Health Directory Application Programming Interface
Implementation Guide

Version 3
October 25, 2019

Document History

Date	Version	Sections Revised	Description	Modifier
10/1/19	1	All	Initial draft	N/A
12/2/19	3	All	Proof / Edits	A. Jones
1/21/20	3	All	Final Proof	A. Jones

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Appendix A: Health Directory Standard REST API Quick Start Guide

Acronyms and Abbreviations Guide

AA	Assigning Authority
ACRS®	Active Care Relationship Service®
AD	Advance Directive
ADT	Admission, Discharge, Transfer
API	Application Programming Interface
CAH	Critical Access Hospital
CAT 1	Category 1
CAT 3	Category 3
CCD®	Continuity of Care Document
CDA®	Clinical Document Architecture
CEHRT	Certified Electronic Health Record Technology
CGS	Common Gateway Service
CHAMPS	Community Health Automated Medicaid Processing System
CHDR	Clinical Data Repository / Health Data Repository
CMS	Centers for Medicare & Medicaid Services
CQM	Clinical Quality Measure
CQMRR	Clinical Quality Measurement Reporting and Repository
DQA	Data Quality Assurance
DSM	Direct Secure Messaging
DSO	Data Sharing Organization
eCQM	electronic Clinical Quality Measure

EH	Eligible Hospital
EHR	Electronic Health Record
EHR-MIPP	Electronic Health Record Medicaid Incentive Payment Program
EP	Eligible Professional
EPID	Enterprise Patient ID
esMD	CMS Electronic Submission of Medical Documentation
FHIR	Fast Healthcare Interoperability Resources
HEDIS	Healthcare Effectiveness Data and Information Set
HIE	Health Information Exchange
HIE-QO	Health Information Exchange Qualified Data Sharing Organization
HIN	Health Information Network
HITSP	Health Information Technology Standards Panel
HL7®	Health Level Seven®
HPD	Health Provider Directory
ICBR	Integrated Care Bridge Record
ICN	Identification Control Number
ICO	Integrated Care Organization
ICT	Integrated Care Teams
IDN	Integrated Delivery Network

IHE	Integrating the Healthcare Enterprise		**SAML**	Security Assertion Markup Language
MDHHS	Michigan Department of Health and Human Services		**SOAP**	Simple Object Access Protocol
MIDIGATE	Medical Information Direct Gateway		**SOM**	State of Michigan
MiHIN	Michigan Health Information Network Shared Services		**SSA**	Social Security Administration
			SSO	Single Sign On
MPI	Master Person Index		**SSSO**	State Sponsored Data Sharing Organization
MUCA	Master Use Case Agreement		**SCD**	Statewide Consumer Directory
NHIE	Nationwide Health Information Exchange		**TDSO**	Trusted Data Sharing Organization
NHIO	Nationwide Health Information Organizations		**UCA**	Use Case Agreement
			UCS	Use Case Summary
NIST	National Institute of Standards and Technology		**URL**	Uniform Resources Locators
NwHIN	Nationwide Health Information Network		**VA**	Department of Veterans Affairs
			VLER	Virtual Lifetime Electronic Record
OID	Object Identifier		**VPN**	Virtual Private Network
ONC	Office of the National Coordinator		**XCA**	Cross Community Access
PD	Patient Discovery		**XCPD**	Cross-Community Patient Discovery
PDQ	Patient Demographic Query		**XDR**	Cross-Enterprise Document Reliable Interchange
PI	Promoting Interoperability			
PO	Participating Organization		**XDS**	Cross-Enterprise Document Sharing
PoM	Peace of Mind		**XML**	Extensible Markup Language
PQRS	Physician Quality Reporting System			
QD	Query for Documents			
QRDA	Quality Reporting Document Architecture			
RAS	Registration and Attestation System			
RD	Retrieve Documents			
REST	Representational State Transfer			

Definitions

Attribution. The connection between a consumer and their healthcare providers. One definition of attribution is "assigning a provider or providers, who will be held accountable for a member based on an analysis of that member's claim data." The attributed provider is deemed responsible for the patient's cost and quality of care, regardless of which providers actually deliver the service.

Active Care Relationship (ACR). (a) For health providers, a patient who has been seen by a provider within the past 24 months, or is considered part of the health provider's active patient population they are responsible for managing, unless notice of termination of that treatment relationship has been provided to Michigan Health Information Network Shared Services (MiHIN); (b) for payers, an eligible member of a health plan; (c) an active relationship between a patient and a health provider for the purpose of treatment, payment and/or healthcare operations consistent with the requirements set forth in HIPAA; (d) a relationship with a health provider asserted by a consumer and approved by the health provider; or (e) any person or Trusted Data Sharing Organization (TDSO) authorized to receive message content under an exhibit which specifies that an ACR may be generated by sending or receiving message content under that exhibit. ACR records are stored by MiHIN in the Active Care Relationship Service® (ACRS®).

Active Care Relationship Service® (ACRS®). The Michigan Health Information Network Shared Services infrastructure service that contains records for Trusted Data Sharing Organizations, their participating organizations' participants or any health providers who have an Active Care Relationship with a patient.

Admission, Discharge, Transfer (ADT). An event that occurs when a patient is admitted to, discharged from, or transferred from one care setting to another care setting or to the patient's home. For example, an Admission, Discharge, Transfer (ADT) event occurs when a patient is discharged from a hospital. An ADT event also occurs when a patient arrives in care setting such as a health clinic or hospital.

ADT Message. A type of Health Leven Seven® (HL7®) message generated by healthcare systems based upon Admission, Discharge, Transfer (ADT) events and the HL7 "Electronic Data Exchange in Healthcare" standard. The HL7 ADT message type is used to send and receive patient demographic and healthcare encounter information, generated by source system(s). The ADT messages contain patient demographic, visit, insurance, and diagnosis information.

