handling Missing Dose Requests sent from BCMA V. 3.0 to the Pharmacy.

Unit Dose Label Printer Devices

BCMA V. 3.0 includes the *Label Print* [PSBO BL] option for printing individual or batch Unit Dose bar code labels. This option allows sites the flexibility to use any printer that has bar code printing capabilities to produce BCMA bar code labels. Routine PSBOBL uses site-specific printers or terminals to produce labels. See Appendix C: "Interfacing with the Bar Code Label Printer" for detailed setup information.

IV Label Printer Devices

Inpatient Medications V. 5.0 provides a menu option for printing individual or batch IV bar code labels. See the section "Interfacing with the Bar Code Label Printer" in the *Inpatient Medications V. 5.0 Technical Manual/Security Guide* for detailed setup information.

Implementation and Maintenance

Files Required to Run BCMA V. 3.0

BCMA V. 3.0 uses the following files installed on the VistA Server. "Journaling" is recommended.

- ^PSB (53.66,   BCMA IV Parameters
- ^PSB (53.68,   BCMA Missing Dose Request
- ^PSB (53.69,   BCMA Report Request
- ^PSB (53.77,   BCMA Unable to Scan Log
- ^PSB (53.78,   BCMA Medication Variance Log
- ^PSB (53.79,   BCMA Medication Log

Note: You can learn more about these files by generating a list with file attributes using VA FileMan.

Routines Installed

Review the listing below to learn the routines installed on to your site's VistA Server during the installation of BCMA V. 3.0. The first line of each routine briefly describes its general function.

Note: You can use the *Kernel First Line Routine Print* [XU FIRST LINE PRINT] option to print a list containing the first line of each PSB routine.

Routine Mapping

At this time, we do *not* offer any recommendations for routine mapping. However, if you choose to map the BCMA V. 3.0 package routines, you will need to bring your system down, and then restart it to load the new routines into memory.

Example: BCMA V. 3.0 Routines Installed onto VistA Server

```
PSBALL     PSBAPIPM   PSBCHIVH   PSBCHKIV   PSBCSUTL   PSBCSUTX   PSBCSUTY
PSBMD      PSBML      PSBML1     PSBML2     PSBML3     PSBMLEN    PSBMLEN1
PSBMLHS    PSBMLLKU   PSBMLTS    PSBMLU     PSBMLVAL   PSBO       PSBO1
PSBOAL     PSBOBL     PSBOBLU    PSBOBZ     PSBOCE     PSBOCE1    PSBOCI
PSBOCI1    PSBOCM     PSBOCM1    PSBOCP     PSBOCP1    PSBODL     PSBODL1
PSBODO     PSBOHDR    PSBOIV     PSBOIV1    PSBOMD     PSBOMH     PSBOMH1
PSBOMH2    PSBOML     PSBOMM     PSBOMM2    PSBOMSF    PSBOMT     PSBOMT1
PSBOMV     PSBOPE     PSBOPF     PSBOPI     PSBOPM     PSBOSF     PSBOST
PSBOVT     PSBOWA     PSBOXA     PSBPAR     PSBPARIV   PSBPOIV    PSBPRN
PSBRPC     PSBRPC1    PSBRPC2    PSBRPC3    PSBRPCMO   PSBRPCXM   PSBSAGG
PSBSVHL7   PSBUTL     PSBVAR     PSBVDLIV   PSBVDLPA   PSBVDLPB   PSBVDLTB
PSBVDLU3   PSBVDLVL   PSBVITFL   PSBVLDU1   PSBVLDU2   PSBVLDUD   PSBVT
PSBVT1
     85 routines
```

Security Features

Defining Mail Groups in BCMA

In BCMA V. 3.0, you can define two "Mail Groups" for notifying Pharmacy, IRM, and other internal staff about errors and Missing Dose Requests. This section describes how you can create mail groups, and the purpose of each group.

Creating Mail Groups for BCMA V. 3.0

Creating mail groups for BCMA V. 3.0 involves using the VistA Mail Group *Enter/Edit* [XMUSER] option to set the TYPE field to PUBLIC. Once this task is accomplished, you can then use the Parameters Tab of the GUI BCMA Site Parameters application to define the mail groups that you created.

