



RESOURCE AND PATIENT MANAGEMENT SYSTEM

# **IHS Patient Merge**

## **(BPM)**

### **Technical Manual**

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## Preface

The purpose of this manual is to provide technical information about the Indian Health Service (IHS) Patient Merge (BPM) package. IHS Patient Merge, a modified component of the Veterans Administration (VA) Duplicate Record Merge software:

- Enhances the ability to associate appropriate data with a single patient identifier
- Provides the tools necessary to automatically identify patient records that have a high likelihood of being duplicates

Originally, Patient Merge was released as a patch to VA Kernel Toolkit 7.3, and was then further modified for use by IHS facilities.

This Technical Manual is designed to provide you, the site manager/Information Resource Management service chief, with the necessary information for the technical operation of the software. It is intended for technical computer personnel and not designed for the typical end user.

# Table of Contents

<b>1.0</b>	<b>Introduction.....</b>	<b>1</b>
<b>2.0</b>	<b>Implementation and Maintenance .....</b>	<b>2</b>
2.1	General Information .....	2
2.1.1	Search for Potential Duplicate Record Pairs.....	2
2.1.2	Review, Verification, And Approval of Duplicate Record Pairs ....	3
2.1.3	The Merge Process .....	4
2.2	System Requirements .....	4
2.3	Package-Wide Variables .....	5
2.4	Security Keys.....	5
2.5	Technical Notes on Site Configuration.....	6
2.5.1	Postinstallation .....	6
2.5.2	Site Parameters.....	7
2.5.3	New Browser Setup: XDRBROWSER1 .....	8
2.5.4	Allocation of Security Keys .....	9
<b>3.0</b>	<b>Menu (mnemonic).....</b>	<b>10</b>
<b>4.0</b>	<b>Routines .....</b>	<b>12</b>
4.1	Routine List.....	12
4.2	Routines with Description .....	12
<b>5.0</b>	<b>Files and Tables.....</b>	<b>17</b>
5.1	File List .....	17
5.2	File Access .....	18
5.3	Cross References .....	19
5.4	IHS Templates.....	27
5.4.1	BPM BRIEF LIST (on Duplicate Record file) .....	27
5.4.2	BPM VERIFIED DISPLAY (on Duplicate Record file) .....	27
5.5	IHS ScreenMan Forms .....	28
5.5.1	BPM RESFILE FORM .....	28
5.6	IHS XPAR Parameters .....	29
<b>6.0</b>	<b>External Relations .....</b>	<b>30</b>
6.1	Programmer Notes .....	30
6.1.1	Special Merge Routines .....	31
6.1.2	Variable Pointers .....	31
6.1.3	DINUM'ed Files with Word-Processing Fields .....	32
6.1.4	DINUM'ed Subfile .....	34
6.2	Published Entry Points.....	35
6.3	Exported Options .....	35
6.3.1	STEP 1 .....	35

6.3.2	STEP 2 .....	35
6.3.3	STEP 3 .....	36
6.3.4	Patient Merge Reports.....	36
6.4	Data Exports.....	38
<b>7.0</b>	<b>Internal Relations .....</b>	<b>39</b>
<b>8.0</b>	<b>Archiving and Purging .....</b>	<b>40</b>
<b>9.0</b>	<b>Documentation Resources .....</b>	<b>41</b>
9.1	System Documentation.....	41
9.1.1	%INDEX .....	41
9.1.2	Inquire Option .....	42
9.1.3	Print Option File.....	42
9.1.4	List File Attributes .....	42
9.2	Online Help .....	43
9.3	Programmer Options .....	44
<b>10.0</b>	<b>SAC Requirements/Exemptions.....</b>	<b>45</b>
<b>11.0</b>	<b>Glossary .....</b>	<b>46</b>
<b>12.0</b>	<b>Appendix A: Duplicate Tests Logic .....</b>	<b>49</b>
12.1	Duplicate Tests and Scores: Technical Description.....	49
12.2	Initial Screen for Potential Duplicates .....	49
12.3	Further Testing of Potential Duplicates.....	50
12.3.1	Tests for Name .....	50
12.3.2	Tests for Social Security.....	50
12.3.3	Tests for Claim Number (not used by IHS).....	51
12.3.4	Tests for Dates .....	51
12.3.5	Tests for Mother's Maiden Name.....	51
12.3.6	Tests for Gender.....	52
<b>13.0</b>	<b>Contact Information .....</b>	<b>53</b>

## 1.0 Introduction

This manual provides Indian Health Service (IHS) site managers with a technical description of the IHS Patient Merge routines, files, menus, cross references, globals, and other necessary information required to effectively manage the system.

All routines, files, options, and keys are namespaced starting with the letters “BPM” or “XDR.” The file number range for this package is 15 – 15.9.

This application has been developed to assist facility Health Information Management (HIM) staff identify and merge duplicate records found in Resource and Patient Management Software (RPMS) files. Record pairs are identified as potential duplicates through a search of the database. These potential duplicates are then validated through a review process to verify that they are duplicates, and then merged. This application is intended to provide a reliable approach to correctly identify and merge duplicate records.

## 2.0 Implementation and Maintenance

IHS Patient Merge is a modified version of the Veterans Administration (VA) Patient Merge module within the Duplicate Resolution Utilities of the VA Kernel Toolkit. Thus, this application uses both Kernel Toolkit software, as well as add-on IHS software, to handle IHS-specific needs.

Specific steps to edit site parameters and set up the new browser device are in both the *IHS Patient Merge User Manual* and the *IHS Patient Merge User Manual Installation Guide and Release Notes*. This chapter provides background about what happens in the merge process.

### 2.1 General Information

Patient Merge provides an automated method to eliminate duplicate patient records within the RPMS database. The overall process consists of three major steps:

1. Search for potential duplicate record pairs
2. Review, verify, and approve of those pairs
3. Begin the merge process

#### 2.1.1 Search for Potential Duplicate Record Pairs

The search and identification of potential duplicate records compares key fields in the VA PATIENT and PATIENT files. By selecting a Basic search option, you begin a search on a file for the first time.

Routines are activated containing preset specifications for duplicate tests. These tests are identified in the DUPLICATE RESOLUTION file (#15.1). Each test uses its corresponding field and file numbers to assist in identifying potential duplicate records. Those fields are

- Name
- Social Security Number (SSN)
- Sex
- Date of Birth (DOB)
- Date of Death (DOD)

- Last Separation Date (not used by IHS)
- Mother's Maiden Name
- Claim Number (not used by IHS).

In addition, the Tribe of Membership field has been added for IHS use.

A value is ascribed to each field based upon similarity of the data present. Then all field values are tabulated to form a single value, which is compared to the Threshold Percentage (a site parameter). When record pair scores evaluate above this percentage, they are considered potential duplicates, entered into the DUPLICATE RECORD file (#15), and made available for further processing.

The search process is a CPU-intensive job that has been known to exceed 100 hours at VA facilities, depending upon factors such as the number of entries in the PATIENT file and the hardware involved. Utilities are provided to enable pausing and restarting the job.

## 2.1.2 Review, Verification, And Approval of Duplicate Record Pairs

Once the search has been initiated and has found a potential duplicate pair, the process of verifying record pairs begins. The review and verification process may begin while the search is running.

The primary reviewer (HIM staff) initially determines if the pair represents a duplicate record by reviewing demographic information and each patient's Health Summary. Other RPMS and paper chart information may need to be examined to determine if the pair is indeed duplicates. Much care must be taken for patients who are twins.

Reviewers determine whether the record pair is a duplicate, not a duplicate (so that subsequent processing need not occur), or undetermined. If the patient records are duplicates, the primary reviewer selects the merge direction. Where appropriate, reviewers may mark data to be overwritten. Those record pairs determined to be verified duplicates are marked as such and are then available for approval to be merged.

The intent of the approval step is to ensure that a conscious decision is made to take verified duplicate record pairs and make them available for the merge process. All verified record pairs, or selected pairs, can be approved. The approval step follows a site-defined waiting period. Reviewers with access to schedule merge batches are responsible for approving verified duplicates.

### 2.1.3 The Merge Process

All approved record pairs are included in a merge process when scheduled; therefore, approve only the number of verified pairs that your system can handle during one batch. The merge process is a lengthy process that is recommended for off-peak hours. Utilities are available for pausing and restarting the merge process.

The merge process merges verified duplicate records in the following order: first, files that require special handling; then the primary file (VA Patient); and finally the resolution of pointers. The resolution of pointers for the primary file or any of those requiring special processing involves three phases. The first two phases permit identification of entries requiring modification based on their internal entry numbers (IENs) (DINUMed) or by cross-references, and are fairly rapid. The third phase involves all other pointers and can be lengthy.

Several special processing routines have been written to handle database entries that point to the VA PATIENT or PATIENT files in an unusual manner. An entry that calls a special processing driver routine has been made in the PACKAGE file (#9.4) multiple, AFFECTS RECORD MERGE field (#20) for the IHS Patient Merge entry. A stub record is maintained to disallow reuse of VA PATIENT and PATIENT file internal entry numbers.

Concurrent with the merge, entries are made in a new global for each record making up the pair. The entries are intended to provide a “before-merge” image. However, note that the merge is a *nonreversible* process. Once the pair of records is merged, there is no automated way of undoing the process.

The application has been written to support multiple parallel jobs (threads, as specified by the site) during the merge process. However, decreased overall processing time is exchanged for increased system utilization.

**Note:** The merge process is a background job, and should not be running when changes are being made to Data Dictionaries or when data conversions are taking place.

## 2.2 System Requirements

The Kernel Toolkit Patch 1003 contains changes to XDR routines exclusively for Patient Merge. The Toolkit patch was tested along with the IHS Patient Merge application. This manual will detail the IHS modifications made to these routines.

The following resources must be installed before the IHS Patient Merge application:

- Kernel Toolkit v7.3 Patch 1003

- AUPN v99.1 Patch 17 and 19
- APSP v7.0 Patch 1004 (Pharmacy v7.0 is required)
- BHS v1.0 Patch 1 (IHS components to VA Health Summary)
- LR v5.2 Patch 1022 (if running Laboratory)
- PIMS v5.3 Patch 1007 (with input transform fix on DG Security File Date field)
- BDW v1.0 Patch 2 (Data Warehouse patch)
- GIS v3.01 Patch 15 (complements Data Warehouse patch changes)
- BQI v1.1 or greater (if running iCare)

## 2.3 Package-Wide Variables

The Patient Merge application contains no package-wide variables.