ADT Notification. An electronic notification that a given patient has undergone an Admission, Discharge, Transfer (ADT) event. An ADT Notification is not a complete ADT Message.

Advance Directive. A document in which consumers specify what type of medical care they want in the future, or who should make medical decisions if they become unable to make decisions for themselves.

Applicable Laws and Standards. In addition to the definition set forth in the Data Sharing Agreement, the federal Confidentiality of Alcohol and Drug Abuse Patient Records statute, section 543 of the Public Health Service Act, 42 U.S.C. 290dd-2, and its implementing regulation, 42 CFR Part 2; the Michigan Mental Health Code, at MCLA §§ 333.1748 and 333.1748a; and the Michigan Public Health Code, at MCL § 333.5131, 5114a.

C62. The HITSP Unstructured Document Component is provided for the capture and storage of patient identifiable, unstructured document content, such as text, PDF, and images rendered in PDF. It is based on the Cross-Enterprise Sharing of Scanned Documents (XDS-SD) profile from Integrating the Healthcare Enterprise (IHE) - http://www.hitsp.org/ConstructSet_Details.aspx?&PrefixAlpha=4&PrefixNumeric=62.

C83. The HITSP Clinical Document Architecture (CDA) Content Modules Component. The CDA Content Modules Component defines the content modules for document based HITSP constructs utilizing clinical information: http://www.hitsp.org/ConstructSet_Details.aspx?&PrefixAlpha=4&PrefixNumeric=83.

Caregiver. An individual such as a health professional or social worker who assists in the identification, prevention or treatment of an illness or disability.

Common Gateway. The method by which data is sent and received by Michigan Health Information Network Shared Services using various national standard protocols (e.g. NwHIN SOAP, IHE XCA, IHE XDS.b).

Conforming Message. A message that is in a standard format that strictly adheres to the implementation guide for its applicable use case.

CONNECT. An open source software solution that supports health information exchange – both locally and at the national level. CONNECT uses Nationwide Health Information Network standards and governance to make sure that health information exchanges are compatible with other exchanges being set up throughout the country (http://www.connectopensource.org/). This software solution was initially developed by federal agencies to support their health-related missions, but it is now available to all organizations and can be used to help set up health information exchanges and share data using nationally recognized interoperability standards.

Critical Access Hospital (CAH). A Critical Access Hospital as defined under the Medicaid Electronic Health Record Incentive Program.

Data Sharing Agreement. Any data sharing organization agreement signed by both Michigan Health Information Network Shared Services (MiHIN) and a participating organization. Data sharing organization agreements include but are not limited to: Qualified Data Sharing Organization Agreement, Virtual Qualified Data Sharing Organization Agreement, Consumer Qualified Data Sharing Agreement, Sponsored Shared Organization Agreement, State Sponsored Sharing Organization Agreement, Direct Data Sharing Organization Agreement, Simple Data Sharing Organization Agreement, or other data sharing organization agreements developed by MiHIN.

EdgeSim. Simulators that are utilized in a testing environment to simulate testing with a data sharing organization.

eHealth Exchange. See the definition for The Sequoia Project.

Electronic Address. A string that identifies the transport protocol and end point address for communicating electronically with a recipient. A recipient may be a person, organization or other entity that has designated the electronic address as the point at which it will receive electronic messages. Examples of an electronic address include a secure email address (Direct via secure SMTP) or secure URL (SOAP/XDR/REST/FHIR). Communication with an electronic address may require a digital certificate or participation in a trust bundle.

Electronic Clinical Quality Measure (eCQM). Clinical Quality Measures that are specified in a standard electronic format and are designed to use data from Health IT systems for measurement.

Electronic Medical Record or Electronic Health Record (EMR/EHR). A digital version of a patient's paper medical chart.

Electronic Service Information (ESI). All information reasonably necessary to define an electronic destination's ability to receive and use a specific type of information (e.g., discharge summary, patient summary, laboratory report, query for patient/provider/healthcare data). ESI may include the type of information (e.g., patient summary or query), the destination's electronic address, the messaging framework supported (e.g., SMTP, HTTP/SOAP, XDR, REST, FHIR), security information supported or required (e.g., digital certificate) and specific payload definitions (e.g., CCD C32 V2.5). In addition, ESI may include labels that help identify the type of recipient (e.g., medical records department).

Eligible Hospital (EH). An eligible hospital as defined under the Medicare and Medicaid Electronic Health Record Incentive Programs.

Eligible Professional (EP). An eligible professional as defined under the Medicare and Medicaid Electronic Health Record Incentive Programs.

End Point. An instance of an electronic address or Electronic Service Information.

Exhibit. Collectively, a use case exhibit or a pilot activity exhibit.

FedSim. Simulators that are utilized in a testing environment to simulate testing with a federal partner e.g., Social Security Administration or Veterans Affairs.

Health Directory. The statewide shared service established by Michigan Health Information Network Shared Services that contains contact information on health providers, electronic addresses, end points, and Electronic Service Information, as a resource for authorized users to obtain contact information and to securely exchange health information.

Health Level Seven® (HL7®). An interface standard and specifications for clinical and administrative healthcare data developed by the Health Level Seven (HL7) organization

and approved by the American National Standards Institute (ANSI). HL7 provides a method for disparate systems to communicate clinical and administrative information in a normalized format with acknowledgement of receipt.

Health Information. Any information, including genetic information, whether oral or recorded in any form or medium, that (a) is created or received by a health provider, public health authority, employer, life insurer, school or university, or healthcare clearinghouse; and (b) relates to the past, present, or future physical or mental health or condition of an individual; the provision of healthcare to an individual; or the past, present, or future payment for the provision of healthcare to an individual.

