BAR CODE MEDICATION ADMINISTRATION (BCMA)

TECHNICAL MANUAL/SECURITY GUIDE

Version 3.0
February 2004

(Revised January 2011)

Department of Veterans Affairs
Product 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
01/2011	i-ii, 6, 7, 10, 15, B-2, B-4	PSB*3*42	Added note and list of BCMA Reports that were added to GUI only. Added definition of data field change for Indian Health Service. Added Indian Health Service terms to Glossary. (R. Singer, DM; B. Thomas, Tech Writer)
10/2009	i-ii, 7, 9, 17	PSB*3*47	Added PSBPXFL and PSBPXLP to the list of installed routines. Add Immunizations Documentation by BCMA Nightly Task [PSB PX BCMA2PCE TASK] option to the *Manager* [PSB MGR] menu. Added Patient Care Encounter to the External Relationships section. (R. Singer, DM; D. Dertien/R. Silverman, Tech Writer)
01/2009	i-ii, iv, 6-7, 13-14, 18-19, 21	PSB*3*28	- Update 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) (R. Singer, PM; R. Thomas, Tech Writer)
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.) (E. Williamson, PM; G. O'Connor, Tech Writer)
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) (R. Singer, PM; E. Phelps, Tech Writer)

Revision History

Date	Revised Pages	Patch Number	Description
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 Followup (correction) and Unknown Action Status Report (new with this patch). (p. 9) – Added description of the "Unknown Actions" mail group parameter. (p. 13) (R. Singer, PM; M. Newman, Tech Writer)
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) (R. Singer, PM; M. Newman, Tech Writer)
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) (R. Singer, PM; M. Newman, Tech Writer)
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) (R. Singer, PM; M. Newman, Tech Writer)
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) (R. Singer, PM; M. Newman, Tech Writer)
02/2004			Original Released BCMA V. 3.0 Technical Manual/Security Guide (R. Singer, PM; M. Pospisil, Tech Writer)

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

IMPORTANT:

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

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.