## 2.4 Security Keys

This application contains security keys from both the VA and IHS packages. There is a main key for both and a manager key for both.

Key Name	Description
BPMZMENU	Allows access to the main IHS Patient Merge menu. Designed for use by HIM staff only.
XDR	Allows access to the VA Duplicate Resolution System. Allocate to the same users who receive the BPMZMENU key.
BPMZMERG	Allows access to the menu where the actual merges take place. Allocate only to HIM staff assigned responsibility to run and monitor merge batches.
XDRMGR	Allows entering a verified pair even if the threshold has not been met. If given, it should only be allocated to a HIM supervisor

**Note:** The DG ELIGIBILITY key is required by persons scheduling merge batches, and is required to provide valid error checking results. This is a VA key from the Patient Information Management System (PIMS) application.

## 2.5 Technical Notes on Site Configuration

### 2.5.1 Postinstallation

Postinstall code (POST^BPMKIDS) performs the following:

- Sets DAYS BEFORE FINAL VERIFY and DAYS BETWEEN VERIFY AND MERGE parameters to zero in Duplicate Resolution File (#15). The second parameter can be changed by a site under the Patient Merge Site Parameters option.
- Cleans out all entries in Package file (#9.4) under the AFFECTS PATIENT MERGE multiple. Kernel Installation and Distribution System (KIDS) install finish will insert the special merge driver routine under IHS Patient Merge. This is the only routine needed.
- Removes an extra “A” cross-reference on the Pharmacy Patient file (#55) under the Prescription Profile multiple (.01 field). This action also triggers recompiling the cross-references for the file.
- Reindexes “AC” cross-reference on CHS Facility file to make sure older entries are properly set.
- Stuffs Tribe of Membership under Duplicate Tests in file 15.1. This IHS field will be used when comparing potential duplicates.
- Stuffs YES (or 1) as the value for Parameter BPM USE IHS LOGIC. Use in modified VA code to determine if new logic is to be used.
- Cleans up database that used old merge software as the format of the FROM patient record stub.
- Cleans up globals with extra zero nodes.
- Cleans out old garbage data from Period of Service field in VA Patient file. Data is no longer automatically stuffed since PIMS v5.3 was installed.

## 2.5.2 Site Parameters

For full instructions on editing site parameters, see Section 8.4, “Patient Merge Site Parameters,” in the *IHS Patient Merge (BPM) User Manual*.

Parameter	Description
MERGE MAIL GROUP	<p>This mail group will receive a bulletin when a merge batch has been completed. The MailMan messages will be comprised of FROM and TO record pairs detected as having data errors during the beginning of the actual merge process. Records contained in this message are excluded from the merge process. The subject of this MailMan message is "MERGE PAIRS EXCLUDED DUE TO PROBLEMS."</p> <p>This mail group will also receive MailMan messages comprised of FROM and TO record pairs excluded from the merge process resulting from their multiple relationship(s) with the record pair selected to be merged. For example, if Patient A and Patient B are duplicates and Patient A and Patient C are duplicates, only one pair may be merged in a batch. The subject of the MailMan message is "PAIRS EXCLUDED FROM MERGE DUE TO MULTIPLE REFERENCES."</p> <p>This mail group must be an entry in the MAIL GROUP file and should contain at least one active member. Sites are required to supply their own mail groups.</p>
DUPLICATE MANAGER MAIL GROUP	<p>This mail group will be sent a bulletin whenever any known problems occur during the duplicate checking or merging process. This mail group must be an entry in the MAIL GROUP file. Sites are required to supply their own mail groups.</p>
POTENTIAL DUPLICATE THRESHOLD%	<p>This field contains a computed percentage based on the values defined in the duplicate tests. When record pair scores evaluate equal to or above this percentage, they are considered potential duplicates. Record pairs may differ on the maximum score to which the percentage threshold is applied. The default potential duplicate threshold with this application release is 60%.</p>
DAYS BETWEEN VERIFY AND MERGE	<p>This is the number of days to elapse between final verification of a duplicate pair and the earliest possible merge date (i.e., the date records are approved to be merged). This parameter is available for sites that may be concerned about possible ongoing actions related to entries that will be merged and want to establish a period of inactivity prior to the actual merge. The number of days entered in this field should be between 0 and 30. The default with this application release is zero days.</p>

Parameter	Description
NUMBER OF THREADS	<p>This field is used to help manage the most time-consuming portion of the merge process. It is used to indicate the number of threads that should be used during the longest phase of the merge process. (Phase 3 is the longest phase of the merge process. It is described in more detail in Section 2.1.3). Your site can set the number of threads (jobs) according to your system resources.</p> <p>For example, an entry of 1 would indicate that only the main process would be running. An entry of 2 to 3 indicates that the main process, along with one to two other threads, should be used during this phase. The greater the number of threads, the more parallel processing occurs. Each thread is used to process one of the more time-consuming files, which reduces the amount of time the overall process takes, at the expense of increased system utilization. The site parameter NUMBER OF THREADS is exported with the Patient Merge application as a default of 3. The maximum allowable value is 5.</p>
REPOINT DELETED VISITS?	<p>This field, added by IHS, determines if your site wants the merge process to spend extra time looking for deleted visits. These visits are just stubs left after the Patient Care Component (PCC) deletion process, and cannot be accessed by FileMan or RPMS applications. Finding these visits requires looping through the entire VISIT file, which for some sites is very large.</p>

### 2.5.3 New Browser Setup: XDRBROWSER1

XDRBROWSER1 is specifically designed to work with Patient Merge. It is a modified version of the VA FileMan Browser. The information should be entered in your TERMINAL TYPE file (#3.2) and DEVICE file (#3.5), respectively.

### Entry in TERMINAL TYPE File

```

NAME: P-XDRBROWSER
SELECTABLE AT SIGN-ON: NO          BACK SPACE: $C(8)
RIGHT MARGIN: 255                 OPEN EXECUTE: D OPEN^XDRDVAL
FORM FEED: #                       CLOSE EXECUTE: D CLOSE^XDRDVAL
PAGE LENGTH: 65500
DESCRIPTION: BROWSER FOR DUPLICATE RESOLUTION APPLICATIONS

```

### Entry in DEVICE File

```

NAME: XDRBROWSER1
$I: T:\TEMP\XDRBR.TXT (or the desired drive and directory)
ASK DEVICE: NO
ASK PARAMETERS: NO
QUEUING: ALLOWED
LOCATION OF TERMINAL: PATIENT MERGE BROWSER
ASK HFS I/O OPERATION: NO
OPEN PARAMETERS: "NWS"
PRE-OPEN EXECUTE: S %ZIS("HFSNAME")=$P(IO, ".")_$_J_"_"_$_P(IO, ".", 2) I
'$D(XDRDVALF), '$$TEST^DDBRT S %ZISQUIT=1 W $C(7), !, "Browser not
selectable from current terminal.", !
SUBTYPE: P-XDRBROWSER
TYPE: HOST FILE SERVER

```

**Note:** You must have a NULL device defined in the device setup.

## 2.5.4 Allocation of Security Keys

The security key needed to access the main menu is **BPMZMENU**. In addition, all users with the main menu key should be allocated the **XDR** key. (Those keys beginning with “XDR” are VA keys, and those beginning with “BPM” are IHS keys).

Only holders of the **BPMZMERG** key will see the S3 – Merge Verified Duplicates option.

The **XDRMGR** key gives the user the ability to access the Duplicate Manager Utilities menu and manually enter a verified duplicate pair, bypassing the threshold required.

Although distributed by another package, the person initiating the merge process must be authorized to hold the **DG ELIGIBILITY** security key. Although not required to select and run the Identify Potential Merge Problems option, the **DG ELIGIBILITY** security key is required to provide valid error-checking results. This key is not required to actually make the necessary edits.

### 3.0 Menu (mnemonic)

IHS Patient Merge [BPMMENU]	
---S1 Find Potential Duplicates [BPM MENU FIND DUPLICATES]	----SRCH Start/Halt Duplicate Search [XDR SEARCH ALL]
	-----DSS Display Search Status [XDR DISPLAY SEARCH STATUS]
	-----FIND Find Potential Duplicates for an Entry in a File [XDR FIND POTENTIAL DUPLICATES]
	-----CHCK Check Pair of Records to see if Duplicates [XDR CHECK PAIR]
	-----PRNT Print List of File Duplicates [XDR PRINT LIST]
	-----VIEW View Duplicate Record Entries [XDR VIEW DUPLICATE RECORD]
---S2 Review/Verify Duplicates [BPM MENU VERIFY DUPLICATES]	-----VPD Verify Potential Duplicates [XDR VERIFY ALL]
	-----ADD Add Verified Duplicate Pair [XDR ADD VERIFIED DUPS]
	-----DVP Display Verified Pair [BPM DISPLAY VERIFIED]
	-----CDC Check for Data Conflicts [BPM OVERWRITE CHECK]
	-----PMP Identify Potential Merge Problems [XDR VALID CHECK]
	-----EDIT Edit the Status Field of a Duplicate Record [XDR EDIT DUP RECORD STATUS]