Health Information Network (HIN). An organization or group of organizations responsible for coordinating the exchange of protected health information in a region, state, or nationally.

Health Plan. An individual or group plan that provides, or pays the cost of medical care (as "group health plan" and "medical care" are defined in section 2791(a)(2) of the Public Health Service Act, 42 U.S.C. 300gg-91(a)(2)). Health plan further includes those entities defined as a health plan under HIPAA, 45 C.F.R 160.103.

Health Professional. Means (a) any individual licensed, registered, or certified under applicable Federal or State laws or regulations to provide healthcare services; (b) any person holding a nonclinical position within or associated with an organization that provides or coordinates healthcare or healthcare related services; and (c) people who contribute to the gathering, recording, processing, analysis or communication of health information. Examples include, but are not limited to, physicians, physician assistants, nurse practitioners, nurses, medical assistants, home health professionals, administrative assistants, care managers, care coordinators, receptionists and clerks.

Health Provider. Means facilities/hospitals, health professionals, health plans, caregivers, pharmacists/other qualified professionals, or any other person or organization involved in providing healthcare.

Immunization Information System (IIS). A registry that stores immunization records.

Information Source. Any organization that provides information that is added to a Michigan Health Information Network Shared Services infrastructure service.

Master Use Case Agreement (MUCA). Legal document covering expected rules of engagement across all use cases. Trusted data sharing organizations sign master use case agreement one time, then sign use case exhibits for participation in specific use cases.

Message. A mechanism for exchanging message content between the participating organization to Michigan Health Information Network Shared Services, including query and retrieve.

Message Content. Information, as further defined in an Exhibit, which is sent, received, found or used by a participating organization to or from Michigan Health Information Network Shared Services. Message content includes the message content header.

Message Header ("MSH") or Message Content Header. The Message Header (MSH) segment present in every Health Level Seven (HL7) message type that defines the Message's source, purpose, destination, and certain syntax specifics such as delimiters (separator characters) and character sets. It is always the first segment in the HL7 message, with the only exception being HL7 batch messages.

Michigan Care Improvement Registry (MCIR). The Immunization Information System for the State of Michigan operated by the Michigan Department of Health and Human Services (MDHHS).

Michigan Health Information Network Shared Services. The Health Information Network for the state of Michigan.

MiHIN Infrastructure Service. Certain services that are shared by numerous use cases. MiHIN infrastructure services include, but are not limited to, Active Care Relationship Service® (ACRS), Health Directory (HD), Statewide Consumer Directory (SCD), and the Medical Information Direct Gateway (MIDIGATE®).

MiHIN Services. The Michigan Health Information Network Shared Services (MiHIN) infrastructure services and additional services and functionality provided by MiHIN allowing the participating organizations to send, receive, find, or use information to or from MiHIN as further set forth in an exhibit.

Nationwide Health Information Network (NwHIN). See the definition for The Sequoia Project.

Nationwide Health Information Organizations (NHIO). Nodes on the eHealth Exchange that use the NwHIN web services to facilitate exchange of information with other nodes in the network.

NwHIN Document Submission (DS) Web Service Interface Specification. The purpose of this specification is to provide the ability to "send" data for a given patient from an exchange partner to a health information exchange using configuration on the sender side.

NwHIN Gateway. An implementation of the Nationwide Health Information Network (NwHIN) specified web service interfaces. These web service interfaces communicate over secured HTTPS using Public Key Infrastructure supported by the NwHIN Operational Infrastructure.

NwHIN Interface. An implementation of the Nationwide Health Information Network (NwHIN) specified web service interfaces. These web service interfaces communicate over secured HTTPS using Public Key Infrastructure supported by the NwHIN Operational Infrastructure.

NwHIN Messaging Platform Specifications. The purpose of this specification is to define a base set of messaging standards and web service protocols which must be implemented by each node in the eHealth Exchange network and applies to all eHealth Exchange transactions.

NwHIN Patient Discovery Web Service Interface Specification. The purpose of this specification is to define the mechanism by which one eHealth Exchange node can query another to reciprocally establish patient identity and to determine if a node may be a source of information for a specific patient.

NwHIN Query for Documents Web Service Interface Specification. The purpose of this specification is to define the mechanism by which an initiating eHealth Exchange node can request a patient-specific list of available documents from a responding node using the patient ID obtained by a prior Patient Discovery transaction.

NwHIN Retrieve Documents Web Service Interface Specification. The purpose of this specification is to define the mechanism by which an initiating eHealth Exchange node can retrieve specific documents from a responding node using the Document Reference IDs obtained using a prior Query for Documents transaction.

Negative Acknowledgment (NAK or NACK). "Not acknowledged" and is used to negatively acknowledge or to reject previously received message content or to indicate some kind of error.

Patient Data. Any data about a patient or a consumer that is electronically filed in a participating organization or participating organization participant's systems or repositories. The data may contain protected health information, personal credit information, and/or personally identifiable information.

Person Record. Any record in a Michigan Health Information Network Shared Services infrastructure service that primarily relates to a person.

Pilot Activity. The activities set forth in the applicable exhibit and typically includes sharing message content through early trials of a new use case that is still being defined and is still under development and which may include participating organization feedback to Michigan Health Information Network Shared Services to assist in finalizing a use case and use case exhibit upon conclusion of the pilot activity.

Principal. A person or a system utilizing a federated identity through a federated organization.

Promoting Interoperability. Using certified electronic health record technology to improve quality, safety and efficiency of healthcare, and to reduce health disparities as further contemplated by Title XIII of the American Recovery and Reinvestment Act of 2009.

Provider Community. A healthcare provider with an active care relationship with the applicable patient.