Implementation and Maintenance

Resource Requirements

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

- Routines   84
- 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    PSBOMT1    PSBOMV     PSBOPE
PSBOPF     PSBOPI     PSBOPM     PSBOPM1    PSBOSF     PSBOST     PSBOVT
PSBOWA     PSBOXA     PSBPAR     PSBPARIV   PSBPOIV    PSBPRN     PSBPXFL
PSBPXLP    PSBRPC     PSBRPC1    PSBRPC2    PSBRPC3    PSBRPCMO   PSBRPCXM
PSBSAGG    PSBSVHL7   PSBUTL     PSBVAR     PSBVDLIV   PSBVDLPA   PSBVDLPB
PSBVDLTB   PSBVDLU1   PSBVDLU3   PSBVDLUD   PSBVDLVL   PSBVITFL   PSBVT1
      84  routines
```

Exported Options

BCMA CHUI Menus

BCMA V. 3.0 exports three main menus. They include those listed below, in the CHUI version of BCMA V. 3.0. The options for each menu are listed in this section.

- **Manager Menu:** [PSB MGR] is assigned to managers
- **Pharmacist Menu:** [PSB PHARMACY] is assigned to all inpatient Pharmacists
- **Nurse Menu:** [PSB NURSE] is assigned to all clinicans and other personnel who administer active medication orders

Manager Menu [PSB MGR]

This menu includes the following options:

- Drug File Inquiry
- Immunizations Documentation by BCMA Nightly Task
- Medication Administration Menu Nursing
  - ➢ Medication Administration Log Report
  - ➢ Missed Medications Report
  - ➢ Ward Administration Times Report
  - ➢ Due List Report
  - ➢ PRN Effectiveness List Report
  - ➢ Enter PRN Effectiveness
  - ➢ Manual Medication Entry
  - ➢ Medication Administration History (MAH) Report
  - ➢ Missing Dose Request
  - ➢ Medication Variance Log
  - ➢ Drug File Inquiry
- Medication Administration Menu Pharmacy
  - ➢ Medication Administration Log Report
  - ➢ Missed Medications Report
  - ➢ Due List Report
  - ➢ Medication Administration History (MAH) Report
  - ➢ Missing Dose Request
  - ➢ Missing Dose Followup
  - ➢ Missing Dose Report
  - ➢ Label Print
  - ➢ Drug File Inquiry
- Missing Dose Followup
- Reset User Parameters
- Trouble Shoot Med Log
- Unknown Action Status Report

Exported Options

BCMA CHUI Menus (cont.)

**Pharmacy Medication Administration Menu
[PSB PHARMACY]**

This menu includes the following options:
- Medication Administration Log Report
- Missed Medications Report
- Due List Report
- Medication Administration History (MAH) Report
- Missing Dose Request
- Missing Dose Followup
- Missing Dose Report
- Label Print
- Drug File Inquiry

**Nursing Medication Administration Menu
[PSB NURSE]**

This menu includes the following options:
- Medication Administration Log Report
- Missed Medications Report
- Ward Administration Times Report
- Due List Report
- PRN Effectiveness List Report
- Enter PRN Effectiveness
- Manual Medication Entry
- Medication Administration History (MAH) Report
- Missing Dose Request
- Medication Variance Log
- Drug File Inquiry

Note: The following reports have been added to BCMA and are available via GUI only, but have not been added to the CHUI menus.
- Cover Sheet Reports:
    - Medication Overview
    - PRN Overview
    - IV Overview
    - Expired/DC'd/Expiring Orders
- IV Bag Status Report
- Medication Therapy Report
- Unable to Scan Detailed Report
- Unable to Scan Summary Report

Security Features

Developing a Contingency Plan

In March 2006, patch PSB*3*8, the BCMA Backup System (BCBU), was reissued with significant enhancements to the field as a Class I solution for the BCMA Contingency Plan. This patch provides real-time backup of all inpatient medication activities on a designated workstation. Review the patch description to learn more about the benefits of this patch.

Appendix B: HL7 Messaging for BCMA

Sample HL7 Data Fields Broadcast to BCMA Subscribers

BCMA includes the Standards from the HL7 V. 2.4 (VistA Messaging) package. For more information, refer to the VistA Messaging and Interface Services Web site at: http://vista.med.va.gov/messaging/hl7. This section provides a list of sample Health Level Seven (HL7) data fields that BCMA broadcasts to BCMA HL7 subscribers. Review the information to learn the "RAS" messages created for the administration and/or update of a medication order. The activities, which cause the broadcast of BCMA HL7 messages, are called "trigger events." BCMA HL7 trigger events are MEDPASS, UPDATE STATUS, PRN EFFECTIVENESS, and ADD COMMENT.

Note: Every message will not use every data field and every segment provided. Some segments may repeat as necessary. Some segments may not appear in the exact order depicted below for all trigger events, but they will be consistent for each specific trigger event.

Example: "RAS" Messages Created for the Administration of a Medication Order

SEG	SEQ	Field Name	Example	HL7 Type
MSH	1	Field Separator	^	string
	2	Encoding Characters	~|\&	string
	3	Sending Application	PSB HL7 SRV	hierarchic designator
	4	Sending Facility		hierarchic designator
	5	Receiving Application	PSB HL7 SUB	hierarchic designator
	6	Receiving Facility		hierarchic designator
