



RESOURCE AND PATIENT MANAGEMENT SYSTEM

Patient Registration MPI Interface

(AG)

Technical Manual

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Preface

For over 20 years, hospitals and health centers of the Indian Health Service and numerous tribal health programs have utilized an information system called the Resource and Patient Management System (RPMS). The RPMS Master Patient Index (MPI) is a suite of software applications designed to improve quality of care and patient safety in Direct Indian Health Service/Tribal/Urban facilities.

Traditionally facilities and patient records have been unrelated. MPI was developed to establish the framework for sharing patient information between sites. The MPI creates a common database that allows patients and healthcare providers to work together to create a unified healthcare plan.

During the initialization to the MPI, each active patient receives the following:

- Integration Control Number (ICN)
- Treating Facility List of the sites where the patient is receiving care.

The creation of the ICN or EUID allows access to MPI patient data and provides a means through a single best record (SBR) to bring disparate records and facilities together. For example, Patient A is seen at multiple facilities and data is sent to MPI. MPI must link all disparate records into a SBR by using a matching matrix. The matching matrix uses weighted factors in various data fields to determine if the records belong to the same patient.

Benefits of using MPI include an improvement in patient care because providers can share data common to a single patient across the enterprise.

Upon implementation of this software package, your site will become part of the network of sites that share key demographic data for patients via HL7 messaging.

The AG (MPI) interface transfers patient data via HL7 messages to the MPI database. The RPMS/HL7–Optimized (HLO) and Ensemble production interface is a way to send patient information (ADT) to the MPI and to receive and store information.

1.0 Introduction

The Master Patient Index (MPI) is composed of a unique list of patients and a current list of medical centers where each patient has been seen. This enables the sharing of patient data between operationally and regionally diverse systems. Each record (or index entry) on the MPI contains a small amount of patient data used to identify individual entries.

The mission of the MPI is to uniquely identify a patient and to “link” that patient’s data throughout the Indian Health Service (IHS) facilities using the Integration Control Number (ICN). The MPI is the authoritative source of a patient’s ICN, the enterprise-wide identifier for IHS facilities and the key to accessing a patient’s record. The accuracy of patient information and patient identification directly affects clinical, administrative, billing, and interdepartmental processes.

Across the industry, as healthcare organizations implement MPI systems, identifying ways to deal with duplicate records is a standard part of the process. One way to begin managing duplicate records is to clean files to reduce the number of duplicate numbers before they are placed on the MPI. Whether files are reviewed before or after the MPI is implemented, managing duplicate records must occur on an ongoing basis once the database is in place.

An MPI is a dynamic, secured directory of uniquely identifiable persons with links to their medical and insurance data located anywhere within the enterprise. To eliminate duplicate identifications, MPI software utilizes a variety of probabilistic and other forms of matching algorithm protocols to evaluate and match identities.

An MPI can provide comprehensive, accurate patient record information to practitioners at the point of care to enhance patient safety, efficiency, and effectiveness in healthcare delivery for American Indian/Alaska Native (AI/AN) people. The MPI can provide real-time data that can be used for quality improvement measurements.

Prior to initializing sites to the MPI, sites are expected to install the Patient Merge application (BPM). Download manuals for the Patient Merge application at: <http://www.ihs.gov/Cio/RPMS/index.cfm?module=home&option=documentschoice>

One factor contributing to unreliability of a database is duplicate records. If there are duplicate entries on the MPI for a patient, a physician will not see a complete picture of the care provided at other sites. In addition, Inter-Facility Consults between sites cannot be accomplished. Duplicate entries on the MPI require examination to verify whether they are or are not the same patient with more than one ICN.

With the MPI's ability to uniquely differentiate patients who are seen at more than one facility and to provide a list of all facilities at which a patient receives care, the door is open for use by other applications. As IHS moves closer to having one electronic record for each patient and being able to share that record among stakeholders, it is critical that each patient's unique record identity is maintained and that duplicate patient records are eliminated.

This document focuses on identifying the requirements for an interface that enables secure communication of specified data between the RPMS database and the MPI database in a way that easily and quickly enables users of the MPI to obtain updated information about patients and health care providers, and enables RPMS administrators to identify problems, provide maintenance, and support the interface.

This includes the development of the following functionality:

- **HL7 A28 Add a Patient Message from RPMS:** Sends patient data to the MPI when the Add a Patient option is used in Patient Registration (AG)
- **HL7 A08 Update a Patient Message from RPMS:** Sends patient data to the MPI whenever cross-referenced fields are edited in Patient Registration (AG) edit screens
- **HL7 A40 Merge a Patient Message from RPMS:** Sends patient data to the MPI whenever two patients are merged within Patient Merge (BPM)
- **HL7 A01 Check in and Check out Message from RPMS:** Sends patient data to the MPI whenever a patient is checked in or checked out
- **HL7 A03 Admissions and Discharges Message from RPMS:** Sends patient data to the MPI whenever a patient is admitted or discharged

2.0 Implementation and Maintenance

2.1 General Information

The RPMS/MPI interface occupies the AG namespace. Options, security locks/keys, templates, routines, protocols, and parameters are within the same namespace.

It is strongly suggested that Patient Merge (BPM) is installed and implemented prior to installing AG (MPI) Interface.