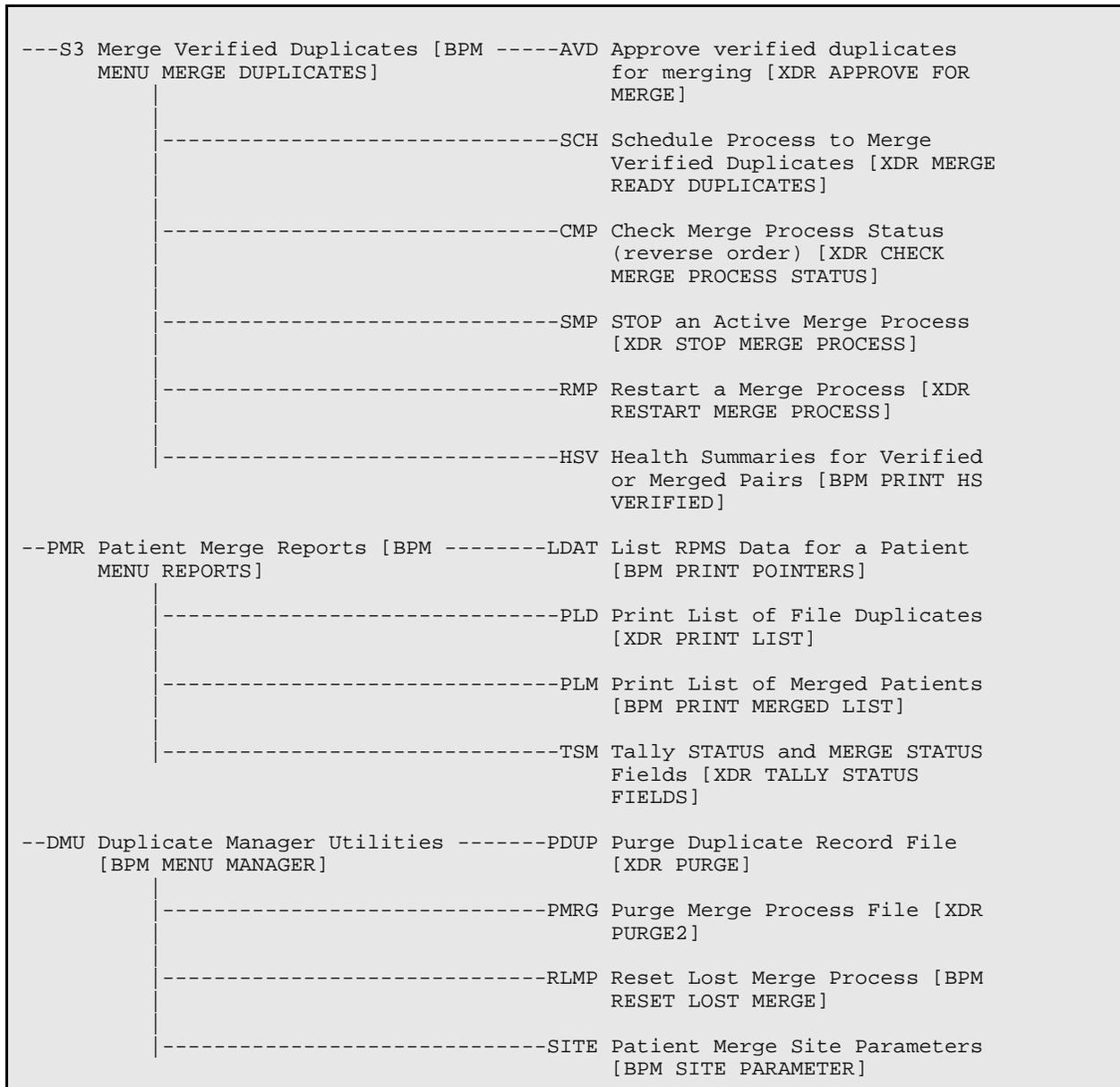


Figure 3-1: IHS Patient Merge menu diagram

## 4.0 Routines

### 4.1 Routine List

BPM namespaced routines (installed with this application):

BPMCHK	BPMHRCN	BPMKALK	BPMKIDS	BPMMRG	BMPPTR
BPMPTTR	BPMRP1	BPMU	BPMVAR	BPMVER	BPMX3PB
BPMXDRV	BPMXLR	BPMXLR2	BPMXPRB	BPMXTAX	BPMXVP
BPMXVST	BPMXWP				

VA XDR namespaced routines (some are modified by IHS and installed via Kernel Toolkit (XT) patches):

XDR2NULL	XDRCNT	XDRDADD	XDRDADJ	XDRDCOMP	XDRDDATA
XDRDEDT	XDRDFPD	XDRDLIST	XDRDMAIN	XDRDOC	XDRDOC1
XDRDOC2	XDRDPDTI	XDRDPICK	XDRDPRE1	XDRDPREL	XDRDPRG2
XDRDPRGE	XDRDQUE	XDRDSCOR	XDRDSHOW	XDRDSTAT	XDRDUP
XDRDVAL	XDRDVAL1	XDRDVAL2	XDREMSG	XDRERR	XDRHLP
XDRLRFIX	XDRMADD	XDRMAIN	XDRMAINI	XDRMERG	XDRMERG0
XDRMERG1	XDRMERG2	XDRMERGA	XDRMERGB	XDRMERC	XDRMPACK
XDRMRG	XDRMRG1	XDRMSG	XDRMVFY	XDRPREI	XDRPREL1
XDRPTCAN	XDRPTCLN	XDRPTDOB	XDRPTDOD	XDRPTLSD	XDRPTMMN
XDRPTN	XDRPTSSN	XDRPTSX	XDRRMRG0	XDRRMRG1	XDRRMRG2
XDRU1	XDRUTL	XDRVCHEK			

### 4.2 Routines with Description

IHS Patient Merge routines

Routine	Description
BPMCHK	Programmer Check For Patient Merge Compliance
BPMHRCN	Displays Chart Numbers From Patient File
BPMKALK	Kill "ALK" Cross-Reference On File 15 For Duplicate Record Merge
BPMKIDS	Preinstall and Environ Check
BPMMRG	IHS Code Called By Merge Function
BMPPTR	Find Pointers To File Entry
BPMPTTR	IHS Compare Tribe Of Memberships
BPMRP1	Print List Of Patients Merged
BPMU	IHS Code Called By Merge Function
BPMVAR	Menu Entry and Exit Actions
BPMVER	IHS Code For Verify Duplicate Function

Routine	Description
BPMX3PB	Repoint 3p Claim And Bill Patients
BPMXDRV	Patient Merge Special Routines Driver
BPMXLR	Repoint Laboratory Data
BPMXLR2	Repoint Lab ^LR("BLRA") E-sig Cross-Reference
BPMXPRB	Repoint and Resequence Problem File
BPMXTAX	Repoint Patient Taxonomy File Pointers
BPMXVP	Repoint Variable Pointer Fields
BPMXVST	Repoint Visit File Pointers
BPMXWP	Process Word Processing Fields

VA Duplicate Resolution Utilities Routines are included here for completeness. For more information, see the VA Kernel Toolkit manuals. XDR routines modified by IHS were released in Toolkit Patch 1003.

Routine	Description
XDR2NULL	Identifies entries with null SSN.
XDRCNT	Counts/tallies records in file #15 by status (verified, not a duplicate; potential duplicate, unverified; verified duplicate; verification in process). Also count/tally records by merge status (not ready, ready, merged, in process). A report is generated to display the results.
XDRDADD	After two records have been matched as potential duplicates, this routine will add the two records to the DUPLICATE RECORD file.
XDRDADJ	Adjusts the DUPLICATE RECORD file upon merge.
XDRDCOMP	Compares two patients via duplicate checker algorithm.
XDRDDATA	Lists basic data on potential duplicates in global format.
XDRDEDT	Updates the Status field in File 15 from either Verified Duplicate or Verified Not a Duplicate to Potential Duplicate. Patch 1003 IHS modifications: 1. Make it clear to users that name is being asked for under LOOKUP 2. Clean up DIR variable
XDRDFPD	Finds all potential duplicates for an entry in a file.
XDRDLIST	Prints various reports from the DUPLICATE RECORD file. It prints listings of Unverified Potential Duplicates, Ready and Not Ready To Merge Verified Duplicates, and Merged Verified Duplicates. Patch 1003 IHS modifications: 1. Changed to IHS print template to add HRCN to displays

<b>Routine</b>	<b>Description</b>
XDRDMAIN	Main driver for the duplicate checking software.
XDRDOC	OBSOLETE Routine; No Longer Used
XDRDOC1	OBSOLETE Routine; No Longer Used
XDRDOC2	OBSOLETE Routine; No Longer Used
XDRDPDTI	When the threshold is increased, this routine will check potential duplicates against it.
XDRDPICK	Verify a pair of potential duplicates after viewing their data. Calls LOOKUP^XDRDEDT to select entries from the DUPLICATE RECORD file (#15) instead of using the standard DIC lookup. Patch 1003 IHS modifications: 1. If no potential duplicates, do not ask to choose from 1 – 0
XDRDPRE1	Generates lists of patients identified by the preliminary scan (XDRDPREL).
XDRDPREL	Preliminary identification of entries with bad data. This routine will scan the file for errors.
XDRDPRG2	Purges the XDR MERGE PROCESS file (#15.2).
XDRDPRGE	Purges the DUPLICATE RECORD file (#15).
XDRDQUE	Starts and stops the search process. If no search is running, it allows the user to queue a search to start. If a search has been halted, the user may continue the search starting at the point they halted. Code has been added to inform user that the search can take a long time. Patch 1003 IHS modifications: 1. Do not ask user for file if only one is defined
XDRDSCOR	Sets scores for duplicate checking.
XDRDSHOW	Displays data in fields so users can select fields to overwrite. Patch 1003 IHS modifications: 1. Check for RGV routine to prevent NOROUTINE error 2. Allow review of fields that point to file 200 3. Display if field marked for overwrite 4. Added display of package for ancillary checks
XDRDSTAT	Displays the status of a search.
XDRDUP	Compares two records and determines whether or not they are duplicates.
XDRDVAL	Contains the basic code for checking whether a data value would be acceptable as input. Patch 1003 IHS modifications: 1. Skipped check of DW Audit file

