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National eHealth Strategy and Change Management Office  
(SCMO)

Enabling Standards-Based eHealth Interoperability

IS0002

Saudi eHealth Core Interoperability Specification for KSA-Wide Healthcare  
Provider Directory Query

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Wide Healthcare Provider Directory Query

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# 1. INTRODUCTION

## 1.1 DOCUMENT PURPOSE

The purpose of this document is to address the Saudi eHealth Core Interoperability Specification for the Healthcare Provider Directory Query Use Case. It forms a set of requirements that complements the set of IHE Profiles, HL7 and SNOMED CT® Standards required by this specification with Saudi eHealth specific constraints. It also aligns with the Saudi e-Government Interoperability Standards (YEFI) to expedite national adoption.

This Interoperability Specification is applicable to existing and new information systems to be connected to the national Saudi eHealth Exchange (SeHE) System.

## 1.2 DESCRIPTION

This Core Interoperability Specification describes the capability to locate Healthcare Providers' and Organizations' communication, association, identifier, and credential details by querying a directory. This service is accessible to point of care clinical information systems, and to MOH Business Applications, providing authoritative, timely and accurate information for effective provider identification and communications. This information describes organizations that provide patient care, such as public and private hospitals, primary care centers, laboratories, pharmacies, etc. It is used by these organizations and by the MOH Business Applications.

## 1.3 SCOPE

### **In Scope:**

The scope of this document is the specification of the content and structure of the Saudi eHealth Healthcare Provider Directory services in support of the Healthcare Provider Directory Query Use Case. This service supports searches for providers and organizations and conveys authoritative attributes related to them.

### **Out-Scope:**

The following is a list of content and specifications that are specifically out of scope for this Interoperability Specification:

- While the Use Case describes a provider directory query in the context of a patient referral, the specification of the referral document and associated transactions for a referral are not in scope for this Core Interoperability Specification.
- The interfaces and processes involved in populating the Healthcare Provider Directory are similarly also out of scope. The Healthcare Provider Directory contains only limited employee information associated with an organization as profiled by the IHE Healthcare Provider Directory (HPD) profile.

## 1.4 METHODOLOGY

This Interoperability Specification has been developed with input from various Saudi stakeholders collected during several months through workshops and teleconferences with the Saudi Council for Health Specialties (SCHS) and MOH. These organizations are responsible for managing information that will serve as the primary sources to populate the Provider Directory. This methodology was informed by ISO TR 28380 Health Informatics - IHE Global Standards Adoption– Part 1: Process.

The development of a Core Interoperability Specification relies on the high-level requirements set by the associated use case. These high-level requirements are not restated in this specification and readers may consider reviewing the related Use Case document.

## 1.5 HOW TO READ THIS DOCUMENT

### 1.5.1 Where to Find Information

This document contains four normative sections, as well as informative appendices for your convenience. The document is structured as follows:

**Section 1:** Contains an introduction to the Interoperability Specification (IS). This section contains a summary of the IS purpose and scope, as well as other content to help orient the first time reader to the topic of the IS and how it relates to other specifications in the SeHE System.

**Section 2:** Describes the Use Case, including design constraints and assumptions and the flows of information that will be specified in this IS. Section 2 also introduces scenarios that describe how the specified flows may be used in the Saudi eHealth context.

**Section 3:** Establishes the Core Interoperability Requirements for the Interoperability Specification

**Section 4:** Describes Saudi eHealth specific constraints for implementing the IHE HPD profile

**Section 5:** Describes the related Saudi eHealth Interoperability Specifications, as well as the international standards which underpin this Interoperability Specification.

**Appendix A:** Illustrates sample documents and queries to be used with HPD

### 1.5.2 Related Documents

The Saudi eHealth Interoperability Core Specification (IS) is the sole entry point for the technology developers, the compliance assessment testing and certification, and the purchaser of IT systems in terms of technical requirements.

It references a number of supporting Interoperability Specifications:

- IS0101 *Saudi eHealth Security and Privacy Interoperability Specification*
- IS0200 Saudi eHealth Terminology Repository.

This document fits into an overall specification framework described in

## **2. FIGURE 1.5-1 SAUDI EHEALTH CORE INTEROPERABILITY SPECIFICATION FOR HEALTHCARE PROVIDER DIRECTORY QUERY DOCUMENT ORGANIZATION. FURTHER DESECRPTIONS AND REFERENCES FOR THE DOCUMENTS IDENTIFIED BELOW ARE PROVIDED IN SECTION 5: SAUDI EHEALTH CONSTRAINTS ON THE IHE HPD PROFILE**

This Section specifies Saudi eHealth extensions and constraints to the IHE Healthcare Provider Directory (HPD) Profile. The reader not familiar with the IHE HPD integration profile and transactions should review IHE ITI HPD Trial Implementation Supplement (See Section 5).

### **2.1 REQUIREMENTS FOR PROVIDER INFORMATION QUERY REQUEST ATTRIBUTES – PROVIDER INFORMATION CONSUMER ACTOR**

This transaction does not limit any restriction on the search scope, size limit, time limit or list of attributes. If needed, those can be constrained by the Provider Information Directory actor implementer.