2.2 System Requirements

- Kernel Version 8.0 Patch 1009 or higher
- FileMan Version 22 Patch 1003 or higher
- Ensemble Version 2009.1.6 or later
- HL7 Version 1.6 Patch 1006 or later
- AG Version 7.1 Patch 9
- AUT Version 98.1 Patch 20
- PIMS 5.3 Patch 1013
- AVA Version 93.2 Patch 20
- BPM Patient Merge Version 1
- AUPN Version 99.1, Patch 18

2.3 Security Keys

- **AGZMGRMPI.** Key for the main AGMPI menu, which contains both the upload menu and the menu to send individual messages. This should be given to site managers or those assigned responsibility for monitoring the MPI messaging module.

Security Key	Description	Assign To
AGZMGRMPI	LOCKS MPI MANAGER MENU	Site managers and anyone responsible for the interface.

2.4 HL7 Messaging

HL7 is a standard protocol that specifies the implementation of interfaces between two computer applications (sender and receiver) for electronic data exchange in healthcare environments. HL7 allows healthcare institutions to exchange key sets of data from different application systems. Specifically, it defines the following:

- The data to be exchanged
- The timing of the interchange
- The communication of errors to the sending/receiving application

The formats are generic in nature, and must be configured to meet the needs of the two applications involved. An HL7 interface specification should be written detailing which formats (events, messages, segments, and fields) will be used, and the lower level protocol that will be implemented in order for the two applications to interface with one another.

The HL7 protocol defines the content and format of abstract messages and transactions for interface capabilities for the following areas:

- Admission, discharge, and transfer (ADT)
- Order entry
- Query
- Financial applications such as charge, payment adjustments, and insurance
- Ancillary data reporting for Laboratory, Radiology, Pharmacy, etc.

In HL7, information is exchanged using HL7 messages when an event occurs in an application. Each HL7 message consists of one or more HL7 segments. A segment can be thought of as a record in a file. Each segment consists of one or more fields separated by a special character called the *field separator*. The field separator character is defined in the Message Header (MSH) segment of an HL7 message. The MSH segment is always the first segment in every HL7 message. Each field is assigned an HL7 data type (e.g., numeric, text, etc.).

2.4.1 Outbound Patient ADT

There are two outbound message types: A28 (add patient registration) and A08 (updates).

After installation, there is a patient load of all existing and living patients with no ICN. All patients will be included, since after installation no patient will have this field populated. This background job will create an A28 (Add a Patient) for each patient without an ICN. This initial load is a TaskMan job that sites run at the site. The time required to run this job depends on the number of patients and the system activity. It runs with a low priority.

After the load is completed, new registrations and updates are triggered by certain events in Patient Registration, such as adding/registering a patient, editing patient demographic information, checking a patient in or out, or admitting and discharging a patient. Registration messages can be sent manually as well.

- **HL7 A28 Add a Patient Message from RPMS** sends patient data to the MPI when the Add a Patient option is used in Patient Registration (AG).
- **HL7 A08 Update a Patient Message from RPMS** sends patient data to the MPI whenever cross-referenced fields are edited in Patient Registration (AG) edit screens.
- **HL7 A40 Merge a Patient Message from RPMS** sends patient data to the MPI whenever two patients are merged within Patient Merge (BPM).
- **HL7 A01 Check in and Check out Message from RPMS** sends patient data to the MPI whenever a patient is checked in or checked out
- **HL7 A03 Admissions and Discharges Message from RPMS** sends patient data to the MPI whenever a patient is admitted or discharged

2.4.2 Inbound MFN

When a patient has been added to MPI, the MPI responds to all associated or linked facilities with an MFN message to update the local file Treating Facility List. Associated facilities are all facilities linked in the MPI to a particular patient.

2.5 HL7 Message Types

2.5.1 Patient Registration/Demographic Data

The HL7 message segments for adding patients to the MPI via ADT/A28 messages and for modifying existing patients via ADT/A08 messages are:

- **MSH.** Message Header
- **EVN.** Event Type
- **PID.** Patient Identification
- **PD1.** Additional Demographic Information
- **ZPD.** IHS Specific Data
- **PV1.** Last Treated Date

2.6 ADT/ACK—Add Person or Patient Information (Event A28)

The purpose of this message is to establish a patient on the MPI so that the patient record can be viewed across the enterprise and to allow multiple systems and respective master patient databases to communicate activity related to a person regardless of whether that person is currently a patient on each system. Each system has an interest in the database activity of the others in order to maintain data integrity across an enterprise. To the enterprise systems, the person may be a current patient, a potential future patient, or never be needed. These events can also be used to maintain another MPI or enterprise database.

The person whose data is being sent should be identified in the PID segment using the PID-3—patient identifier list. An A28 requests the establishment of an ICN and stores the patient identifiers (e.g., social security number, claim number, or other unique identifiers) as passed in the PID-3—patient identifier list. Other identifiers such as deprecated identifiers (i.e., local ICN) can be sent in the PID-4 -alternate patient identifier list, which are also stored as an alternate ID on the MPI for that system to include in subsequent communication from the MPI. Each new system needs to register the identifier list and assigning authority with the MPI development group.