<b>Routine</b>	<b>Description</b>
XDRDVAL1	Entry points for the validation of data in terms of data entry. Patch 1003 IHS modifications: 1. Allow selection of inactive patients
XDRDVAL2	(Continued from XDRDVAL1). Patch 1003 IHS modifications: 1. Bypass data checks on Indian vs. tribe quantum (if checked separately, they might not pass input transform)
XDREMSG	Error message processor.
XDRERR	OBSOLETE Routine; No Longer Used
XDRHLP	OBSOLETE Routine; No Longer Used
XDRLRFIX	New routine to be called by XT*7.3*36 post-init; two entry points, LAB and CLEANUP. LAB will build a merge process if previous merge process has problems in LAB. CLEANUP will \$Order through File 15 to ensure statuses of merged records are accurate.
XDRMADD	Adds entries to the DUPLICATE RECORD file.
XDRMAIN	This is currently the main driver for duplicate merge software.
XDRMAINI	Initialization routine for XDRDMAIN.
XDRMERG	Tentative update pointer nodes. Patch 1003 IHS modifications: 1. Added call to IHS subroutine for end of merge steps
XDRMERG0	Start of noninteractive batch merge. The merge can be queued. Patch 1003 IHS modifications: 1. Added check to prevent UNDEF error 2. Added check that Package file is clean 3. Added call to delete DW Audit entry for FROM patients
XDRMERG1	Tentative update pointer nodes (Continued from XDRMERG).
XDRMERG2	Tentative update pointer nodes (Continue from XDRMERG). Patch 1003 IHS modifications: 1. Prevent View Merge Status from scrolling off screen 2. Set 19th piece of ^DPT on FROM patient for backward compatibility with PCC Mgt Reports
XDRMERGA	Start of noninteractive batch merge (Continued from XDRMERG0). Patch 1003 IHS modifications: 1. If none found to mark, say so (communicate with user) 2. Added IHS chart # to approval display
XDRMERGB	Tentative update pointer nodes.
XDRMERGC	Check Merge

<b>Routine</b>	<b>Description</b>
XDRMPACK	Checks the PACKAGE file for special merge routines in the Affects Record Merge field.
XDRMRG	Merges duplicate records.
XDRMRG1	Error trap for XDRMRG.
XDRMSG	Sends various mail messages when verifying and merging have been completed.
XDRMVFY	Verifies potential duplicates. Patch 1003 IHS modifications: 1. Uncommented IHS line that VA commented out 2. Changed call from ^DTPDZCH to ^BPMHRCN
XDRPREI	OBSOLETE Routine; No Longer Used
XDRPREL1	Identifies problem entries that are <i>not</i> pointed to.
XDRPTCAN	Screens for patient records with similar names, DOBs, and SSNs.
XDRPTCLN	Compares patients' claim numbers.
XDRPTDOB	Compares patients' DOB dates.
XDRPTDOD	Compares patients' DOD dates.
XDRPTLSD	Compares last service separation dates.
XDRPTMMN	Compares mothers' maiden names.
XDRPTN	Compares patients' names.
XDRPTSSN	Compares patients' SSNs.
XDRPTSX	Compares the sex of two patients.
XDRRMRG0	Triggers the data review for ancillary services – the verification process for potential duplicates that have ancillary data.
XDRRMRG1	Duplicate verification routine for ancillary services. Patch 1003 IHS modifications: 1. Display IHS Patient file fields (multiple lines changed or added)
XDRRMRG2	Retrieves patient's Health Summary. Patch 1003 IHS modifications: 1. Use IHS merge type as default Health Summary 2. Change default on using browser to NO
XDRU1	Contains general utilities.
XDRUTL	XDR routine utilities.
XDRVCHEK	Checks for entries that have passed the number of days required for verification. Patch 1003 IHS modifications: 1. Remove ancillary check

## 5.0 Files and Tables

**Note:** All IHS modifications and additions in this section are indicated in **bold** text

### 5.1 File List

There are no IHS files in this application. The following are VA files used by the Duplicate Resolution Utilities. IHS modifications to these files are detailed. None of these files are exported with data.

File #	Filename	Description
15	DUPLICATE RECORD	<p>This file contains information about duplicate records in any file defined in the two variable pointer fields, RECORD1 and RECORD2 (.01 and .02). The status of an entry in this file may be “potential duplicate, unverified,” “verified, not a duplicate,” or “verified duplicate.”</p> <p style="text-align: center;"><b>***** WARNING *****</b></p> <p>When you add a file to a variable pointer field, FileMan deletes the input transform, so save it before the change and restore it after the change.</p> <p><b>Cautionary Note:</b> The DUPLICATE RECORD file can be used as a perpetual list of which records have been merged and when. It is recommended that this file <i>not</i> be deleted using any means other than the option provided with this package (i.e., Purge Duplicate Record File), so that data can be kept for future use. The Purge Duplicate Record File option has a safety feature that does not allow you to purge merged duplicate records.</p> <p>Using FileMan, see the full file description, which explains the merge process, describes cross-references, and gives warnings.</p> <p><b>IHS modification: Addition of AIHSKALK cross-reference.</b></p>

File #	Filename	Description
15.1	DUPLICATE RESOLUTION	This file is used to handle duplicate checking and merging of files that have entries in the Duplicate Record File. It is meant to provide the overall control information that would be used to first identify duplicates within a file (for example, Patient File), and then merge the entries. <b>IHS modifications: Addition of field 99999.01 - REPOINT DELETED VISITS (Answer YES if you want Merge to spend the extra time to find deleted visits.) and addition of AIHSKALK cross-reference.</b>
15.2	XDR MERGE PROCESS	When a merge process is set up, all its information is stored in this file. Once a merge process has completed, that entry may be purged using the Purge Merge Process File option in the managers menu.
15.3	XDR REPOINTED ENTRY	This file is used to record the entry number of the FROM record that is merged into the TO record. This can be used for FileMan to determine which entries were merged, so the IEN of the FROM record will not be reused.
15.4	MERGE IMAGES	File 15.4 stores an image of the pairs of entries in files that were merged immediately prior to the actual merge. In addition, there is also a record of the locations of pointer values that were changed during the merge process.

## 5.2 File Access

File #	Filename	GL	RD	WR	LYG	DD	DEL
15	DUPLICATE RECORD	^VA(15,	#	@	@	@	@
15.1	DUPLICATE RESOLUTION	^VA(15.1,	#	@	@	@	@
15.2	XDR MERGE PROCESS	^VA(15.2,		#	#	@	#
15.3	XDR REPOINTED ENTRY	^VA(15.3,		#	#	@	#
15.4	MERGE IMAGES	^XDRM(	@	@	@	@	@

## 5.3 Cross References

### FILE #15 – DUPLICATE RECORD

XREF	FIELD #	FIELD NAME	TYPE
"ACMORS"	.03	STATUS	<p>Massachusetts General Hospital Utility Multi Programming System (MUMPS) (code is only Q)</p> <p>This sets up the ACMORS cross-reference on CMOR scores for the first entry</p>
"ADJ"	.05	MERGE STATUS	<p>MUMPS</p> <p>This cross-reference is fired only when an entry has been merged. The routine ^XDRDADJ then looks at the file to determine if any other file entry pairs need to be adjusted. For example, using File 2, if Patient 5 was merged to Patient 10, and there was a potential duplicate entry for Patient 5 and Patient 15, that entry would be changed to Patient 10 and Patient 15.</p> <p>There are other possible situations that are far more complex than the above example.</p>
"AFR"	.04	MERGE DIRECTION	<p>MUMPS</p> <p>SET:  S:X="V" X=\$P(^VA(15,DA,0),U,1),  ^VA(15,"AFR",\$P(X,";",2),+X,DA)=""</p> <p>KILL:  Q:X'="V" S X=\$P(^VA(15,DA,0),U,1) K  ^VA(15,"AFR",\$P(X,";",2),+X,DA)</p>

XREF	FIELD #	FIELD NAME	TYPE
"AFR"	.05	MERGE STATUS	<p>MUMPS</p> <p>This cross-reference is permanent and exists for all merged entries. It indicates which file entry was the 'from' entry. It is used by the Input Transforms on the .01 and .02 fields to prevent entering a file entry that has already been merged away.</p> <p>The form of this cross-reference, using File 2 as an example, is:  <code>^VA(15,"AFR", "DPT(",fe#,DA)=""</code> where fe# is the 'from' file entry.</p> <p>Note that the kill side of this cross-reference kills all possible combinations because deleting an entry in this file using <code>^DIK</code> results in the Merge Direction field being null when this cross-reference is fired.</p>
"AIHSKALK"	.05	MERGE STATUS	<p><b>MUMPS</b></p> <p><b>Added by IHS</b></p> <p><b>SET: D EN^BPMKALK(X,DA)//</b></p> <p><b>KILL: Q//</b></p> <p><b>IHS/OIT/LJF 11/15/2006 Cross-reference added because during testing it was found that the ALK cross-reference on this field did not always fire for merged pairs.</b></p>
"ALK"	.03	STATUS	<p>MUMPS</p> <p>This cross-reference will exist, in one form or the other, from the time an entry is made in this file until the records are merged or verified as not a duplicate.</p> <p>The form of this xref, using File 2 as an example, is:  <code>^VA(15,"ALK",^DPT(",fe#1,n,fe#2,DA)=""</code>  where 'n' will be 1 for a potential duplicate and 2 for a verified duplicate.</p> <p>When 'n' is 1 there will be two "ALK" cross-references with the fe#s reversed. When 'n' is 2 there will be only one "ALK" cross-reference and the fe#s will be in the order RECORD1 RECORD2. The "ALK2" cross-reference on MERGE DIRECTION will reset this cross-reference to be in the order 'from' 'to.' Once merged the "ALK" cross-reference for this entry will be killed by the "ALK3" cross-reference on the Merge Status field.</p>

<b>XREF</b>	<b>FIELD #</b>	<b>FIELD NAME</b>	<b>TYPE</b>
"ALK2"	.04	MERGE DIRECTION	MUMPS This cross-reference kills the existing "ALK" cross-reference for this entry and resets it to be in order 'from' 'to.' See "ALK" cross-reference on Status field for more information.
"ALK3"	.05	MERGE STATUS	MUMPS This cross-reference kills the "ALK" cross-reference for this entry. See the "ALK" cross-reference on the Status field for more info.
"AMFIC"	999999901	MFI CONTROLLED	REGULAR <b>This cross-reference is set to allow the Multi-Facility Integration (MFI) duplicate resolution software direct access to MFI-controlled entries.</b> (Added by IHS years ago for MFI sites)
"AMFIP"	999999903	MFI PATIENT	REGULAR <b>This cross-reference contains the controlled patient when an entry in this file is under MFI control because of an 'install' command.</b> (Added by IHS years ago for MFI sites)
"AMFIP2"	999999902	MFI RESOLVED	MUMPS <b>This cross-reference sets the value of the "AMFIP" cross-reference to 1 once this entry is resolved. It sets it back to "" if this field is changed from resolved.</b> (Added by IHS years ago for MFI sites)
"AMFIR"	999999902	MFI RESOLVED	REGULAR <b>This cross-reference is set for unresolved entries only. When the entry is changed to resolved, this cross-reference is deleted.</b> (Added by IHS years ago for MFI sites)