Query for Documents Message. A message specific to the Query for Documents Web Services Interface Specification that references the Integrating the Healthcare Enterprise's Cross-Community Access specification.

REST. REST stands for Representational State Transfer, which is an architectural style, and an approach to communications that is often used in the development of web services.

Retrieve Documents Message. Retrieve documents web services interface specification that references the Integrating the Healthcare Enterprise's Cross-Community Access specification.

Send/Receive/Find/Use (SRFU). Means sending, receiving, finding, or using message content. Sending involves the transport of message content. Receiving involves accepting and possibly consuming or storing message content. Finding means querying to locate message content. Using means any use of the message content other than sending, receiving and finding. Examples of use include consuming into workflow, reporting, storing, or analysis. SRFU activities must comply with Applicable Laws & Standards or State Administrative Code as that term is defined in this agreement and the data sharing agreement.

Service Interruption. A party is unable to send, receive or find message content for any reason, including the failure of network equipment or software, scheduled or unscheduled maintenance, general Internet outages, and events of force majeure.

SOAP. Simple Object Access Protocol is a lightweight protocol intended for exchanging structured information in a decentralized, distributed environment. It uses Extensible Markup Language (XML) technologies to define an extensible messaging framework providing a message construct that can be exchanged over a variety of underlying protocols. The framework has been designed to be independent of any particular programming model and other implementation specific semantics. For the eHealth Exchange to be a truly scalable, secure and interoperable network, a common transport layer is essential. The messaging platform is based on SOAP 1.2 messages over HTTP.

Source System. A computer system, such as an electronic health record system, at the participating organization, that sends, receives, finds or uses message content or notices.

Specifications. Specifications provide a standard set of service interfaces that enable the exchange of interoperable health information among the health information exchanges.

Target Health Information Exchange. The Health Information Exchange or eHealth Exchange Node that the message or feedback is being addressed.

The Sequoia Project. An organization that manages the nationwide network formerly known as Nationwide Health Information Network now called eHealth Exchange, which uses a set of standards, services and policies that enable secure health information exchange over the Internet.

Transactional Basis. The transmission of message content or a notice within a period of time of receiving message content or notice from a sending or receiving party as may be further set forth in a specific exhibit.

Transitions of Care. The movement of a patient from one setting of care (e.g., hospital, ambulatory primary care practice, ambulatory specialty care practice, long-term care, rehabilitation facility) to another setting of care and can include transfers within a healthcare organization.

Trusted Data Sharing Organization (TDSO). An organization that has signed any form of agreement with Michigan Health Information Network Shared Services for data sharing.

Use Case. (a) A use case agreement previously executed by a participating organization; or (b) the use case summary, use case exhibit and a use case implementation guide that participating organization or Trusted Data Sharing Organization must follow to share specific message content with the Michigan Health Information Network Shared Services.

Use Case Exhibit. The legal agreement attached as an exhibit to the master use case agreement that governs participation in any specific use case.

Use Case Implementation Guide (UCIG). The document providing technical specifications related to message content and transport of message content between participating organization, Michigan Health Information Network Shared Services, and other Trusted Data Sharing Organizations. Use case implementation guides are made available via URLs in exhibits.

Use Case Summary. The document providing the executive summary, business justification and value proposition of a use case. Use case summaries are provided by Michigan Health Information Network Shared Services (MiHIN) upon request and via the MiHIN website at https://mihin.org/use-case-factory/.

View Download Transmit (VDT). A requirement for Promoting Interoperability with the objective to provide patients with the ability to view online, download and transmit their health information within a certain period of the information being available to an eligible professional.

1. Introduction

1.1 Purpose of Use Case

This document defines two RESTful API (Application Programming Interface) methodologies that can be used to create and update providers and organizations within the Health Directory. This interface adopts the terminology and semantics of a subset of the Health Level Seven® (HL7®) Fast Healthcare Interoperability Resources (FHIR®) standard for its FHIR API as well as outlining use of the standard Salesforce REST API. References to resources defined by the FHIR standard and adopted by this API are included.

> *The Health Directory use case allows participating organizations to manage information regarding healthcare professionals – utilizing a centralized directory service – to allow health professionals to efficiently share health information.*

1.2 Message Content

For this use case, message content means healthcare provider and healthcare organization data.
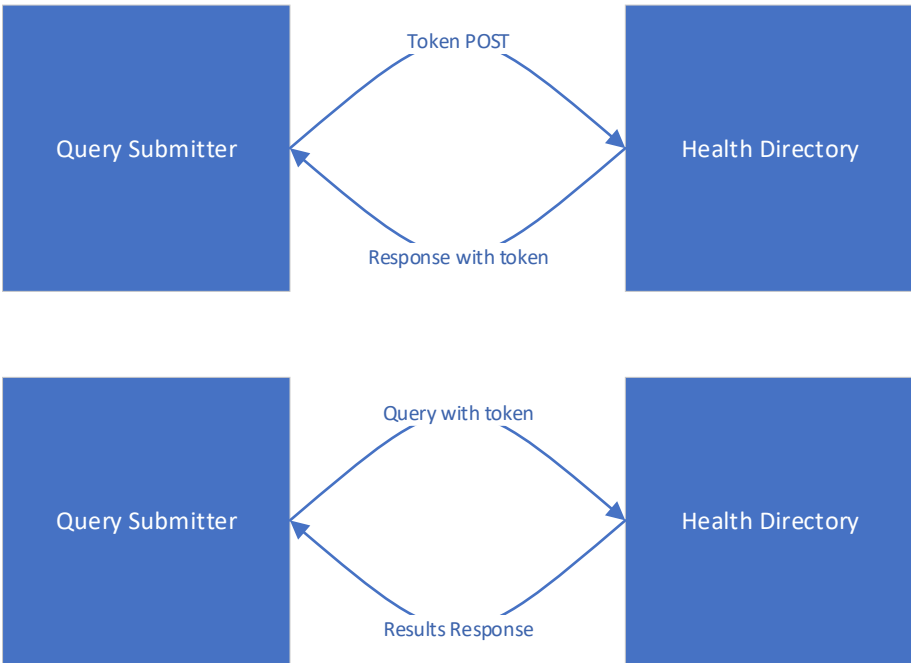
1.3 Data Flow and Actors

Figure 1. API Data flow

1. *Initiator obtains token through POST command.*
2. *Initiator sends query with token through GET command.*
3. *System returns query results in response.*

For more information about this use case, refer to the documents linked below.