ADT^A28^ADT_A28	ADT Message
MSH	Message Header
EVN	Event Type
PID	Patient Identification
[PD1]	Additional Demographics
PV1	Patient Visit
[ZPD]	VA Specific Patient Information Segment

ACK^COMMIT	Commit Level Acknowledgement
MSH	Message Header
MSA	Message Acknowledgement
ACK^A28^ACK	Application Level Acknowledgement
MSH	Message Header
MSA	Message Acknowledgement
[ERR]	Error
ACK^COMMIT	Commit Level Acknowledgement
MSH	Message Header

ACK^COMMIT	Commit Level Acknowledgement
MSA	Message Acknowledgement

Message Sent TO the MPI from RPMS

Note: Only RPMS systems can add patients to the MPI at this time.

```
MSH^~|\&^RPMS-MPI^14752~161.223.91.63:5026~DNS^MPI
^8990~:8899~DNS^20100708094653-0600^^ADT~A28^14752 1198^T~^2.4^^^AL^NE^
EVN^A28^^^398~FRAZIER~TIM~~~~~USIHS&&0363~L~~~NI~IHS FACILITY ID -NOT-A-REAL
FACILITY&14752&L^14752
PID^1^V^V~~~USIHS&&0363~NI~IHS FACILITY ID - NOT-A-REAL FACILITY&14752&L|779358
654~~~USSSA&&0363~SS~IHS FACILITY ID - NOT-A-REAL FACILITY&14752&L|7296~~~USIHS&
&0363~PI~IHS FACILITY ID - NOT-A-REAL FACILITY&14752&L|V~~~USIHS&&0363~NI~IHS FA
CILITY ID - NOT-A-REAL FACILITY&14752&L~~200910205571-0700^^CERSUN~MARION~M~~~~L
^JECKSON~JEREMIAH~DARRYL~~~~M^19630808^F^WABAR~JEREMIAH~DARRYL^^BOX 354~~KETTLE
RIVER~MN~~~P~|~~MINNEAPOLIS~MN~~~N^~~~|~~|~~|~~~~~|
ZPD^1^997^C^01^UNSPECIFIED^7296~0000109481~516~19316~|7296~0000109482~517~17493
~|
```

Figure 2-1: ADT-A28—Add Person or Patient Information message: Sent from RPMS to MPI

Commit-Level Acknowledgement Sent FROM the MPI to the Sending System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708094702.267-0700^^ACK~A28^29501^T^2.4^^^
NE^NE
MSA^CA^14752 1198
```

Figure 2-2: ADT-A28—Add Person or Patient Information message: Commit acknowledgement sent from MPI to sending system

Application-Level Acknowledgement Sent FROM the MPI to the Sending System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708094721-0600^^ACK~A28^23696~se^T^2.4^^^A
L^NE
MSA^AA^14752 1198^^^DFN=1000592558
```

Figure 2-3: ADT-A28—Add Person or Patient Information message: Application acknowledgement sent from MPI to sending system

Commit-Level Acknowledgement Returned TO the MPI from the Sending System

```
MSH^~|\&^EnsembleHL7^ISC^MPI^8990^201007080947^^ACK~A28^23696~se^T^2.4
MSA^CA^23696~se
```

Figure 2-4: ADT-Add Person or Patient Information message: Commit acknowledgement returned to MPI

2.7 ADT/ACK—Update Patient Information (Event A08)

This trigger event occurs when patient demographic information has changed or has been edited. For example, an A08 event can be used to notify the MPI of a change of address or a name change.

Note: Updates to specific patient demographic data will trigger the broadcast of a HL7 ADT-A08 message. Because there is no set way of identifying when an edit to patient information is complete, these edit events are marked as needing to be transmitted in the ADT/HL7 PIVOT file (#391.71). The background job AGMP A08 BCKGRND UPDATE TSK (scheduled TaskMan job) periodically broadcasts the HL7 ADT-A08 message, containing any changes to data, to the MPI.

Message Sent TO the MPI from RPMS

```
MSH^~|\&^RPMS-MPI^14752~161.223.91.63:5026~DNS^MPI
^8990~:8899~DNS^20100708101516-0600^^ADT~A08^14752 1201^T~^2.4^
^^AL^NE^
EVN^A08^^^^398~FRAZIER~TIM~~~~~USIHS&&0363~L~~~NI~IHS FACILITY ID -NOT-A-REAL
FACILITY&14752&L^^14752
PID^1^1000592558V803451^1000592558V803451~~~USIHS&&0363~NI~IHS FACILITY ID - NO
T-A-REAL FACILITY&14752&L|779358654~~~USSSA&&0363~SS~IHS FACILITY ID - NOT-A-REA
L FACILITY&14752&L|7296~~~USIHS&&0363~PI~IHS FACILITY ID - NOT-A-REAL FACILITY&1
4752&L|1000592558V803451~~~USIHS&&0363~NI~IHS FACILITY ID - NOT-A-REAL FACILITY&
14752&L~200910205571-0700^^CERSUN~MARION~M~~~~L^JECKSUN~JEREMIAH~DARRYL~~~~M^19
630808^F^WABAR~JEREMIAH~DARRYL^^BOX 354~~KETTLE RIVER~MN~~~P~|~~MINNEAPOLIS~MN~~
~N^^~|~~|~~|~~^|
PDI^^^^~D~
PVI^1^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
ZPD^1^997^C^01^UNSPECIFIED^7296~0000109481~516~19316~|7296~0000109482~517~17493
~|
```

Figure 2-5: ADT-A08—Update Patient Information message: Sent to MPI from RPMS

Commit-Level Acknowledgement Sent FROM the MPI to Receiving System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708101519.28-0700^^ACK~A08^29502^T^2.4^^^N
E^NE
MSA^CA^14752 1201
```

Figure 2-6: ADT-A08—Update Patient Information message: Commit acknowledgement sent from MPI to RPMS

Application Level Acknowledgement Sent FROM the MPI to Receiving System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708101527-0600^^ACK~A08^23697~se^T^2.4^^^A
```

```
L^NE
MSA^AA^14752 1201^^^DFN=1000592558
```

Figure 2-7: ADT-A08—Update Patient Information message: Application acknowledgement sent from MPI