Mail Group Types in BCMA V. 3.0

This section describes the mail groups that you can define using the Parameters Tab of the GUI BCMA Site Parameters application.

- **Due List Error:** Generates an E-mail message for any medication order that BCMA V. 3.0 cannot resolve for the BCMA VDL placement, and sends it to the mail group members. An example might include no administration times entered for a Continuous order.

- **Missing Dose Notification:** Generates an E-mail message for any Missing Dose Request entered using the BCMA V. 3.0 CHUI or GUI menu options. The E-mail is sent to all members of the mail group, specifically Pharmacy, as a "fail safe" even if the designated Missing Dose printer is not functioning.

- **Unknown Actions:** This field generates an E-mail message for any administration with an "Unknown" status while processing administrations to display on the VDL.

- **Unable to Scan:** Generates an E-mail message to alert the mail group when a user creates a scanning failure entry, and to assist in researching the reasons for a scanning failure.

Security Features

Assigning Menus to Users

Use this section to assign menus to BCMA V. 3.0 CHUI and GUI users, if they have not already been assigned.

CHUI Version

Refer to this section for BCMA V. 3.0 CHUI menu assignments.

- **PSB MGR:** assign to a manager
- **PSB PHARMACY:** assign to all Inpatient Pharmacists
- **PSB NURSE:** assign to all clinicians and other personnel who administer active medication orders

GUI Version

Refer to this section for BCMA V. 3.0 GUI menu assignments.

- **PSB GUI CONTEXT – USER:** assign to all clinicians and other personnel who administer active medication orders

Allocating Security Keys to Users

Refer to this section to allocate the following security keys to appropriate site personnel.

- **PSB MANAGER:** designates the holder as a manager
- **PSB INSTRUCTOR:** designates the holder as a nursing instructor supervising student nurses
- **PSB STUDENT:** designates the holder as a student nurse, requiring that an instructor also sign on to BCMA V. 3.0 at the same time
- **PSB CPRS MED BUTTON:** designates the holder as a nurse who can document administered verbal- and phone-type STAT and NOW (One-Time) orders using the CPRS Med Order Button on the BCMA VDL
- **PSB READ ONLY:** designates the holder as a user that only has Read-Only access to BCMA. Note that users with Read-Only access will also be required to have the PSB GUI CONTEXT – USER secondary menu option.
- **PSB UNABLE TO SCAN:** designates the holder as a user that can run the Unable to Scan (Detailed and Summary) reports.

Establishing Electronic Signature Codes

You may establish Electronic Signatures Codes using the Kernel *Electronic Signature code Edit* [XUSESIG] option.
Note: For easier access by all users, this option is tied to the Common Options, under the *User's Toolbox* [XUSERTOOLS] submenu.

Internal and External Relations

Internal Relations

This section describes options, package-wide variables, and templates within BCMA V. 3.0.

Options

You can invoke ALL options in BCMA V. 3.0 independently.

Package-Wide Variables

BCMA V. 3.0 does *not* include package-wide variables.

Templates

BCMA V. 3.0 does *not* include any templates for Sort, Input, or Print.

External Relations

BCMA V. 3.0 can only be run in an environment that already has several existing features, such as a standard MUMPS operating system. It also requires the following Department of Veterans Affairs (VA) software packages (versions listed or higher) — and all current patches. Otherwise, BCMA V. 3.0 will *not* be fully functional for your users.

- Inpatient Medications   5.0
- Kernel   8.0
- MailMan   8.0
- Nursing   4.0
- Order Entry/Results Reporting   3.0
- Pharmacy Data Management   1.0
- RPC Broker (32-bit)   1.1
- Toolkit   7.3
- VA FileMan   22.0
- Vitals/Measurements   5.0

Internal and External Relations

External Relations (cont.)

Callable Routines, Entry Points, and Variables

BCMA V. 3.0 includes two callable routines: PSBAPIPM and PSBMLHS. Each routine is described in this section, along with the entry points and variables information for each.

- **PSBAPIPM:** Provides information to Inpatient Medications V. 5.0 for determining the start date for a renewed order.
- **PSBMLHS:** Provides other software packages with the ability to call the BCMA Medication History Report. The report lists medications, that a patient has received, by orderable item.