1.3.1 Use Case Summary

The use case summary is available online at https://mihin.org/wp-content/uploads/2016/09/MiHIN-UCS-Submit-Data-to-HPD-PUBLISHED-v11-9-16-15.pdf.

You can contact Michigan Health Information Network Shared Services (MiHIN) at help@mihin.org for more information.

2 Standard Overview

2.1 Message Format

For message formatting using the Salesforce standard REST API see the Quick Start Guide in *Appendix A.*

2.2 Message Example

For message examples using the Salesforce standard REST API see the Quick Start Guide in *Appendix A.*

3 Onboarding Process

3.1 Initial Onboarding

For organizations to share data with MiHIN under this use case, the organization undergoes two onboarding processes simultaneously. The two onboarding processes are legal onboarding and technical connectivity onboarding. These may occur in parallel – i.e., the organization can review and complete legal agreements with MiHIN while simultaneously establishing and testing technical connectivity. To initiate these two parallel onboarding processes, notify MiHIN via http://mihin.org/requesthelp/.

3.1.1 Initial Legal Process

The first time an organization undergoes the legal onboarding process with MiHIN, the organization negotiates and enters into a master organization agreement and master use case agreement which then allows the organization to enter into one or more use cases via use case exhibits.

Once an organization has entered into a master organization agreement, the organization can enter into an unlimited number of use cases with MiHIN. All of MiHIN's use cases are available at https://mihin.org/use-case-factory/.

3.1.2 Initial Technical Connectivity Process

The following steps describe the technical onboarding process. However, MiHIN typically conducts "onboarding kickoff" meetings with new organizations to go through each of these steps in detail and answer any questions.

1. The organization selects one or more supported transport methods and establishes connectivity with MiHIN. This step varies based on the method selected.
2. Test messages are sent by the organization to MiHIN.

4 Specifications

4.1 Message Trigger Events

Queries are initiated by the submitter. Triggers are not defined by MiHIN.

4.2 General Message Requirements

Salesforce REST API

Documentation on the Salesforce REST API can be found at:
https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/.

FHIR API Resources

As explained on the HL7® website page regarding the definition of resources:

> "*Resources represent granular clinical concepts. The resources can be managed in isolation or aggregated into complex documents. This flexibility offers coherent solutions for a range of interoperability problems. The simple direct definitions of the resources are based on thorough gathering of requirements, formal analysis and extensive cross-mapping to other relevant standards.*
>
> *Each resource carries a master ID. The ID is never changed or reused, and it identifies the resource permanently. Resources may refer to other resources by ID knowing that this is a stable reference. Each resource has a URL which is derived from the ID, the type, and the local base URL. Given one resource address, the address of any other resource can be automatically determined.*
>
> *Resources contain references to other resources. While each resource can be read and/or changed without explicit reference to these other resources, the presence of these references influences the behavior of the system - implementations are required to maintain system and data integrity at all times.*
>
> *Each resource supports the same list of transactions - read, update, delete, etc. One particularly important transaction supported by every resource type is the provision of a conformance statement which specifies what parts of the defined content model are supported by the system, and what other transactions or interactions are supported. If any of the other interactions are supported, the conformance interaction must be supported. (i.e., if the conformance interaction returns an error, no operations are supported).*"[1]

The sections below define resources supported by this API, their supported data fields and how these fields are mapped to the Health Directory data model.

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[1] "Resources," *HL7*, accessed on October 7, 2016, http://wiki.hl7.org/index.php?title=Resource

4.3 Specific Segment and Field Definitions

4.3.1 Segment 1 – Organization

"A formally or informally recognized grouping of people or organizations formed for the purpose of achieving some form of collective action. Includes companies, institutions, corporations, departments, community groups, healthcare practice groups, etc." [2]

The following fields are supported by this API:

- **id** – [0..1] Inherited from Resource. The Organization.ID
- **name** – [1..*] Organization Name related objects
- **type** – [0..1] Organization.Type *(See section for Health Directory Supported Codings below.)*
- **identifier** – [0..*] Organization Identifier related objects
- **address** – [0..*] Organization Address related objects
- **telecom** – [0..*] Organization Telephone, Email, Website

Practitioner

"A person who is directly or indirectly involved in the provisioning of healthcare."[3]

The MiHIN data model uses the term "Provider" which maps to the FHIR resource "Practitioner." The following fields are supported by this API:

- **id** – [0..1] The Contact ID (Providers are a record type of Contact)
- **name** – [1..*] Provider Name related objects
- **active** – [0..1] Provider.Status
- **gender** – [0..1] Provider.Gender
- **birthdate** – [0..1] Provider.Birthdate
- **identifier** – [0..*] Provider Identifier related objects
- **telecom** – [0..*] Provider.Telephone, Email
- **address** – [0..*] Provider Address related objects
- **qualification** – [0..*] Provider Credential related objects

Bundle

"A container for a collection of resource."[4]

The following fields are supported by this API:

- **type** – [1..1]
- **entry** – [1..*]

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[2] "Organization," HL7, accessed December 2, 2019,
http://www.hl7.org/implement/standards/fhir/organization.html
[3] "Resource Practitioner – Content," HL7, accessed December 5, 2019,
http://www.hl7.org/implement/standards/fhir/practitioner.html
[4] "Resource Bundle – Content," HL7, accessed December 5, 2019,
http://www.hl7.org/implement/standards/fhir/bundle.html

FHIR Resource Extensions

This API supports the following classes that augment and extend the current set of FHIR Resources. They closely model the current Health Directory artifacts and are required to support the current Health Directory Use Case. These new resources have been submitted to the FHIR development process in the hope that they can be incorporated into that standard at some point in the future.