Commit Level Acknowledgement Returned TO the MPI from Receiving System

```
MSH^~|\&^EnsembleHL7^ISC^MPI^8990^201007080947^^ACK~A08^23696-se^T^2.4
MSA^CA^23696-se
```

Figure 2-8: ADT-A08—Update Patient Information message: Commit acknowledgement returned to MPI

2.8 ADT/ACK—Admit/Visit Notification (Event A01)

An A01 event is intended to be used for “Admitted” patients only. An A01 event is sent as a result of a patient undergoing the admission process. It signals the beginning of a patient’s stay in a healthcare facility. This information is entered in the primary Patient Administration system (RPMS Patient Information Management System [PIMS] Admit a Patient option). It includes short stay and “John Doe” (e.g., patient name is unknown) admissions. It will be sent to the MPI to update the fields date last treated and event reason.

Message Sent TO the MPI from RPMS

```
MSH^~|\&^RPMS-MPI^14752~161.223.91.63:5026~DNS^MPI
^8990~:8899~DNS^20100708102554-0600^^ADT~A01^14752 1204^T~^2.4^^AL^NE^
EVN^A1^^^398~FRAZIER~TIM~~~~~USIHS&&0363~L~~~NI~IHS FACILITY ID -NOT-A-REAL F
ACILITY&14752&L^14752
PID^1^1000592558V803451^1000592558V803451~~~USIHS&&0363~NI~IHS FACILITY ID - NO
T-A-REAL FACILITY&14752&L|779358654~~~USSSA&&0363~SS~IHS FACILITY ID - NOT-A-REA
L FACILITY&14752&L|7296~~~USIHS&&0363~PI~IHS FACILITY ID - NOT-A-REAL FACILITY&1
4752&L|1000592558V803451~~~USIHS&&0363~NI~IHS FACILITY ID - NOT-A-REAL FACILITY&
14752&L~200910205571-0700^^CERSUN~MARION~M~~~~L^JECKSUN~JEREMIAH~DARRYL~~~~M^19
630808^F^WABAR~JEREMIAH~DARRYL^^BOX 354~~KETTLE RIVER~MN~~~P~|~~MINNEAPOLIS~MN~~
~N^~|~~|~~|~~~~~|
PD1^^~D~
PVL^1^1^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^2010-07-08 00:00:00
ZPD^1^997^C^01^UNSPECIFIED^7296-0000109481-516-19316~|7296-0000109482-517-17493
~|
```

Figure 2-9: ADT-A01—Admit/Visit Notification message: Sent from RPMS to MPI

Commit-Level Acknowledgement Sent FROM MPI to the Sending System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708102554.749-0700^^ACK~A01^29503^T^2.4^^
NE^NE
MSA^CA^14752 1204
```

Figure 2-10: ADT-A01—Admit/Visit Notification message: Commit acknowledgement sent from MPI to sending system

Application-Level Acknowledgement Sent FROM the MPI to the Sending System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708102600-0600^^ACK~A01^23698-se^T^2.4^^^A
L^NE
MSA^AA^14752 1204^^^DFN=1000592558
```

Figure 2-11: ADT-A01—Admit/Visit Notification message: Application acknowledgement sent from MPI to sending system

Commit-Level Acknowledgement Returned TO the MPI from the Sending System

```
MSH^~|\&^EnsembleHL7^ISC^MPI^8990^201007080947^^ACK~A01^23696-se^T^2.4
MSA^CA^23696-se
```

Figure 2-12: MFN sent from MPI to RPMS

```
MSH^~|\&^MPI^8990^^14752^20100708102600-0600^^MFN~M05^29501^D^2.4^^AL^NE
MFI^TFL^^REP^^AL^UPD
MFE^MAD^29501-1000606876-0^2010-07-08 00:00:00^7296~14752~~1000592558~ICN
```

Figure 2-13: ADT-A01—Admit/Visit Notification message: Commit acknowledgement returned to MPI

```
MSH^~|\&^MPI^8990^^14752^20100708105747-0600^^MFN~M05^29502^D^2.4^^AL^NE
MFI^TFL^^REP^^AL^UPD
MFE^MAD^29502-1000606877-0^2010-07-09 00:00:00^7296~14752~~1000592558~ICN
```

Figure 2-14: MFN-M05 - Received from MPI

```
MSH^~|\&^RPMS-MPI^14752~161.223.91.63:5026~DNS^MPI
^8990~:8899~DNS^20100708103002-0600^^MFK~M05^14752 1208^T~^2.4^^AL^NE^
MFI^TFL^^REP^^AL
MFE^MAD^29501-1000606876-0^2010-07-08 00:00:00^7296~14752~~1000592558~ICN
MFA^MAD^14752^2010070add
```

Figure 2-15: ADT-A01—Admit/Visit Notification message: MFK acknowledgement returned to MPI

2.9 ADT/ACK—Discharge/End Visit (Event A03)

An A03 event signals the end of a patient's stay in a healthcare facility. An A03 event signals that the patient's status has changed to "discharged" and that a discharge date has been recorded. (RPMS PIMS Discharge a Patient option). It is also captured when the patient checks out of a nonstop code clinic. (RPMS PIMS Appointment Check-in/Check-out option.) The MPI captures this event in order to update the following:

- On the MPI: The date last treated on the MPI.
- The MPI then sends out an MFN to all linked facilities.

- In RPMS: The MFN is then used to update fields DATE LAST TREATED (#.03) and ADT/HL7 EVENT REASON (#.07) located in the TREATING FACILITY LIST file (#391.91).