Database Integration Agreements (DBIAs)

BCMA subscribes to Database Integration Agreements (DBIAs) with the Inpatient Medications, CPRS, Nursing, and Registration packages. BCMA V. 3.0 also offers DBIAs for other packages to subscribe to as well.

For detailed information about these DBIAs, log in to FORUM and select the *Integration Agreements Menu* [DBA IA ISC] option located under the *DBA* [DBA] option (Data Base Administrator). Once in the Integration Agreements Menu Option, select "Inquire" and type **BCMA** at the "Select INTEGRATION REFERENCES:" prompt.

Remote Procedure Calls (RPCs)

Following is a list of Remote Procedure Calls associated with BCMA.

1 PSB ALLERGY	2 PSB BAG DETAIL
3 PSB CHECK IV	4 PSB CHECK SERVER
5 PSB COVERSHEET1	6 PSB CPRS ORDER
7 PSB DEVICE	8 PSB FMDATE
9 PSB GETIVPAR	10 PSB GETORDERTAB
11 PSB GETPRNS	12 PSB GETPROVIDER
13 PSB INSTRUCTOR	14 PSB IV ORDER HISTORY
15 PSB LOCK	16 PSB MAIL
17 PSB MAN SCAN FAILURE	18 PSB MAXDAYS
19 PSB MED LOG LOOKUP	20 PSB MEDICATION HISTORY
21 PSB MOB DRUG LIST	22 PSB NURS WARDLIST
23 PSB PARAMETER	24 PSB PUTIVPAR
25 PSB REPORT	26 PSB SCANMED
27 PSB SCANPT	28 PSB SERVER CLOCK VARIANCE
29 PSB SUBMIT MISSING DOSE	30 PSB TRANSACTION
31 PSB USERLOAD	32 PSB USERSAVE
33 PSB UTL XSTATUS SRCH	34 PSB VALIDATE ESIG
35 PSB VALIDATE ORDER	36 PSB VERSION CHECK
37 PSB VITAL MEAS FILE	38 PSB VITALS
39 PSB WARDLIST	

Glossary

Learning BCMA V. 3.0 Lingo

The alphabetical listing, in this section, is designed to familiarize you with the many acronyms and terms used throughout this guide.

Example: Alphabetical Listing of BCMA V. 3.0 Acronyms and Terms

Acronym/Term	Definition
Archive	To transfer files from a computer onto long-term storage.
BCMA Clinical Reminders	A marquee located in the lower, right-hand corner of the VDL that identifies PRN medication orders needing effectiveness documentation. The setting is based on the "PRN Documentation" site parameter, and applies to current admissions or the site parameter timeframe (whichever is greater). A mouse-over list displays when the pointer is placed over the PRN Effectiveness Activity, or a full list is available by double clicking on the Activity.
CHUI	**Ch**aracter-based **U**ser **I**nterface.
Client	An architecture in which one computer can get information from another. The Client is the computer that asks for access to data, software, or services.
CPRS	**C**omputerized **P**atient **R**ecord **S**ystem. A VistA software application that allows users to enter patient orders into different packages from a single application. All pending orders that appear in the Unit Dose and IV packages are initially entered through the CPRS package. Clinicians, Managers, Quality Assurance Staff, and Researchers use this integrated record system.
Data Dictionary	Also called "DD," the dictionary that contains file attributes.
DBIA	**D**ata**b**ase **I**ntegration **A**greement. A formal understanding between two or more application packages which describes how data is shared or how packages interact. This Agreement maintains information between package Developers, allowing the use of internal entry points or other package-specific features.
FileMan	The VistA database management system.
GUI	**G**raphical **U**ser **I**nterface. The type of interface chosen for BCMA V. 3.0.
IV	A medication given intravenously (within a vein) to a patient from an IV bag. IV types include Admixture, Chemotherapy, Hyperal, Piggyback, and Syringe.
Journaling	A record of changes made in files and messages transmitted. It is quite useful when recovering previous versions of a file before updates were made, or to reconstruct updates if an updated file gets damaged.
LIMITED ACCESS BCMA	A mode in which BCMA can be accessed that provides medication administering users the ability to access patient records for non-medication administration documentation, review and reporting purposes without being at the patient's bedside.

Glossary

The alphabetical listing, in this section, is designed to familiarize you with the many acronyms and terms used throughout this guide.