Organization

The following new fields extend the standard definition of Organization (as noted above). These fields are implemented using the FHIR Extensibility mechanism:[5]

- **service** – [0..*] References to ElectronicServices are encoded as Extensions with the MIHIN_ELECTRONIC_SERVICE_URL = http://mihin.org/fhir/extension/electronic-service
- **taxonomy** – [0..*] Organization Specialty related objects are encoded as Extensions with the MIHIN_*TAXONOMY*_URL = http://mihin.org/fhir/extension/taxonomy
- **qualification** – [0..*] Organization Credential related objects are encoded as Extensions with the MIHIN_QUALIFICATION_URL = http://mihin.org/fhir/extension/qualification

Practitioner

This API supports the United States Realm FHIR Profile[6] extensions to encode optional race, ethnicity and religion attributes. If a Direct email is encoded in a telecom associated with the Practitioner, this will have the effect of adding/updating an appropriate ElectronicService in the "service" field described below. The following new fields also extend the standard definition of Practitioner as noted above. These fields are implemented using the FHIR Extensibility mechanism:

- **service** – [0..*] References to ElectronicServices are encoded as Extensions with the MIHIN_ELECTRONIC_SERVICE_URL = http://mihin.org/fhir/extension/electronic-service
- **taxonomy** – [0..*] Provider Specialty related objects are encoded as Extensions with the NUCC_*TAXONOMY*_URL= http://nucc.org/taxonomy

Membership

A Membership denotes a formal relationship between a Practitioner or Organization and another Organization in which the member participates or has participated. These fields

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[5] "1.17.0 Extensibility," *FHIR,* accessed on October 7, 2016, http://www.hl7.org/implement/standards/fhir/extensibility.html

[6] "United States Realm FHIR Profile," *FHIR*, accessed on October 7, 2016, http://www.hl7.org/implement/standards/fhir/us-core.html

are implemented using the FHIR Extensibility mechanism as instances of the FHIR Basic resource.[7]

- **id** – [0..1] Inherited from Resource. The ID of the Membership
- **code** – [1..1] A CodeableConcept that includes the MIHIN_MEMBERSHIP_URL Coding
- **extensions** – This Basic resource is further extended with Extensions having the MIHIN_MEMBERSHIP_URL with the field name appended and separated by a period.
  - **type** – [1..1] A CodeableConcept that denotes the type of the membership. See Organization Membership Types and Practitioner Membership Types, below.
  - **owner** – [1..1] A Reference to an Organization that has the members
  - **member** – [1..1] A Reference to a Practitioner or Organization
  - **identifier** – [0..1] An Identifier by which the member is known to the Organization
  - **service** – [0..*] References to ElectronicServices
  - **period** – [0..1] A Period that defines the effective dates of this membership

ElectronicService

ElectronicServices represent the information required to securely transmit protected health information from one system to another system electronically. These fields are implemented using the FHIR Extensibility mechanism as instances of the FHIR Basic resource[8].

- **id** – [0..1] Inherited from Resource. The Electronic_Service__c.ID
- **code** – [1..1] A CodeableConcept that includes the MIHIN_ELECTRONIC_SERVICE_URL Coding
- **extensions** – This Basic resource is further extended with Extensions having the MIHIN_ELECTRONIC_SERVICE_URL with the field name appended and separated by a period.
  - **name** – [1..1] A plain text *string* name of the service
  - **managingOrganization** – [0..1] A Reference to the Organization that manages this endpoint (may not be the Organization that exposes the endpoint)
  - **destination** – [0..*] A list of CodeableConcepts that denote the MiHIN service use cases for which this ElectronicService is a destination. See Service Destination Types, below.
  - **content** – [1..*] A list of CodeableConcepts that denote the content data types consumed by this service (i.e. delivery preferences). See Content Profile Types, below.
  - **integration** – [1..1] A CodeableConcept that denotes the networking protocol expected by this service. See Integration Profile Types, below.
  - **address** – [1..1] A string denoting the service's delivery address (Direct email, IP, logical address)

[7, 8] "6.3 Resource Basic – Content," *FHIR*, accessed on October 7, 2016, http://www.hl7.org/implement/standards/fhir/basic.html

Data Types

"The FHIR specification defines a set of data types that are used for the resource elements. There are two categories of data types: simple/primitive types, which are single elements, and complex types, which are re-usable clusters of elements."[9]

Identifier

"A numeric or alphanumeric string that is associated with a single object or entity within a given system. Typically, identifiers are used to connect content in resources to external content available in other frameworks or protocols. Identifiers are associated with objects and may be changed or retired due to human or system process and errors."[10]

The following fields are supported by this API:

- **id** – [0..1] Required for **update**, optional for **read**, not allowed for **create**
- **use** – [1..1] usual | official | temp | secondary
- **type** – [0..1] Usually optional. See http://www.hl7.org/implement/standards/fhir/datatypes.html#identifier
- **system** – [1..1] The namespace for the Identifier. See Health Directory Identifier Systems, below
- **value** – [1..1] The value that is unique
- **period** – [0..1] The time period when the Identifier is/was valid for use. Represented by the fields Organization|Provider_Identifier__c.Start_Date__c and ...End_Date__c