For nonadmitted patients, an A03 event signals the end of a patient's visit to a healthcare facility. The event could be used to signal the end of a visit for a one-time or recurring outpatient who is not assigned to a bed. An A03 event could also be used to signal the end of a visit to the Emergency Room.

Message Sent TO the MPI from a RPMS System

```
MSH^~|\&^RPMS-MPI^14752~161.223.91.63:5026~DNS^MPI
^8990~:8899~DNS^20100708105736-0600^^ADT~A03^14752 1210^T~^2.4^^AL^NE^
EVN^A2^398~FRAZIER~TIM~~~~~USIHS&&0363~L~NI~IHS FACILITY ID -NOT-A-REAL F
ACILITY&14752&L^14752
PID^1^1000592558V803451^1000592558V803451~USIHS&&0363~NI~IHS FACILITY ID - NO
T-A-REAL FACILITY&14752&L|779358654~USSSA&&0363~SS~IHS FACILITY ID - NOT-A-REA
L FACILITY&14752&L|7296~USIHS&&0363~PI~IHS FACILITY ID - NOT-A-REAL FACILITY&1
4752&L|1000592558V803451~USIHS&&0363~NI~IHS FACILITY ID - NOT-A-REAL FACILITY&
14752&L~200910205571-0700^^CERSUN-MARION~M~L^JECKSON~JEREMIAH-DARRYL~M^19
630808^F^WABAR~JEREMIAH-DARRYL^BOX 354~KETTLE RIVER-MN~P~|~MINNEAPOLIS~MN~
~N^^~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|~|
PD1^^^~D~
PV1^1^2010-07-09 00:00:00
ZPD^1^997^C^01^UNSPECIFIED^7296~0000109481~516~19316~|7296~0000109482~517~17493~|
```

Figure 2-16: ADT-A03—Discharge/End Visit message: Sent to MPI from RPMS

Commit Level Acknowledgement Sent FROM the MPI to the Sending System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708105747-0600^^ACK~A03^23699~se^T^2.4^^AL^NE
MSA^CA^14752 1210
```

Figure 2-17: ADT-A03—Discharge/End Visit message: Commit acknowledgement sent from MPI to sending system

Application Level Acknowledgement Sent FROM the MPI to the Sending System

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708105740.532-0700^^ACK~A03^29505^T^2.4^^
MSA^AA^14752 1210^^^DFN=1000592558
```

Figure 2-18: ADT-A03—Discharge/End Visit message: Application acknowledgement sent from MPI to sending system

Commit Level Acknowledgement Returned TO the MPI from the Sending System

```
MSH^~|\&^EnsembleHL7^ISC^MPI^8990^201007080947^^ACK~A03^23696~se^T^2.4
MSA^CA^23696~se
```

Figure 2-19: ADT-A03—Discharge/End Visit message: Commit acknowledgement returned to MPI

```
MSH^~|\&^MPI^8990^^14752^20100708105747-0600^^MFN~M05^29502^D^2.4^^AL^NE
```


Application-Level Acknowledgement Sent FROM the MPI to RPMS

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708112130-0600^^ACK~A40^23700-se^T^2.4^^^AL^NE
MSA^AA^14752 1216^^^DFN=1000592558
```

Figure 2-24: ADT-A40—Merge Patient—Patient Identifier List message: Application acknowledgement sent from MPI to RPMS

Commit-Level Acknowledgement Returned TO the MPI from RPMS

```
MSH^~|\&^EnsembleHL7^ISC^MPI^8990^201007080947^^ACK~A40^23696-se^T^2.4
MSA^CA^23696-se
```

Figure 2-25: ADT-A40—Merge Patient—Patient Identifier List message: Commit acknowledgement returned to MPI

MFN returned by MPI

```
MSH^~|\&^MPI^8990^^14752^20100708112132-0600^^MFN~M05^29503^D^2.4^^^AL^NE
MFI^TFL^^REP^^^AL^MRG
MFE^MAD^29503-1000606878-0^2010-07-09 00:00:00^7296~14752~~1000592558~ICN
```

Figure 2-26: MFN-M05 – Received from MPI

MFK returned TO MPI from RPMS

```
MSH^~|\&^RPMS-MPI^14752~161.223.91.63:5026~DNS^MPI
^8990~:8899~DNS^20100708112501-0600^^MFK~M05^14752 1220^T~^2.4^^^AL^NE^
MFI^TFL^^REP^^^AL
MFE^MAD^29503-1000606878-0^2010-07-09 00:00:00^7296~14752~~1000592558~ICN
MFA^MAD^14752^20100708^S
```

Figure 2-27: MFK-M05 sent back to MPI

Commit Acknowledgement Returned TO MPI from RPMS