XREF	FIELD #	FIELD NAME	TYPE
"AMRG"	.05	MERGE STATUS	<p>MUMPS</p> <p>This cross-reference is short-lived and exists only for entries that are verified duplicates that have not yet been merged.</p> <p>The form of this cross-reference, using File 2 as an example, is:  <math>\wedge\text{VA}(15, \text{"AMRG"}, \text{"DPT"}(, n, \text{DA}) = \text{"}</math> where 'n' will be 0 for a Merge Status of Not Ready and a 1 for Ready.</p> <p>Once merged, the "AMRG" cross-reference for this entry will be killed.</p>
"ANOT"	.03	STATUS	<p>MUMPS</p> <p>This cross-reference will exist only when the status is Verified, Not A Duplicate.</p> <p>The form of this cross-reference, using File 2 as an example, is:  <math>\wedge\text{VA}(15, \text{"ANOT"}, \text{"DPT"}(, \text{"fe\#1"}^{\wedge}\text{fe\#2}, \text{DA}) = \text{"}</math>  where the order of the fe#s will be low^high</p> <p>This cross-reference will be killed when the Status field is changed to any other value.</p>
"ANR"	15.01101 subfile .02	STATUS	<p>MUMPS</p> <p>This cross-reference is set only when the status is 'not ready.' It is used to determine when all entries in this subfile are ready, which means the primary file entries in the DUPLICATE RECORD file entry may now be merged.</p>
"AODUP"	.03	STATUS	<p>MUMPS</p> <p>The form of this cross-reference, using File 2 as an example, is:  <math>\wedge\text{VA}(15, \text{"AODUP"}, \text{"DPT"}(, \text{fe\#1"}^{\wedge}\text{fe\#2}, \text{DA}) = \text{"}</math>  and the fe#s will be in the order low^high.</p> <p>This cross-reference will be killed when the Status field is changed to any other value.</p>
"APOT"	.03	STATUS	<p>MUMPS</p> <p>The form of this cross-reference, using File 2 as an example, is:  <math>\wedge\text{VA}(15, \text{"APOT"}, \text{"DPT"}(, \text{fe\#1"}^{\wedge}\text{fe\#2}, \text{DA}) = \text{"}</math> and the fe#s will be in the order low^high.</p> <p>This cross-reference will be killed when the Status field is changed to any other value.</p>

XREF	FIELD #	FIELD NAME	TYPE
"ARDUP"	.03	STATUS	MUMPS The form of this cross-reference, using File 2 as an example, is: <code>^VA(15,"ARDUP","DPT(",fe#1^fe#2,DA)="</code> and the fe#s will be in the order low^high. This cross-reference will be killed when the Status field is changed to any other value.
"ARDUP1"	.03	STATUS	MUMPS This cross-reference (RXDUP1) on Field .03 is used to identify potential duplicates in the verification process. It is used to rapidly check entries for the number of days since they entered the verification process.
"ATO"	.04	MERGE DIRECTION	MUMPS SET: <code>S:X="V" X=\$P(^VA(15,DA,0),U,2), ^VA(15,"ATO",\$P(X,";",2),+X,DA)="</code> KILL: <code>Q:X="V" S X=\$P(^VA(15,DA,0),U,2) K ^VA(15,"ATO",\$P(X,";",2),+X,DA)</code>
"ATO"	.05	MERGE STATUS	MUMPS This cross-reference is permanent and exists for all merged entries. It indicates which file entry was the 'to' entry. It is currently not used by the dictionary. The form of this cross-reference, using file 2 as an example, is: <code>^VA(15,"ATO","DPT(",fe#,DA)="</code> where fe# is the 'to' file entry. Note that the kill side of this cross-reference kills all possible combinations because deleting an entry in this file using ^DIK results in the Merge Direction field being Null when this cross-reference is fired.
"AVCHG"	.12	WHO CHANGED	REGULAR
"AVDUP"	.03	STATUS	MUMPS This cross-reference permanently exists for all entries in this file that are verified duplicates. The form of this cross-reference, using File 2 as an example, is: <code>^VA(15,"AVDUP","DPT(",fe#1^fe#2",DA)="</code> where the order of the fe#s will be in the order low^high.

XREF	FIELD #	FIELD NAME	TYPE
"AXDUP"	.03	STATUS	MUMPS This cross-reference (AXDUP) on Field .03 is used to identify potential duplicates in the verification process. It is used to rapidly check entries for the number of days since they entered the verification process.
"AXDUP1"	.03	STATUS	MUMPS The form of this cross-reference, using File 2 as an example, is: ^VA(15,"AXDUP1","DPT(",fe#1^fe#2,DA)="" and the fe#s will be in the order low^high. This cross-reference will be killed when the Status field is changed to any other value.
"B"	.01	RECORD1	REGULAR
"B"	.02	RECORD2	MNEMONIC

The following table contains a list of triggers and their descriptions.

Trigger	Description
.01 RECORD1	This trigger sets the Date Found field when an entry is added to this file.
.0 RECORD1	This trigger sets the Who Created field when an entry is added to this file.
.01 RECORD1	This trigger fires only for File 2, and then only on the kill side. Its purpose is to delete the corresponding entry in the DUPLICATE RECORD VALUE file, if there is one.
.03 STATUS	This trigger sets the Date Verified field. It is not fired for a status of "Potential Duplicate, Unverified." If the status is changed from Verified, the Date Verified field is deleted and will be reset if appropriate.
.03 STATUS	This trigger sets the Who Verified field. It is not fired for a status of "Potential Duplicate, Unverified." If the status is changed from Verified, the Who Verified field is deleted and reset as appropriate. The conditional logic on this trigger was modified, using ^%GEDIT, to prevent firing during a Re-Index.
.03 STATUS	This trigger deletes the Merge Direction field when the status is being changed from 'Verified Duplicate' to any other value. The conditional logic on this trigger was modified, using ^%GEDIT, to prevent firing during a Re-Index.
.03 STATUS	This trigger sets the Merge Status field to 0=NOT READY when the status is set to "Verified Duplicate." The Merge Status field is deleted when the status is changed from 'verified duplicate' to any other value. The conditional logic on this trigger was modified, using ^%GEDIT, to prevent firing during a Re-Index.

Trigger	Description
.03 STATUS	This trigger sets the Date Resolved field when the status is set to "Verified, Not A Duplicate." The Date Resolved field is deleted when the status is changed to any other value.
.03 STATUS	This trigger sets the Who Changed field to the user number any time the status is changed from 'verified duplicate' to any other value. The conditional logic on this trigger was modified, using ^%GEDIT, to prevent firing during a Re-Index.
.05 MERGE STATUS	This trigger sets the Date Resolved field when the merge status is set to "Merged." The conditional logic on this trigger was modified, using ^%GEDIT, to prevent firing during a Re-Index.
<b>999999901 MFI CONTROLLED</b>	This trigger sets the MFI Resolved field to 0=UNRESOLVED when a value is entered into this field. It has no effect on the change/delete side because this field is uneditable (Added years ago by IHS for MFI sites).

### FILE #15.1 – DUPLICATE RESOLUTION

XREF	FIELD #	FIELD NAME	TYPE
"ADPT1"	.15	POTENTIAL DUPLICATE THRESHOLD%	<b>MUMPS</b> This cross-reference is set whenever the Potential Duplicate Threshold is increased. This cross-reference is utilized by the Duplicate Resolution software to let it know to go through the existing nonverified potential duplicates and see if the duplicate record pair meets the increased Potential Duplicate Threshold. If not, the duplicate record pair entry is deleted from the file. The variable XDR("APDTI") is left around if somebody deletes the entry from the Duplicate Resolution file. This is due to FileMan never allowing you to know if a person is just editing, adding, or deleting an entry.
"AGL"	.01	FILE TO BE CHECKED	<b>MUMPS</b> This cross-reference is utilized by the XDRDUP when adjusting existing score values for a duplicate record entry.
"AIHSKALK"	.05	<b>TYPE OF SEARCH</b>	<b>MUMPS</b> <b>Added by IHS</b> <b>SET: D EN^BPMKALK(X,DA)//</b> <b>KILL: Q//</b> <b>Added cross-reference based on findings by Anne Fugatt, Phoenix Area Office that "ALK"</b>

XREF	FIELD #	FIELD NAME	TYPE
			<b>cross-reference does not always work. Should be killed when status set to MERGED.</b>
"AO"	1100 .02	DUPLICATE TESTS subfile ORDER OF TEST	REGULAR This cross-reference is used to place the duplicate resolution tests in the order the programmers want them to be executed.
"AZ1"	1100 .04	DUPLICATE TESTS subfile FILE FOR INFORMATION	MUMPS This cross-reference is just used to make FileMan log the response so that the input transform on the FIELD TO BE CHECKED can refer to the \$P value of this field.
"B"	.01	FILE TO BE CHECKED	REGULAR