Example: Alphabetical Listing of BCMA V. 3.0 Acronyms and Terms

Acronym/Term	Definition
MAH	**M**edication **A**dministration **H**istory. A patient report that lists a clinician's name and initials, and the exact time that an action was taken on an order (in a conventional MAR format). Each order is listed alphabetically by the orderable item. The date column lists three asterisks (***) if a medication was Discontinued.
MAR	**M**edication **A**dministration **R**ecord. The traditional, handwritten record used for noting when a patient received a medication. BCMA V. 3.0 replaces this record with an MAH.
NOW Order	A medication order given ASAP to a patient, entered as a One-Time order by Providers and Pharmacists. This order type displays for a fixed length of time on the VDL, as defined by the order Start and Stop Date/Time.
Patient Transfer Notification	A message that displays when a patient's record is opened or the Unit Dose or IVP/IVPB Medication Tab is viewed for the first time. This message indicates that the patient has had a movement type (usually a transfer) within the site-definable parameter, and the last action for the medication occurred before the movement, but still within the defined timeframe.
PRN Order	The Latin abbreviation for **P**ro **Re** **N**ata. A medication dosage given to a patient on an "as needed" basis.
PSB CPRS MED BUTTON	The name of the security "key" that must be assigned to nurses who document verbal- and phone-type STAT and NOW (One-Time) medication orders using the CPRS Med Order Button on the BCMA VDL.
PSB INSTRUCTOR	The name of the security "key" that must be assigned to nursing instructors, supervising nursing students, so they can access user options within BCMA V. 3.0.
PSB MANAGER	The name of the security "key" that must be assigned to managers so they can access the PSB Manager options within BCMA V. 3.0.
PSB READ ONLY	The name of the security "key" that must be assigned to users that can only access BCMA in Read-Only mode. Users who are assigned the PSB READ ONLY security key will never be able to administer medications or perform any actions against a patient's medical record. The PSB READ ONLY security key overrides all other BCMA security keys.

Glossary

The alphabetical listing, in this section, is designed to familiarize you with the many acronyms and terms used throughout this guide.

Example: Alphabetical Listing of BCMA V. 3.0 Acronyms and Terms

Acronym/Term	Definition
PSB STUDENT	The name of the security "key" that must be assigned to nursing students, supervised by nursing instructors, so they can access user options within BCMA V. 3.0. This key also requires that a nursing instructor sign on to BCMA.
PSB UNABLE TO SCAN	The name of the security "key" that must be assigned to allow the user to run the Unable to Scan (Detailed and Summary) reports.
Purge	To delete a set of data, and all references to the data.
Read-Only BCMA	A mode in which BCMA can be accessed that provides non-medication administering users the ability to view a patient's VDL and print reports, without performing any actions against a patient's medical record.
RPC	**R**emote **P**rocedure **C**all. A procedure stored on the VistA Server, which is executed to return data to the Client.
RPC Broker	A Client/Server System within the VA's Veterans Health Information Systems and Technology Architecture (VistA) environment. It enables client applications to communicate and exchange data with M Servers.
Security Keys	Used to access specific options within BCMA V. 3.0 that are otherwise "locked" without the security key. Only users designated as "Holders" may access these options.
Server	An architecture in which one computer can get information from another. The Server, which can be anything from a personal computer to a mainframe, supplies the requested data or services to the Client.
STAT Order	A medication order given immediately to a patient, entered as a One-Time order by Providers and Pharmacists. This order type displays for a fixed length of time on the VDL, as defined by the order Start and Stop Date/Time.
VDL	**V**irtual **D**ue **L**ist. An on-line "list" used by clinicians when administering active medication orders (i.e., Unit Dose, IV Push, IV Piggyback, and large-volume IVs) to a patient. This is the Main Screen in BCMA V. 3.0. **Note:** This is called BCMA VDL in this guide to eliminate confusion with the VistA Documentation Library (VDL) also mentioned in this guide.
VistA	**V**eterans Health **I**nformation **S**ystems and **T**echnology **A**rchitecture.
Ward Stock	Unit Dose and IV medications that are "stocked" on an ongoing basis on wards and patient care areas. They are packaged in a ready-to-use form or compounded by the medication administrator.
ZPL	**Z**ebra **P**rogramming **L**anguage.