```
MSH^~|\&^MPI^8990^RPMS-MPI^14752^20100708112505-0600^^ACK~M05^29508^T^2.4^^^NE^N
MSA^CA^14752 1220
```

Figure 2-28: Commit acknowledgement sent from MPI to RPMS

2.11 MFN (Master File)

- MSH Message Header
- MFI Master File Identification
- MFE Master File Entry

Sequence #	Component Piece	Data Element	MPI Usage	For Encoded Values, RPMS Expanded File/Field ¹
MFI Segment				
1	1	MASTER FILE IDENTIFIER	If the record is for a doctor/physician then it	Hard Code TFL
2	1	Master file application identifier		Not used
3	1	FILE-LEVEL EVENT CODE	REP' for replace or 'UPD' for update	Hard Code "UPD"
4	1	Entered date time	2.4; TS	Not used
5	1	Effective date time	2.4; TS optional	Not used
6	1	RESPONSE LEVEL CODE		Hard code "AL"
MFE Segment				
1	1	RECORD-LEVEL EVENT CODE	If the patient was added then this field contains 'MAD'. If the patient was modified then this field contains 'MUP'.	
2	1	MFN CONTROL ID		ID from MPI
3	1	EFFECTIVE DATE/TIME		Last treated date
4	1	PRIMARY KEY VALUE	Lid~system code~~EUID~type	

2.11.1 Escape Characters

HL7 encoding characters, if found within a data field, are automatically replaced with the proper escape sequence. The escape sequences are \ = E, ^ = S, & = T, and ~ = R.

¹ If no field is identified, the expanded value is the only field in the file.

2.12 Obtaining Data Dictionary Listings

Technical information about files and the fields in files is stored in data dictionaries. Use the List File Attributes option on the Data Dictionary Utilities submenu in FileMan to print formatted data dictionaries.

3.0 Routines

3.1 Routines Description

Routine Name	Description
AGMPHL01	ADT-A01 ACK processor. Also creates A01,A03 messages
AGMPHL03	ADT-A03 ACK processor Also creates A01,A03 messages
AGMPHLBU	HLO MPI A08 Background update task Sends A08 from entries in PIVOT file
AGMPHLEU	HLO MPI A28 Missing ICN background task
AGMPHLU	MPI HLO UTILITIES and single message creation routine
AGMPHMFN	HLO MPI MFN-M05 PROCESSING RTN
AGMPIHLO	MPI HLO Interface create messages
AGMPIPID	AGMPI create PID segment
AG0	Add a patient opening page. Contains call to create A28 message
AGMPIACK	MPI A28/A08 ACK PROCESSOR
AGMPIBGP	Patient Registration MPI INCOMING MESSAGE PROCESSOR
AGMPIHL1	AGMPI extension to AGMPIHLO routine
AGMPPURG	AGMPI MESSAGE PURGE
AGMPHLU1	MPI HLO UTILITIES Reports
AGMPHLU2	MPI HLO UTILITIES Reports

4.0 Files

There are no new files with this application.

5.0 Mail Group

There is one mail group in this build: AGMP MPI. The users in this mail group receive notifications of errors via Veterans Administration (VA) Alerts generated on both outbound and incoming messages.

The users in this group need the ability to review these messages and possibly take action and reprocess or resend messages.

6.0 Parameters

The AGMPI messaging relies on some parameters to hold data required for certain functions to run properly. Parameters can be edited via the OPT option in Patient Registration. See the *Patient Registration MPI Interface (AG) Installation Guide and Release Notes* for explanations of these parameter settings.

```
Select REGISTRATION PARAMETERS SITE NAME:      516
SITE NAME: NOT-A-REAL FACILITY
DAYS TO KEEP MPI HLO MESSAGES: 7//
LOCAL LISTENER PORT FOR MPI: 5201//
```

Figure 6-1: Parameters

7.0 Exported Options

Option Name	Description
AGMP MPI MSG ERR SEG RPT	Looks for ERR segments in ^HLA
AGMP MPI MSG ERR SEG TSK RPT	Same as above and can be tasked
AGMP A08 BCKGRND UPDATE TSK	To be scheduled in Taskman. It takes entries in the ADT/HL7 PIVOT field and sends an A08.
AGMP ACK BCKGRND TSK	To be schedule in Taskman to process incoming messages from the MPI. It then calls the appropriate routine to process it.
AGMP HLO A28 ADD PATIENT	Send a single A28 message to the MPI
AGMP HLO MPI DIRECT CONNECT	Do a query to the MPI to see if the patient exists on the MPI
AGMP HLO MPI MANAGER OPTIONS	Contains all MPI options
AGMP HLO PROCESS MFN	Process existing MFN message and return MFK
AGMP HLO RESEND MSG	Resend a message to MPI
AGMP HLO SEND A01/A03	Create a new A01 or A03 message
AGMP HLO SEND A08 UPDATE	Send an A08 update message
AGMP MPI MSSING ICN TSK	To be scheduled in Taskman. This traverses the ^DPT looking for patients with missing ICNs. If they don't have one an A28 is sent to the MPI This option will run at night to add patients to the MPI who do not have an ICN assigned. A patient may not have an ICN if he/she was added when the network was down, the MPI server was down, or there was an error during the process of sending a message. This option will also be used to initially populate the MPI with a site's patients.
AGMP MPI PURGE HLO MSGS	Purges Messages in ^HLA, ^HLB
AGMP MPI RPTS AND DEBUG MENU	This menu contains options that can be used to report on the messages that are in the HLA and HLB globals. Some of these can be used to debug.

Option Name	Description
AGMP MPI MSG ERR SEG RPT	This report traverses the HLA global and looks for ERR segments being returned by the MPI. This usually indicates an "application error" occurred on the MPI-side, and the message was rejected for bad data or for a similar reason. The MPI support will need to discern what is incorrect, fix the reason for the error, and then resend the message or create a new one to pull the data properly.
AGMP MPI MSG ERR SEG TSK RPT	This report traverses the HLA global and looks for ERR segments being returned by the MPI. This usually means an "application error" occurred on the MPI side and the message was rejected for bad data or a similar reason. The MPI support will need to discern what is incorrect, fix the reason for the error, and then resend the message or create a new one to pull the data properly.
AGMP MPI UNSUCCESSFUL MFE	This report will show any unsuccessful updates of the TREATING FACILITY LIST file from an incoming MFN message from the MPI. If an unsuccessful MFE is found, it can be investigated as to why it failed to update the file and later resolved.
AGMP MPI EVENT/TYPE/ACK RPT	This option can be used to print out messages which contain a certain event such as an A28 (add a patient), or a certain type of message (ADT v. ACK). If the message type is an ACK the ACK code will print. This can be used to print out messages that may have been reported via email alerts.
AGMP MPI MESSAGE TOTALS	This option gives a total count of all HLO MPI messages, and the total number of messages in the IN queue and in the OUT queue.
AGMP MPI RPT MSGS BY DATE	This can be used to print messages by date range. It will print totals for each message type and event, as well as a grand total and the % for each message type^event pair. If message processing is out of balance, this report will show it. When totals are balanced, acks for each message corresponding event should be roughly equal.
AGMP MPI ICN REPORT	This report will show the number of icns populated or unpopulated. ICN = integration control number (#991.01) in VA patient file (#2)
AGMP MPI UNSUCCESS MSGS	This option will print unsuccessful messages for a given date range. This option can then be used in conjunction with the resend option to take care of messages that did not get to the MPI.

8.0 Menu Diagram

Figure 8-1 displays the main MPI menu and the RPT menu, located in the AGMENU option of Patient Registration.