#### FILE #15.2 – XDR MERGE PROCESS

XREF	FIELD #	FIELD NAME	TYPE
"B"	.01	NAME	REGULAR

#### FILE #15.3 – XDR REPOINTED ENTRY

XREF	FIELD #	FIELD NAME	TYPE
"B"	.01	FILE NUMBER	REGULAR

#### FILE #15.4 – MERGE IMAGES

XREF	FIELD #	FIELD NAME	TYPE
"B"	.01	MERGED FROM	REGULAR
"B"	.02	MERGED TO	Regular

## 5.4 IHS Templates

### 5.4.1 BPM BRIEF LIST (on Duplicate Record file)

This is a copy of the XDR BRIEF LIST print template with IHS chart number added to the display. The reference to the print template in routine ^XDRDLIST has been modified.

```

FIRST PRINT FIELD: "IEN: ";S1;C8//
THEN PRINT FIELD: NUMBER;X//
THEN PRINT FIELD: "RECORD 1: ";C3//
THEN PRINT FIELD: RECORD1;X//
THEN PRINT FIELD: S X=+^VA(15,D0,0) W " [IEN: "_X_"]";X//
THEN PRINT FIELD: I XDRFL=2 S X=$P(^DPT(+^VA(15,D0,0),0),U,9) W "
SSN: "_X;X//
THEN PRINT FIELD: I XDRFL=2 S X=$P($G(^AUPNPAT(+^G(^VA(15
,D0,0)),41,+^G(DUZ(2)),0)),U,2,3) W " HRCN: "_$P(X,U)
_$S($P(X,U,2)]"":(I)",1:"");X//
THEN PRINT FIELD: "RECORD 2: ";C3//
THEN PRINT FIELD: RECORD2;X//
THEN PRINT FIELD: S X=+$P(^VA(15,D0,0),U,2) W " [IEN: "_X_"]";X//
THEN PRINT FIELD: I XDRFL=2 S X=$P(^DPT(+^VA(15,D0,0),U,2),0)
,U,9) W " SSN: "_X;X//
THEN PRINT FIELD: I XDRFL=2 S X=$P($G(^AUPNPAT(+^P(^VA(15 ,D0,0)
,U,2),41,+^G(DUZ(2)),0)),U,2,3) W " HRCN: "_
$P(X,U)_$S($P(X,U,2)]"":(I)",1:"");X//
THEN PRINT FIELD: "STATUS: ";C5//
THEN PRINT FIELD: STATUS;X//
THEN PRINT FIELD: "SCORE %: ";C4//
THEN PRINT FIELD: DC DUPE MATCH PERCENTILE;X;L3//

```

### 5.4.2 BPM VERIFIED DISPLAY (on Duplicate Record file)

This is a new template created to display verified pairs in columnar format.

```

FIRST PRINT FIELD: "RECORD 1:";X//
THEN PRINT FIELD: RECORD1;X;C20;L55//
THEN PRINT FIELD: "RECORD 2: ";C1;X//
THEN PRINT FIELD: RECORD2;X;C20;L55//
THEN PRINT FIELD: "STATUS: ";C1;X//
THEN PRINT FIELD: STATUS;X;C20//
THEN PRINT FIELD: "MERGE DIRECTION: ";X;C1//
THEN PRINT FIELD: MERGE DIRECTION;X;C20//
THEN PRINT FIELD: "MERGE STATUS:";C1;X//
THEN PRINT FIELD: MERGE STATUS;X;C20//
THEN PRINT FIELD: "DATE VERIFIED:";C1;X//
THEN PRINT FIELD: DATE VERIFIED;X;C20//
THEN PRINT FIELD: "VERIFIED BY:";X;C1//
THEN PRINT FIELD: WHO VERIFIED;X;C20//

```

## 5.5 IHS ScreenMan Forms

### 5.5.1 BPM RESFILE FORM

A copy was made of the VA ScreenMan form used to edit site parameters. Questions were removed about ancillary reviews and the parameter REPOINT DELETED VISITS was added. This IHS parameter (Field 99999.01) determines if merge will loop through whole visit file to find deleted visit stubs. At sites with a very large visit file, this looping may slow down the merge too much. These deleted visit nodes are not selectable via FileMan and do not have any cross-references.

```

PRIMARY FILE: 15.1
DISPLAY ONLY: NO
FORM ONLY: NO
COMPILED: YES
DESCRIPTION: This form is used to edit site parameters. This form
is used in the option Patient Merge Site Parameters, which is
located on the locked Duplicate Manager Utilities menu.

PAGE NUMBER: 1
HEADER BLOCK: BPM RESFILE HEADER
PAGE COORDINATE: 1,1
NEXT PAGE: 2
PAGE NAME: Page 1

BLOCK NAME: BPM RESFILE HEADER
BLOCK ORDER: 1
BLOCK COORDINATE: 1,1
TYPE OF BLOCK: DISPLAY

BLOCK NAME: BPM RESFILE DATA
BLOCK ORDER: 2
BLOCK COORDINATE: 2,1
TYPE OF BLOCK: EDIT

```

```

PAGE NUMBER:                1.1
PAGE COORDINATE:            5,15
IS THIS A POP UP PAGE?:    YES
LOWER RIGHT COORDINATE:    15,75
PAGE NAME:                  Page 1.1

    BLOCK NAME:              BPM RESFILE SUB-BLK1
    BLOCK ORDER:             1
    BLOCK COORDINATE:        1,1
    TYPE OF BLOCK:           EDIT

PAGE NUMBER:                1.2
PAGE COORDINATE:            5,10
IS THIS A POP UP PAGE?:    YES
LOWER RIGHT COORDINATE:    17,78
PAGE NAME:                  Page 1.2

    BLOCK NAME:              BPM RESFILE SUB-BLK2
    BLOCK ORDER:             1
    BLOCK COORDINATE:        1,1
    TYPE OF BLOCK:           EDIT

    BLOCK NAME:              BPM RESFILE SUB-BLK3
    BLOCK ORDER:             2
    BLOCK COORDINATE:        9,30
    TYPE OF BLOCK:           EDIT
    REPLICATION:             4

```

## 5.6 IHS XPAR Parameters

Several routine changes in the XDR namespaced routines could be incorporated by the VA application. Such changes have been forwarded to the VA in hopes that future VA patches will include them.

However, some changes are based on IHS logic that would never be used at VA sites. Those changes could also be incorporated into future VA patches because they check for the IHS XPAR parameter BPM USE IHS LOGIC. If the call returns a Yes, then the IHS logic is run. The IHS Patient Merge application installs this parameter and sets it to Yes upon installation. These changes have also been forwarded to the VA.

```

ENTITY:      IHS PATIENT MERGE
PARAMETER:   BPM USE IHS LOGIC
INSTANCE:    1
VALUE:       YES

```

## 6.0 External Relations

### 6.1 Programmer Notes

The data contained in the VA Patient (#2) and the IHS Patient (#9000001) files will be used to determine potential duplicate pairs, as well as being used in verifying, if they are indeed duplicates.

During the merge process, all files that point to either of the Patient files will be scanned for the FROM patient and any pointers changed to the TO patient. Except for some special merge routines, all data changes will be accomplished via standard FileMan calls. Once merged, the FROM patient will only have a stub left in both ^DPT and ^AUPNPAT. There will be a -9 node in both globals that prevents FileMan from seeing the entry. The -9 node will equal the internal entry number of the TO patient. The zero node will contain the first piece. The ^DPT global will also contain the pointer to the TO patient in the 19th piece, for backwards compatibility purposes only. Most software should look at the -9 node for the TO patient data.

During the installation process, a namespaced VA Health Summary type will be added (BPM MERGE), the Affect Record Merge multiple of the Package (#9.4) file will be cleaned out, cross-references on Pharmacy Patient file (#55) will be recompiled, the "AC" cross-reference on the CHS Facility file will be reindexed, and Tribe of Membership will be added to the Duplicate Resolution file as a field to be used in determining potential duplicates.

All IHS modifications to VA routines (XDR namespace) to accommodate IHS logic use a parameter call to determine if the code is to be executed. This allows the VA to incorporate these changes into their version and the IHS logic is only run at IHS sites. A document detailing all IHS modifications (for IHS logic and found errors) has been forwarded to the VA Patient Merge team.

There are several fields in RPMS that are not patient merge compliant and therefore require special processing. Any field in RPMS that points to either the VA PATIENT or PATIENT files should have a regular cross-reference defined and populated, and should have no triggers or cross-references that, if executed, would cause problems.

The following is a list of the special merges that must be done. A single special merge driver routine (^BPMXDRV) is called, which then executes all defined and agreed-upon special merges. Some special merges reside in that application's namespace and some are written in the BPM namespace. The routine ^BPMXDRV is defined in the Package file (#9.4) under the AFFECTS RECORD MERGE multiple for the BPM entry. No other entry under this multiple is allowed for any other application. All special merges go through this routine.

**Note:** All RPMS developers are responsible for ensuring that any field in the application that points to patient files be merge-compliant, handled by a BPM special merge routine, or handled by that package's routine yhsy has been reviewed and added to the special merge driver.

### 6.1.1 Special Merge Routines

The special merge routine must pass the BPMRY parameter that Patient Merge sets equal to the following array.

```
^TMP("XDRFROM", $J, FROMIEN, TOIEN, FROMIEN_GLOBROOT, TOIEN_GLOBROOT) = FILE
```

For example:

```
^TMP("XDRFROM", 2804, 6364, 1991, "6364;DPT(", "1991;DPT(")=2
```

See the routines called by ^BPMXDRV for examples. At the beginning of each, the FROM and TO patient IENS are set using the following code:

```
N BPMFR, BPMTO
S BPMFR=$O(@BPMRY@(0)) Q: 'BPMFR
S BPMTO=$O(@BPMRY@(BPMFR,0)) Q: 'BPMTO
```

### 6.1.2 Variable Pointers

The VA software does not currently address variable pointers fully. Therefore, the routine ^BPMXVP was written to do so. The fields covered by this routine are:

- Account field (#.01) of the A/R ACCOUNTS/IHS file (#90050.02)
- Guarantor field (#.01) of the GUARANTOR subfile in the GUARANTOR file (#9000043)
- Destination field (#.127) of the 3P CLAIM DATA file (#9002274.3)
- Patient Name field (#.02) of the WKLD LOG file (#64.03)

- Patient field (#9) of the 'ACCESSION WKLD CODE TIME' subfile of the WKLD CODE subfile of the DATE subfile in the WKLD DATA file (#64.1)
- Object Of Order field (#.02) of the ORDER file (#100)
- Member field (#.01) of the MEMBER subfile in the OE/RR LIST file (#100.21)
- Person field (.03) of the PATIENT RELATION file (#408.12)