Address

"A postal address. There are a variety of postal address formats defined around the world. Postal addresses are often also used to record a location that can be visited to find a patient or person."[11]

This API also supports the United States Realm FHIR Profile extensions to encode *county* information in addresses. The following fields are supported by this API:

- **id** – [0..1] Required for **update**, optional for **read**, not allowed for **create**
- **use** – [1..1] Organization|Provider_Address__c.Use__c
- **type** – [1..1] Organization|Provider_Address__c.Type__c

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[9] "Data Types," HL7, accessed on December 5, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html
[10] "Data Types – Identifier," HL7, accessed on December 5, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html#Identifier
[11] "Data Types – Address," HL7, accessed on December 5, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html#Address

- **line** – [0..3] Organization|Provider_Address__c.StreetAddress_i__c
- **city** – [1..1] Organization|Provider_Address__c.City__c
- **district** – [0..1] Organization|Provider_Address__c.County__c
- **state** – [1..1] Organization|Provider_Address__c.State__c
- **postalCode** – [1..1] Organization|Provider_Address__c.Postal_Code__c
- **period** – [0..1] The time period when the Address is/was valid for use. Represented by the fields Organization|Provider_Address__c.Start_Date__c and ...End_Date__c

CodeableConcept

"A CodeableConcept represents a value that is usually supplied by providing a reference to one or more terminologies or ontologies, but may also be defined by the provision of text. This is a common pattern in healthcare data."[12]

This API restricts CodeableConcepts to a representation containing a single, required Coding. The following fields are supported by this API:

- **coding** – [1..1] Code defined by a terminology system
- **text** – [0..1] Plain text representation of the concept

Coding

"A Coding is a representation of a defined concept using a symbol from a defined "code system."[13] See Using Codes in Resources.[14]

The following fields are supported by this API:

- **system** – [1..1] Identity of the terminology system
- **code** – [1..1] Symbol in syntax defined by the system
- **display** – [0..1] Representation defined by the system

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[12] "Data Types – CodeableConcept," HL7, accessed on December 5, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html#CodeableConcept
[13] "Data Types – Coding," HL7, accessed on December 5, 2019.
[14] "Using Codes in Resources," HL7, accessed on December 5, 2019, http://www.hl7.org/implement/standards/fhir/terminologies.html

ContactPoint

"Details for all kinds of technology-mediated contact points for a person or organization, including telephone, email, etc."[15]

This API also supports the United States Realm FHIR Profile extensions to encode the *direct* flag indicating that a particular email address can be used with the Direct protocol. The following fields are supported by this API:

- **system** – Required
- **value** – Required
- **use** – Required
- **rank** – Optional
- **period** – Optional

HumanName

"A name of a human with text, parts and usage information."[16]

The following fields are supported by this API:

- **use** – Required
- **prefix** – Optional
- **given** – Required
- **family** – Required
- **suffix** – Optional

Period

"A time period defined by a start and end date/time."[17]

The following fields are supported by this API:

- **start** – (Optional) If not present Period has been ongoing
- **end** – (Optional) If not present Period is ongoing

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[15] "Data Types – ContactPoint," HL7, accessed on December 5, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html#ContactPoint

[16] "Data Types – HumanName," HL7, accessed on December 6, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html#HumanName

[17] "Data Types – Period," HL7, accessed on December 6, 2019, http://www.hl7.org/implement/standards/fhir/datatypes.html#Period

Health Directory Supported Codings

The following Codings represent the vocabulary used for CodeableConcepts used in this API:

Organization Types

These Codings are used to denote the types of Organizations supported by this API.

- **system =** "http://mihin.org/fhir/organization/type"
- **code =** {ACO, Association, Clinic, Department, HIE, Hospital, Lab, Long Term Care Facility, Medical School, Payer, Pharmacy, PO, Practice, University, Other}
- **display =** (type if code = Other)

Organization Affiliation Types

These Codings are used to denote the types of Organization Affiliations supported by this API.

- **system =** "http://mihin.org/fhir/organization/affiliation/type"

Code	Display	Text
PO	Part Of	A part of the organization
MO	Member Of	A member of the organization
SP	Service Provider To	A service provider to the organization

Practitioner Affiliation Types

These Codings are used to denote the types of Practitioner Affiliations supported by this API.

- **system =** "http://mihin.org/fhir/practitioner/affiliation/type"

Code	Display	Text
EB	Employed By	Employed by the organization
MO	Member Of	A member of the organization
PI	Practices In	Practices in the organization
HAP	Has Admitting Privileges	Has admitting privileges in the organization

Service Destination Types

These Codings are used to denote the types of Service Destinations supported by this API.

- **system =** "http://mihin.org/fhir/service/destination-type"

Code	Display	Text
TOC	Transitions of Care	MiHIN Transitions of Care Service
MEDREC	Medication Reconciliation	MiHIN Medication Reconciliation Service
ACRS	Active Care Relationships	MiHIN Active Care Relationships Service
CAT-1	CAT-1 eCQM Reporting	MiHIN CAT-1 eCQM Reporting Service
CAT-3	CAT-3 eCQM Reporting	MiHIN CAT-3 eCQM Reporting Service

Content Profile Types

These Codings are used to denote the types of content profiles supported by this API: HL-7 ADT message types and LOINC codes. See Known Code Systems[18] for additional details.

- **system =** "http://hl7.org/fhir/ValueSet/v2-0354"
- **code =** See "http://hl7-fhir.github.io/v2/0354/index.html"

Integration Profile Types

These Codings are used to denote the types of Integration Profiles supported by this API.