```

*****
*
*      INDIAN HEALTH SERVICE      *
*      PATIENT REGISTRATION SYSTEM *
*      VERSION 7.2.0, AUG 30, 2010 *
*
*****
                NOT-A-REAL FACILITY
*** NOTE:  IF YOU EDIT A PATIENT AND SEE THEIR NAME IN REVERSE VIDEO
***
*** WITH '(RHI)' BLINKING NEXT TO IT, IT MEANS THEY HAVE RESTRICTED ***
*** HEALTH INFORMATION ***

PTRG  Patient Registration ...
AGX   Registration data- prepare for export ...
OPT   Set Registration OPTIONS
SIT   Reset Default Facility
TM    Table Maintenance Menu ...
SAMP  PATIENT File Random Sampler ...
SSN   SSN Reports Menu ...
MPI  MPI Manager Options ...

                PATIENT REGISTRATION
                NOT-A-REAL FACILITY
                MPI Manager Options

DIR   SEND EXACT MATCH QUERY (VQQ-Q02)
ADD   SEND A28 ADD PATIENT
MRG   SEND A40 MERGE PATIENTS
UPD   SEND A08 UPDATE
MFN   PROCESS MFN AND SEND MFK
VST   SEND A01/A03 MESSAGE
RS    RESEND HL7 MESSAGE   RPT  MPI Reports and Debug option

Select MPI Manager Options Option: RPT  MPI Reports and Debug option

                PATIENT REGISTRATION
                NOT-A-REAL FACILITY
                MPI Reports and Debug option

ERR   MPI Msg ERR Report
MFE   MPI Unsuccessful MFE Report
ETA   MPI Event/Type/Ack Report
DAT   MPI Messages by Date
TOT   MPI Queue and msg Totals
ICN   MPI Report of ICNs populated
UN    MPI Print Unsuccessful Messages
Select MPI Reports and Debug option Option:

```

Figure 8-1: Menu Diagram for MPI and RPT

9.0 Protocols and Links

9.1 Protocols

Two protocols have been added to enable AGMPI to subscribe to admission and discharge, check-in, and check-out events. See the table below.

New Protocol	Parent Protocol	Sequence Number	Description
AGMP MPI ADMIT DISCHARGE	BDGPM MOVEMENT EVENTS	140	Sends admit or discharge information to the MPI.
AGMP MPI CHECKIN CHECKOUT	BSDAM APPOINTMENT EVENTS	40	Sends check in or check out information to MPI.

9.2 Links

HL7 messages are sent on logical links. The HL LOGICAL LINK NODE is MPI and is in the HL LOGICAL LINK file.

```
Select OPTION: INQUIRE TO FILE ENTRIES

OUTPUT FROM WHAT FILE: HL LOGICAL LINK//
Select HL LOGICAL LINK NODE: MPI
  1  MPI
  2  MPIVA
  3  MPIVA DIR
CHOOSE 1-3: 1  MPI
ANOTHER ONE:
STANDARD CAPTIONED OUTPUT? Yes// (Yes)
Include COMPUTED fields: (N/Y/R/B): NO// - No record number (IEN), no
Computed
Fields