### 6.1.3 **DINUM'ed Files with Word-Processing Fields**

The main patient merge logic handles files DINUM'ed to the patient files except for moving word-processing field data. If the FROM patient has data in the WP field and the TO patient does not, the merge logic simply deletes the data and does not copy it to the other entry. The routine ^BPMXWP was written to fix this oversight. The fields covered by this routine are:

In PATIENT File:

- Location Of Home field
- Additonal Registration Info field
- Remarks field
- Alerts field
- CHS Notes field

In Asthma Register File:

- Notes/Comments field

In MHSS Intake File:

- Referred By field
- Informants Include field
- History Of Presenting Problem field
- Past Psychiatric History field
- Drug/Alcohol History field
- Legal History field
- Social History field
- Medical History field
- Current Medications field
- Mental Status Exam field

- Impression/Formulation field
- Developmental History field
- Educational History field
- Family History field
- Vocational History field
- Hobbies field
- Strengths/Resources field
- Initial Plan field
- Intake Documentation/Narrative field

In BI PATIENT file:

- IMM/Serve Text field

In BW PATIENT file:

- Notes field

In PHARMACY PATIENT file:

- Comments field

In GMRY PATIENT I/O file:

- Intake field
- IV field
- Output field

In OUTPATIENT PROFILE file:

- Comments field

In ABSP ELIGIBILITY file:

- Transmission Raw Data field
- Response Raw Data field

## 6.1.4 DINUM'ed Subfile

The PT Taxonomy file has a subfile which is DINUM'ed to the Patient file but does not have a regular cross-reference on it. The merge logic is not smart enough to handle pointers DINUM'ed in subfiles. The routine ^BPMXTAX was written to accommodate this. The iCare application also contains one of these files. The iCare routine BQIPTMRG is called from the BPMXDRV driver routine to merge those entries correctly.

### 6.1.4.1 Nonstandard Global References

The Third Party Billing and Accounts Receivable files have the facility number defined within their global reference. This is not standard for FileMan and therefore the merge logic cannot handle them. The routine ^BPMX3PB was written to merge these files.

### 6.1.4.2 Lab Files

The Lab files, having been designed years ago, cannot be merged using the FileMan-based logic. The merge driver calls ^BPMXLR, which in turn calls MERGE^BLRMERG. The routine ^BPMXLR also contains logic the ESIG logic in File 63.

### 6.1.4.3 Files Needing Resequencing

The Problem file entries for both the FROM and TO patients may include problems numbered 1 and 2. When merged, they need to be renumbered 1 through 4, which is not automatically done by the FileMan-based merge logic. Therefore, the Problem file is merged using ^BPMXPRB.

### 6.1.4.4 Deleted Visits

If a site parameter is turned on, a special routine ^BPMXVST will loop through every Visit file entry to make sure any previously deleted visits are updated. Since there are no cross-references on deleted visits, this is the only way to update these entries that cannot be accessed via FileMan or visit lookup routines. If a site finds the merge taking too long, turning this parameter OFF might help.

Printing of health summaries is part of verifying that potential duplicate pairs really are duplicates and part of verifying that the merge ran successfully. The Health Summaries run are using the VA Health Summary application updated with IHS components.

## 6.2 Published Entry Points

There are no public entry point routines (APIs) in the Patient Merge application.

## 6.3 Exported Options

This application uses many VA options from the Duplication Resolution Utilities, along with a few new IHS ones. The menus have been reorganized from the VA menus to provide a clear indication of the steps involved in the merge process.

### 6.3.1 STEP 1

Corresponds to the S1 – Find Potential Duplicates menu (BPM MENU FIND DUPLICATES). This menu contains all VA XDR namespaced options.

Menu Option	Description
<b>BPM MENU FIND DUPLICATES</b>	Find Potential Duplicates
XDR SEARCH ALL	Start/Halt Duplicate Search
XDR DISPLAY SEARCH STATUS	Display Search Status
XDR FIND POTENTIAL DUPLICATES	Find Potential Duplicates for an Entry in a File
XDR PRINT LIST	Print List of File Duplicates
XDR VIEW DUPLICATE RECORD	View Duplicate Record Entries
XDR CHECK PAIR	Check Pair of Records to see if Duplicates

### 6.3.2 STEP 2

Corresponds to the S2 – Review/Verify Duplicates menu (BPM MENU VERIFY DUPLICATES). This menu contains four VA XDR namespaced options plus two IHS BPM namespaced display options.

Menu Option	Description
<b>BPM MENU VERIFY DUPLICATES</b>	Review/Verify Duplicates
XDR ADD VERIFIED DUPS	Add Verified Duplicate Pair
XDR VERIFY ALL	Verify Potential Duplicates
XDR EDIT DUP RECORD STATUS	Edit the Status Field of a Duplicate Record
BPM DISPLAY VERIFIED	Display Verified Pair
XDR VALID CHECK	Identify Potential Merge Problems

Menu Option	Description
BPM OVERWRITE CHECK	Check for Data Conflicts

### 6.3.3 STEP 3

Corresponds to S3 – Merge Verified Duplicates menu (BPM MENU MERGE DUPLICATES). This menu contains five VA XDR namespaced options plus one IHS BPM namespaced option to print health summaries for merged pairs.

Menu Option	Description
<b>BPM MENU MERGE DUPLICATES</b>	Merge Verified Duplicates
XDR APPROVE FOR MERGE	Approve verified duplicates for merging
XDR MERGE READY DUPLICATES	Schedule Process to Merge Verified Duplicates
XDR CHECK MERGE PROCESS STATUS	Check Merge Process Status (reverse order)
XDR RESTART MERGE PROCESS	Restart a Merge Process
XDR STOP MERGE PROCESS	STOP an Active Merge Process
BPM PRINT HS VERIFIED	Health Summaries for Verified or Merged Pairs

### 6.3.4 Patient Merge Reports

The PMR – Patient Merge Reports menu (BPM MENU REPORTS) contains miscellaneous reports (two VA and two IHS).

Menu Option	Description
<b>BPM MENU REPORTS</b>	Patient Merge Reports
XDR PRINT LIST	Print List of File Duplicates
XDR TALLY STATUS FIELD	Tally Status and Merge Status Fields
BPM PRINT MERGED LIST	Print List of Merged Patients
BPM PRINT POINTERS	List RPMS Data for a Patient

**Note:** The IHS option BPM PRINT POINTERS gives the local information technology department, as well as any national support staff, the ability to look for any pointers that were not changed by the merge process. HIM staff can run it, but may be confused as to the data it presents unless properly trained. This option must be run twice: once for the VA Patient file and again for the Patient file. There is a warning that it can take a long time to run and use many sheets of paper.

For FROM patients, the only data left after a merge should be as follows:

```

.   RECORD2 field (#.02) of the DUPLICATE RECORD File (#15)
    21      10860;DPT(

6.   MERGED FROM field (#.01) of the MERGE IMAGES File (#15.4)
    1      10860;DPT(

. . .
141. NAME field (#.01) of the PATIENT File (#9000001)
    10860      10860

```

Figure 6-1: FROM patient data left after a merge

One extra nicety of this option is that it can be run for any file that is pointed to by other files.

### 6.3.4.1 Duplicate Manager Utilities

Finally, the DMU – Duplicate Manager Utilities menu (BPM MENU MANAGER) contains two VA XDR options for purging data and two IHS BPM options for editing site parameters and resetting stuck merge processes.

Menu Option	Description
<b>BPM MENU MANAGER</b>	Duplicate Manager Utilities
BPM SITE PARAMETER	Patient Merge Site Parameters
XDR PURGE	Purge Duplicate Record File
XDR PURGE2	Purge Merge Process File
BPM RESET LOST MERGE	Reset Lost Merge Process

**Note:** The BPM Reset Lost Merge option is used when a merge batch process stops due to an error and cannot be reset using the STOP An Active Merge Process option on the Merge Verified Duplicates menu. It resets the status to UNKNOWN and Halt Flag to HALT. This will allow the HIM staff to restart the merge process.  
**Do not reset until you have corrected the problem that caused the error or it could just error out again.**

## 6.4 Data Exports

This application does not export data, but it is important to know how the Registration and PCC Visit exports are affected by the merge process. After a duplicate pair is merged, the Registration data for the TO patient is sent to the National Data Warehouse (NDW), along with every PCC visit whose patient pointer has been changed. At the beginning of the merge process, all PCC visits with the FROM patient pointer are updated by calling MOD^AUPNVSIT. For the FROM patient, a merge/delete message is sent.

IHS modifications to the merge process include flagging all FROM patient visits for export before the merge begins and setting a stub node in ^AUPNPAT for the FROM patient after the merge is complete. DW Audit entries for FROM patients are deleted at start of merge and an entry is added with a Delete Flag at end of merge.

## 7.0 Internal Relations

All of the Patient Merge options can be invoked independently. None require any special setup in order to run successfully.

## 8.0 Archiving and Purging

There are no application-specific archiving procedures or recommendations for the Duplicate Record Merge: Patient Merge application.

Two options under the Duplicate Manager Utilities menu are provided to facilitate the purging of Patient Merge files:

1. Purge Duplicate Record File will purge select entries in the DUPLICATE RECORD file. Only the Potential Duplicates or the Verified Non-Duplicates or both may be purged.
2. Purge Merge Process File will purge merge batch entries in the XDR MERGE PROCESS file. Keeping this clean keeps the Check Merge Process Status report short.

## 9.0 Documentation Resources

This section describes a few methods to generate online technical documentation.

### 9.1 System Documentation

Online VPS system documentation can be generated through the use of several Kernel options, including, but not limited to:

- %INDEX
- Menu Management
- Inquire Option
- Print Option File
- VA FileMan
- Data Dictionary Utilities
- List File Attributes

For more option listings and further information about other utilities that supply online technical information, see the Decentralized Hospital Computer Program (DHCP) Kernel Reference manual.

#### 9.1.1 %INDEX

The %INDEX option analyzes the structure of a routine to determine, in part, if the routine adheres to RPMS programming standards. The output can include the following components:

- Compiled list of errors and warnings
- Routine listing
- Local variables
- Global variables
- Naked globals
- Label references
- External references

Running %INDEX for a specified set of routines allows users to discover any deviations from RPMS programming standards that exist, and to see how routines interact with one another (i.e., which routines call or are called by other routines).