	7	D/T of Message	20030530075514-0600	HL7 format timestamp (yyyymmddhhnnss-0600)
	8	Security		string
	9	Message Type	RAS~O17	composite
	10	Message Control ID	5001457	string
	11	Processing ID	P	processing type
	12	Version ID	2.4	ID
	13	Sequence Number		numeric
	14	Continuation Pointer		string
	15	Accept Acknowledgement Type	AL	ID
	16	Application Acknowledgment Type	NE	ID
	17	Country Code	USA	ID
	18	Character Set		ID
	19	Principal Language of Message		coded element

Appendix B: HL7 Messaging for BCMA

Example: "RAS" Messages Created for the Administration of a Medication Order (cont.)

SEG	SEQ	Field Name	Example	HL7 Type
PID	3	Patient Identifier List	748	composite ID
	4	Alternate Patient ID	54~~~~AGE	extended composite ID
	5	Patient Name	BCMAPATIENT~TWO	patient name
	7	Date/Time of Birth	19490101	HL7 format timestamp (yyyymmdd)
	8	Administrative Sex	M	user table
	19	SSN Number (VA) or HRN Number (IHS)–Patient	000001000 (VA) or 123456 (IHS)	string
PV1	2	Patient Class	U	table 0004
	3	Patient Location	7A GEN MED 724-A~~~500	user table
	7	Attending Doctor	BCMAPROVIDER~ONE	composite ID
ORC	1	Order Control	XX	table 119
	2	Placer Order Number	1045~PSB~1045~IEN	entity identifier
	3	Filler Order Number	13V	entity identifier
	7	Quantity/Timing	~~~~~~~~C	dosage, scheduled administration time, schedule type
	8	Parent	~	composite
	9	D/T of Transaction	20030530075514-0600	HL7 format timestamp (yyyymmddhhnnss-0600)
	10	Entered by	BCMANURSE~ONE	extended composite name
	15	Order Effective D/T	20030530075514-0600	HL7 format timestamp (yyyymmddhhnnss-0600)
	19	Action By	BCMANURSE~ONE	extended composite name
RXR	1	Route	IV	table 0162
	2	Administration Site	3 INJECTION SITE	table 0163
RXO	1	Requested Give Code	269~FLOUROURACIL	coded element
	2	Requested Give Amount		numeric
	10	Requested Dispense Code	748V52	coded element
	21	Requested Give Rate Amount	~250 ml/hr	string

Example: "RAS" Messages Created for the Administration of a Medication Order (cont.)

SEG	SEQ	Field Name	Example	HL7 Type
RXC	1	RX Component Type	A	table 0166
	2	Component Code	20~5-FLUOURACIL	coded element
	3	Component Amount	5-FLUOURACIL	numeric
	4	Component Units		coded element
RXC	1	RX Component Type	B	table 0166
	2	Component Code	8~AMINO ACID SOLUTION 8.5%	coded element
	3	Component Amount	AMINO ACID SOLUTION 8.5%	numeric
	4	Component Units		coded element
RXA	1	Give Sub-ID Counter	0	number
	2	Administration Sub-ID Counter	1	number
	3	Date/Time Start of Administration	20030530075514-0600	HL7 format timestamp (yyyymmddhhnnss-0600)
	5	Administered Code	20~5-FLUOURACIL	coded element
	6	Administered Amount	450 MG	number
	7	Administered Unit		
	9	Administration Notes		coded element
	18	Substance/Treatment Refusal Reason	~Elevated Blood Sugar	coded element
	19	Indication	~	coded element
	20	Completion Status	C	user table
NTE	2	Source of Comment		table 105
	3	Comment	This is a comment …	free text
	4	Comment Type	BCMANURSE~ONE~20030 530075514-0600~Date Entered	coded element (includes HL7 format timestamp [yyyymmddhhnnss-0600])

Appendix B: HL7 Messaging for BCMA

Definitions of Data Fields Under FIELD NAME Column

This section lists the definitions for some of the data fields provided under the FIELD NAME column, along with the location of the data field. The message header (i.e., the MSH segment) is constructed and supported by the VistA HL7 message development tool.

Note: The MSH segment field names are *not* described below.

- **PATIENT ID:** Field (#.01) of the BCMA MEDICATION LOG file (#53.79) and Internal Entry Number (IEN) pointer to the PATIENT file (#2).

- **PATIENT NAME:** As returned by the Application Program Interface (API) VADPT.

- **DATE OF BIRTH:** As returned by the API VADPT.

- **ADMINISTRATIVE SEX:** As returned by the API VADPT.

- **SSN NUMBER (VA) or HRN NUMBER (IHS):** As returned by the API VADPT.

- **PATIENT LOCATION:** Field (#.02) of the BCMA MEDICATION LOG file (#53.79), which contains the actual room-bed and ward location of the patient at the time the medication pass occurred. Also contains field (#.03) of the BCMA MEDICATION LOG file (#53.79), which contains the division number of the ward that the patient was on during the medication pass.

- **PLACER ORDER NUMBER:** IEN for the BCMA MEDICATION LOG file (#53.79).

- **FILLER ORDER NUMBER:** Contains the ORDER REFERENCE NUMBER field (#.11) of the BCMA MEDICATION LOG file (#53.79), which contains the IEN of the actual medication order from the PHARMACY PATIENT file (#55)PREVIOUS ORDER NUMBER as returned by the API PSJBCMA1.

- **QUANTITY/TIMING:** Contains the order dosage, schedule type, and scheduled administration time data from the BCMA MEDICATION LOG file (#53.79), fields #.15, #.12, and #.13 respectively.

- **PARENT:** Contains the PREVIOUS ORDER NUMBER as returned by the PSB routine PSBVT.

- **DATE/TIME OF TRANSACTION:** Contains the ACTION DATE/TIME field (#.06) of the BCMA MEDICATION LOG file (#53.79), which contains the FileMan date/time of the actual time that the action was taken.