- **system =** "http://mihin.org/fhir/service/integration-type"
- **code =** {Direct SMTP, LLP, Other}
- **display =** (type if code = Other)

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[18] "1.25.1.0 Known Code Systems," FHIR, accessed on October 10, 2016, http://www.hl7.org/ implement/ standards/fhir/terminologies-systems.html

Health Directory Identifier Systems

This is a list of the Identifier systems that have been defined for this API. Links to more information for these identifier systems are available by clicking on the Identifier name:

- NPI: Assigned by the National Plan and Provider Enumeration Service
- Social Security Number: Assigned by the US Social Security administration
- Medicare: Assigned by US Medicare
- Medicaid: Assigned by US Medicaid
- OID: Assigned by HL7
- HSTR OID: Defined by Michigan Department of Health and Human Services (MDHHS)
- StarLIMS: Assigned by Michigan MDHHS
- Blood Spot: Assigned by Michigan MDHHS
- Blood Lead: Assigned by Michigan MDHHS
- Common Key Service: Assigned by MiHIN's Common Key Service

5 Troubleshooting

5.1 Production Support

	Severity Levels			
	1	*2*	*3*	*4*
Description	*Critical Impact/ System Down:* Business critical software is down or critical interface has failed. The issue is impacting all production systems, causing all participating organizations' or other organizations' ability to function to be unusable.	*Significant Business Impact:* Software component severely restricted. Entire organization is unable to continue business functions, causing all communications and transfer of messages to be halted.	**Partial Failure or Downtime:** Program is useable and less significant features unavailable. The service is online, though may not working as intended or may not currently working as intended or may not currently be accessible, though other systems are currently available.	**Minimal Business:** A non-critical software component is malfunctioning, causing minimal impact, or a test system is down.
Example	All messages to and from MiHIN are unable to be sent and received, let alone tracked	MiHIN cannot communication (send or receive) messages between single or multiple participating organizations but can still successfully communicate with other organizations.	Messages are lost in transit; messages can be received but not sent.	Additional feature requested.
Primary Initiation Method	*Phone:* 517-336-1430	*Phone:* 517-336-1430	Web form at https://mihin.org/request help/	Web form at https://mihin.org/request help/
Secondary Initiation Method	Web form at https://mihin.org/request help/	Web form at https://mihin.org/request help/	Email to help@mihin.org	Email to help@mihin.org
Tertiary Initiation Method	Email to help@mihin.org	Email to help@mihin.org	N/A	N/A
Initial Response	Within 2 hours	Within 2 hours	1 business day	1 business day
Resolution Goal	24 hours	24 hours	3 business days	7 business days

If you have questions, please contact the MiHIN Help Desk:

- https://mihin.org/requesthelp/
- Phone: 517-336-1430
- Monday – Friday 8:00 AM – 5:00 PM (Eastern Standard Time)

6 Legal Advisory Language

This reminder applies to all UCEs or PAEs covering the exchange of electronic health information:

The data sharing agreement establishes the legal framework under which PO can exchange messages through the MiHIN Platform, and sets forth the following approved reasons for which messages may be exchanged:

a. By health care providers for Treatment, Payment and/or Healthcare Operations consistent with the requirements set forth in HIPAA;
b. Public health activities and reporting as permitted by HIPAA and other Applicable Laws and Standards;
c. To facilitate the implementation of "promoting interoperability" criteria as specified in the American Recovery and Reinvestment Act of 2009 and as permitted by HIPAA;
d. Uses and disclosures pursuant to an Authorization provided by the individual who is the subject of the Message or such individual's personal representative in accordance with HIPAA;
e. By Data Sharing Organizations for any and all purposes, including but not limited to pilot programs and testing, provided that such purposes are consistent with Applicable Laws and Standards; and
f. **For any additional purposes as specified in any UCE or PAE, provided that such purposes are consistent with Applicable Laws and Standards**.

Under these agreements, "*Applicable Laws and Standards*" means all applicable federal, state, and local laws, statutes, acts, ordinances, rules, codes, standards, regulations and judicial or administrative decisions promulgated by any governmental agency, including the State of Michigan, or the Michigan Health Information Technology Commission as any of the foregoing may be amended, modified, codified, reenacted, promulgated or published, in whole or in part, and in effect from time to time which is enforceable against a Party. Without limiting the generality of the foregoing, "Applicable Laws and Standards" includes HIPAA "; the federal Confidentiality of Alcohol and Drug Abuse Patient Records statute, section 543 of the Public Health Service Act, 42 U.S.C. 290dd-2, and its implementing regulation, 42 CFR Part 2; the Michigan Mental Health Code, at MCLA §§ 333.1748 and 333.1748a; and the Michigan Public Health Code, at MCL § 333.5131, 5114a.

It is each PO's obligation and responsibility to ensure that it is aware of Applicable Laws and Standards as they pertain to the content of each message sent, and that its delivery of each message complies with the Applicable Laws and Standards. This means, for example, that if a UCE is directed to the exchange of physical health information that may be exchanged without patient authorization under HIPAA, the PO must not deliver any message containing health information for which an express patient authorization or consent is required (e.g., mental or behavioral health information).

Disclaimer: The information contained in this implementation guide was current as of the date of the latest revision in the Document History in this guide. However, Medicare and Medicaid policies are subject to change and do so frequently. HL7 versions and formatting are also subject to updates. Therefore, links to any source documents have been provided within this guide for reference. MiHIN will apply its best efforts to keep all information in this guide up-to-date. It is ultimately the responsibility of the Participating Organization and Sending Facilities to be knowledgeable of changes outside of MiHIN's control.

Appendix A

Health Directory Standard REST API Quick Start Guide

MiHIN PD REST API
quick start v4 08-27-