To run %INDEX for the VPS system:

- At the “Routine(s)?” prompt, type the <<CC>> namespace.

### 9.1.2 Inquire Option

The Inquire menu management option provides the following information about a specified option:

- Option name
- Menu text
- Option description
- Type of option
- Lock (if any)

In addition, all items on the menu are listed for each menu option. To secure information about <<RPMSpackage>> options, specify the << >> namespace.

### 9.1.3 Print Option File

The Print Option File utility generates a listing of options from the Option file (#19). Users can print all of the entries or a single option or range of options.

### 9.1.4 List File Attributes

This VA FileMan option allows users to generate documentation pertaining to files and file structure. The standard format of this option provides the following data dictionary information for a specified file:

- File name and description
- Identifiers
- Cross-references
- Files pointed to by the file specified
- Files that point to the file specified
- Input, print, and sort templates

In addition, the following applicable data is supplied for each field in the file:

- Field name, number, title, and description
- Global location
- Help prompt
- Cross-references
- Input transform
- Date last edited
- Notes

Using the Global Map format of this option generates an output that lists the following information:

- All cross-references for the file selected
- Global location of each field in the file
- Input, print, and sort templates

For a comprehensive listing of <<package name>> files, see Section 5.0, “Files and Tables.”

## 9.2 Online Help

In addition to system documentation, RPMS includes special help displays for most menu options and data entry prompts. Typing ? at the “Select . . . Option” prompt displays information related to the current option, where

Typing . . .	Displays . . .
One question mark (?)	A list of all options accessible from the current option
Two question marks (??)	A list of all accessible options and their formal names
Three question marks (???)	A brief description for each option in a menu
One question mark (?) followed by an option name (?OPTION)	Extended help, if available, for that option

## 9.3 Programmer Options

### Programmer Options > Kernel Installation & Distribution System > Utilities

- **Build File Print**

This option details all the components shipped for installation on your system. For IHS Patient Merge, run this option for both IHS PATIENT MERGE and XT\*7.3\*1003 (which contains the XDR routines modified by IHS).

- **Display Patches for a Package**

This option lists when you installed a particular version, as well as which patches have been installed and when.

### Programmer Options > Routine Tools

- **First Line Routine Print**

Use this option for a concise listing of all routines within a namespace with a short title for each. The first line also indicates the routine author's initials. For this application, remember to look at both BPM and XDR namespaced routines.

- **Routines by Patch Number**

Use this option for a short listing of which routines were included with each patch for an application. For this application, remember to look at both BPM and XDR namespaced routines.

## **10.0 SAC Requirements/Exemptions**

There are no special SAC requirements or exemptions for this application.

## 11.0 Glossary

### **Archiving**

The storing of historical or little-used data off-line (often on tape).

### **Browser**

An interactive application that displays ASCII text on a terminal that supports a scroll region. The text can be in the form of a word-processing field or sequential local or global array. The user is allowed to navigate freely within the document.

### **Callable Entry Points**

Places in a routine that can be called from an application program.

### **Cross-Reference**

An indexing method whereby files can include presorted lists of entries as part of the stored database. Cross-references facilitate look-up and reporting.

### **DINUM'ed**

Refers to a file where the .01 field points to another file in such a way that the IEN in both files is the same.

### **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).

### **HIM**

Health Information Management department, formerly known as Medical Records.

**IEN**

Internal Entry Number – The number used to identify an entry within a file. Every record has a unique internal entry number.

**Kernel**

The set of MUMPS software utilities that function as an intermediary between the host operating system and application packages, such as Laboratory and Pharmacy. The Kernel provides a standard and consistent user and programmer interface between application packages and the underlying MUMPS implementation. These utilities provide the foundation for RPMS.

**Kernel Toolkit**

An application that contains various miscellaneous additional tools not included in the main Kernel software. The Duplicate Resolution Utilities is one such module with the namespace of XDR. The Toolkit is released under the namespace XT, but contains other namespaces.

**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).

**Namespace**

A unique set of two to four alpha characters that are assigned by the database administrator to a software application. BPM has been assigned to the IHS Patient Merge software. XDR is the namespace for the VA Duplicate Resolution Utilities software module.

**Option**

An entry in the Option file. As an item on a menu, an option provides an opportunity for users to select it, thereby invoking the associated computing activity. Options may also be scheduled to run in the background, noninteractively, by TaskMan.

**PCC**

Patient Care Component – The central repository for clinical data in RPMS. Contains all patient encounters, plus basic data on each encounter.

**Purging**

The removal of data from a database since it is no longer needed. This helps to save disk space and speed up access in large files.

**RPMS**

Resource Patient Management System – the name for the IHS-healthcare-facility-based software system.

**Routine**

A program or sequence of instructions called by a program that may have some general or frequent use. MUMPS routines are groups of program lines that are saved, loaded, and called as a single unit via a specific name.

## 12.0 Appendix A: Duplicate Tests Logic

This is a copy of Appendix A in the VA technical manual, detailing the logic used for each field to find potential duplicates. The appendix is copied here for completeness.

### 12.1 Duplicate Tests and Scores: Technical Description

The following attributes from the PATIENT file (#2) are used in the identification of potential duplicate pairs. Shown below are the field names, field number, and the positive and negative weights currently assigned to these values in the determination of a numeric value for comparison with the potential total value.

Field Name	Field Number	Positive Weight (score)	Negative Weight (score)
Name	.01	100	-60
SSN	.09	100	-60
Claim Number	.313	80	-60
Date of Birth	.03	60	-40
Date of Death	.351	50	-50
Mother's Maiden Name	.2403	50	-90
Last Separation Date	.327	50	-40
Sex	.02	20	-90

### 12.2 Initial Screen for Potential Duplicates

The current file entry is tested against other entries in the file to determine records that might be potential duplicates. The initial screen for potential duplicates is a very broad test. It is based on Name, SSN, and DOB data. Records identified are compared in further detail to determine whether they should be retained as potential duplicates. Other pertinent information applying to the initial screen:

- If the current file entry has an SSN value beginning with five zero digits, it is skipped as a test patient entry.
- Any entry in the file that has a name beginning with the same last name and first initial (as determined from the "B" cross-reference) is included.
- Any entry with the same last four digits of the SSN (as determined from the "BS" cross-reference) is included.
- Any entry with the same DOB or with a DOB in which the day of the month is transposed (as determined from the "ADOB" cross-reference) is included.

## 12.3 Further Testing of Potential Duplicates

After the initial screen, the current file entry is tested against each potential duplicate found with respect to each of the attributes listed on the previous page. If either one of the potential duplicate pair entries does not contain data for an attribute, that attribute is ignored and is not included within the final score. Each test is associated with a positive score and a negative score. The positive score (or a fraction of it) is given if the two entries match (or are considered a partial match). The negative score is assigned if the two entries do not match. The scores assigned (positive or negative) for each attribute are totaled and compared to the total positive score possible for the attributes included. If the actual score is equal to or greater than a set percentage of the total possible, the pair of entries is added as a potential duplicate pair. Currently, the threshold percentage is set at 60.

### 12.3.1 Tests for Name

Each possible name for the entry being matched is used during the comparisons. The name that gives the highest score is used as the score for the pair. (Possible names include the primary name entry, any aliases assigned, and names that are generated if a ZZ string precedes a name).

- Names that match exactly are given the full positive score.
- If first names match and last names match, the pair is given 80% of the full score.
- If first names match by soundex and last names match by soundex, the pair is given 60% of the full score.
- If last names and first initials match, the pair is given 50% of the full score.
- If last names match, the pair is given 40% of the full score.
- If first names match by soundex, the pair is given 20% of the full score.
- All other pairs are given the negative score.

### 12.3.2 Tests for Social Security

- If either entry in the pair has a pseudo-SSN, the testing of SSNs is omitted.
- Any pair in which the SSNs differ only by a single digit, or only by the transposition of two adjacent digits, are given the full positive score.
- If the first initial of the last name and the last four digits of the SSN match, 80% of the full score is given.
- If the last four digits of the SSN match, 60% of the full score is given.

- If the first five digits of the SSN match, 40% of the full score is given.
- If the first three digits match and at least two of the last four digits match in value and position, 20% of the full score is given.
- If the middle two digits (digits 4 and 5) match between entries and at least two of the last four digits match in value and position, 20% of the full score is given.
- Pairs that do not meet any of the above criteria are given the full negative score.

### 12.3.3 Tests for Claim Number (not used by IHS)

- If the Veteran's Claim Numbers are identical, the full positive value is given.
- If the Veteran's Claim Numbers differ by only one digit or by transposition of two adjacent digits, 80% of the value is given.
- Any other pairs with claim numbers are assigned the full negative value.

### 12.3.4 Tests for Dates

The DOB, DOD, and Last Separation Date (not used by IHS) are all processed in the same manner.

- If the pair of dates matches exactly, the full positive value is given.
- If the pair of dates differs only in a single digit, or by transposition of an adjacent pair of digits, 80% of the value is given.
- If one or both of the dates is missing the day of the month, but they are otherwise identical, 80% of the value is given.
- If one or both of the dates is missing the month, but they are from the same year, 60% of the value is given.
- Other date pairs are given a negative value.

### 12.3.5 Tests for Mother's Maiden Name

The data in Mother's Maiden Name is processed in the same manner as the Name field, except initial processing is performed to attempt to isolate the actual maiden name. Since a number of entries, including information such as '(Deceased)' or '(Living),' have been observed, only text prior to a parenthesis is taken. If there are commas included, then only the text preceding the comma is taken. If there are no commas but a space in the name, the name after the space is taken [this might affect some multistring names, but the last string should be the same, if they match].

### **12.3.6 Tests for Gender**

The gender values (Sex field) are tested for being the same or different. The positive value is given if they are the same, but this is a much smaller positive value than most scores. The negative value, however, for the sex of the two entries being different is much larger, since it basically separates the two entries from each other.

## 13.0 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](mailto:support@ihs.gov)