NODE: MPI                               LLP TYPE: TCP
DEVICE TYPE: Persistent Client           AUTOSTART: Enabled
SHUTDOWN LLP ?: NO                       QUEUE SIZE: 10
TCP/IP ADDRESS: 10.154.33.1410.154.33.14 TCP/IP SERVICE TYPE:
CLIENT (SENDER)
PERSISTENT: NO                           TCP/IP PORT (OPTIMIZED): 5200
```

Figure 9-1: HL LOGICAL LINK

Sites must edit the IP address and port to make a connection to the server.

10.0 Purging

A task can be set up to purge MPI HL7 messages on a regular basis. The AGMP MPI PURGE HLO MSGS OPTION task can be scheduled to run in TaskMan.

The default setting is to keep successful messages for seven days. To change the default, use the OPT option in Patient Registration and type a different value in the DAYS TO KEEP MPI HLO MESSAGES parameter.

At the time of this release, it is recommended that sites retain messages for seven days.

11.0 External Relations

This package calls the following documented entry points:

Security Key	Description
^ZTLOAD	Queue Task
GET^XPAR	Get data on a particular parameter
\$\$ADDSEG^HLOAPI	Add an HL7 message segment
\$\$NEWMMSG^HLOAPI	Create a new HL7 message
\$\$SENDONE^HLOAPI1	Send out one HL7 message
\$\$ADDR^VAFHLFNC	Create an HL7 formatted address
SET^HLOAPI	Set a field in an HL7 segment
\$\$HLDATE^HLFNC	Create an HL7 formatted date
\$\$NEXTSEG^HLOPRS	Get the next segment in the HL7 message
\$\$HLNAME^HLFNC	Get HL7 formatted name
\$\$HLPHONE^HLFNC	Get HL7 formatted phone
\$\$RSEND^ALOAPI3	Resend a message
\$\$STARTMSG^HLOPRS	Begin processing a message
\$\$NEXTSEG^HLOPRS	Get next segment
DEM^VADPT	Call to get PID demographic data
KVA^DPT	Kill variables set up by DEM^VADPT
\$\$SITE^VASITE	Get station number given DUZ(2)
XBSAVE	Save data to flat file
\$\$FMTE^XLFDT	Get formatted date
\$\$HLNAME^XLFNAME	Get formatted name
EN^XPAR	Update alert definitions
SETUP^XQALERT	Set up alert call for mail group

Security Key	Description
EN^XQOR	Unroll protocols so subscribers will get unwrapped
\$\$NS^XUAF4	Get facility info
\$\$STA^XUAF4	Get station number

12.0 Internal Relations

All users should be given access to the appropriate options and keys to those options, as needed. All of the options stand alone.

13.0 How to Generate Online Documentation

The namespace is AGMP. All parameters, routines, options, etc., begin with AG.

This section describes some of the methods by which users can generate dental technical documentation. Online technical documentation pertaining to the Patient Registration MPI Interface software can be generated through the use of several Kernel options. These include, but are not limited to, the following:

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

Entering question marks at the “Select...Option” prompts also provides users with valuable technical information. For example, typing a single question mark (?) lists all options that can be accessed from the current option. Typing two question marks (??) lists all options accessible from the current one, showing the formal name and lock for each.

Typing three question marks (???) displays a brief description for each option in a menu, whereas an option name preceded by a question mark (?OPTION) shows extended help, if available, for that option.

For a more exhaustive option listing and further information about other utilities that supply online technical information, consult the *DHCP Kernel Reference Manual*.

13.1 %INDEX

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

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

- Label references
- External references

By running %INDEX for a specified set of routines, you are afforded the opportunity to discover any deviations from RPMS Programming Standards that exist in the selected routines, and to see how routines interact with one another (for example, which routines call or are called by other routines).

To run %INDEX for the Patient Registration MPI Interface package, specify the AGMP namespace at the “Routine(s)?>” prompt.

13.2 Inquire Option

This menu management option provides the following information about a specific 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 Patient Registration MPI Interface options, specify the AGMP namespace.

13.3 Print Option File

This utility generates a listing of options from the Option file (#19). You can choose to print all of the entries in this file, or you can specify a single option or range of options. For a list of Patient Registration MPI Interface options, refer to Section 9.0.

13.4 List File Attributes

This VA FileMan option enables you to generate documentation pertaining to files and file structure. Using the standard format of this option yields 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.

Glossary

Archiving

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

Banner

A line of text with a user's name and domain.

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, 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.

Component

A segment of the health summary that provides a mechanism for grouping data into sections.

Cross-reference

An indexing method whereby files can include presorted lists of entries as part of the stored database. Cross-references (x-refs) facilitate lookup and reporting.

Entry Point

Entry point within a routine that is referenced by a "DO" or "GOTO" command from a routine internal to a package.

File

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

FileMan

The database management system for RPMS.

Flowsheet

A tabular format for organizing and displaying data in a special section of the health summary.

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).

INDEX (%INDEX)

A Kernel utility used to verify routines and other MUMPS code associated with a package. Checking is done according to current ANSI MUMPS standards and RPMS programming standards.

This tool can be invoked through an option or from direct mode (>D ^%INDEX).

Init

Initialization of an application package. The initialization step in the installation process builds files from a set of routines (the init routines). “Init”

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.

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 menu-type options are displayed, the prompt includes the name of the menu 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 assigned by the database administrator to a software application.

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, non-interactively, by TaskMan.

Panel

A tabular format for presenting a series of clinical measurements or results in the health summary.

Queuing

Requesting that a job be processed at a later time rather than within the current session.

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.

Up-Hat (^)

A circumflex, also known as a “hat” or “caret,” that is used as a piece delimiter in a global. The up-hat is denoted as “^” and is typed by pressing Shift+6 on the keyboard.

Utility

A callable routine line tag or function. A universal routine usable by anyone.

Variable

A character or group of characters that refers to a value.

MUMPS recognizes three types of variables: local variables, global variables, and special variables. Local variables exist in a partition of the main memory and disappear at sign-off. A global variable is stored on disk, potentially available to any user. Global variables usually exist as parts of global arrays.

Acronym List

AG	Namespace for Patient Registration
EIE	Ensemble Integration Engine
ICD	International Classification of Diseases
IHS	Indian Health Service
IEN	Internal Entry Number. The number used to identify an entry within a file. Every record has a unique internal entry number.
IRM	Information Resource Management. The IHS personnel responsible for information systems management and security.
MPI	Master Patient Index
MUMPS	Massachusetts General Hospital Utility Multi-Programming System
RPMS	Resource and Patient Management System. A series of integrated software components that includes clinical, administrative, and financial functions.
UCI	User Class Identification: a computing area.

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