### **2.2 BEHAVIOR RULES FOR THE PROVIDER INFORMATION CONSUMER ACTOR**

[KHPD-045] - Implementations of the Provider Information Consumer Actor **SHALL** support the return of at least 50 matching directory entries.

### **2.3 REQUIREMENTS FOR THE HPD PROVIDER DIRECTORY SCHEMA STRUCTURE**

[KHPD-011] The directory naming context **SHALL** be c=SA, o=SeHE, dc=HPD

#### **2.3.1 HPDProvider Optional Attributes**

1. [KHPD-012] Retired
2. [KHPD-013] Retired
3. [KHPD-014] hpdProviderBillingAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value, and the "KSA City", and "KSA Postal Code" value sets.
4. [KHPD-015] hpdProviderMailingAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value set, and the "KSA City", and "KSA Postal Code" value sets.
5. [KHPD-016] hpdProviderPracticeAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value set , and the "KSA City", and "KSA Postal Code" value sets
6. [KHPD-017] hpdCredential **SHALL** minimally support expression of University credentials with associated attributes: University, College, Country, and Date



### 2.3.2 HPDProviderCredential Mandatory Attributes

7. [KHPD-018] credentialType **SHALL** minimally support expression of the credential to reflect the individual provider University, College, Country, and date of the degree

### 2.3.3 HPDProviderCredentialOptional Attributes

8. No Further constraints

### 2.3.4 HCProfessionalAttributes

9. [KHPD-019] uid **SHALL** be populated as a Unique ID = Issuing Authority Identifier : National Professional/Orgnaizational Identifier, where the Issuing Authority Identifier is:

- 2.16.840.1.113883.3.3731.1.2.4 as the OID representing SeHE and the National Professional Identifier issued by the Provider Information Directory Actor.
- 2.16.840.1.113883.3.3731.1.2.6 as the OID representing SeHE and the National Organizational Identifier issued by the Provider Information Directory Actor.

10. [KHPD-020] hcIdentifier **SHALL** minimally include two instances reflecting the provider Professional ID and the National ID of the provider. Those two values shall conform to the IHE specifications that means that they are structured as colon-delimited strings.

- a) The provider license **SHALL** be populated as hcidentifier = <Issuing Authority Identifier>:<Type>:<National Professional Identifier>:<Status>, where Issuing Authority Identifier = 2.16.840.1.113883.3.3731.1.2.1 as the OID representing SCHS as the issuing authority for National Professional Identifiers, where the National/Regional Professional Identifier is the provider License Number.

Type **SHALL** be populated with "KSA Individual Provider Type" value set code.

Status **SHALL** be populated with the status of the provider credential and **SHALL** minimally support the code in the "KSA License Status" value set.

- b) The national ID of the provider **SHALL** be populated as hcIdentifier = <Issuing Authority Identifier>:<Type>:<National Identifier>:<Status>, where Issuing Authority is **SHALL** one of the following National ID Issuing Authorities:

- Citizen's ID - 2.16.840.1.113883.3.3731.1.1.100.2
- Iqama Identifier - 2.16.840.1.113883.3.3731.1.1.100.3
- Border Control ID - 2.16.840.1.113883.3.3731.1.1.100.5

Note: The OID referenced is the same as the OID specified by IS0001 Saudi eHealth Core Interoperability Specification for KSA-Wide Patient Demographic Query. Only the subset of possible issuing authorities listed above is allowable for healthcare provider identifiers.

The National Identifier is a national identifier number issued by the above authority Type **SHALL** be populated with a static value of 'NationalID'.

Status **SHALL** be populated with the status of the provider National/Regional and **SHALL** be set to 'Registered'

11. [KHPD-021] hcProfession **SHALL** minimally support expression of the credential to reflect the individual provider license type such that

credentialName@organization\_domain\_name and such that credentialName SHALL minimally support the Saudi print name associated with the "KSA Individual Provider Type" value set and organization\_domain\_name = 2.16.840.1.113883.3.3731.1.2.1 as the OID representing SCHS

12. [KHPD-022] Provider type SHALL be populated with "KSA Individual Provider Type" value set, and description SHALL be populated with the Saudi print name corresponding to the "KSA Individual Provider Type" value set.
13. [KHPD-022] Provider type SHALL be populated with "KSA Individual Provider Type" value set, and description SHALL be populated with the Saudi print name corresponding to the "KSA Individual Provider Type" value set.

The human readable text and the coded value SHALL be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority SHALL be "SCHS".
- Code System SHALL be the Coding System identifier (OID)
- Code SHALL be the Concept Code.
- CodeDisplayName SHALL be the Saudi Print Name

13. [KHPD-023] hpdProviderStatus SHALL be populated with the status of the provider credential and SHALL minimally support the code in the "KSA License Status" value set to reflect this status. The hpdProviderStatus SHALL be set to "Temporary" for visiting providers.

The human readable text and the coded value SHALL be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority SHALL be "SCHS".
- Code System SHALL be the Coding System identifier (OID)
- Code SHALL be the Concept Code.
- CodeDisplayName SHALL be the Saudi Print Name

14. [KHPD-024] displayName SHALL be populated with the legal name of the provider as recorded by the Ministry of Interior (MOI). This SHALL be structured as:

- First name
- Second name
- Third name
- Family name

All names are mandatory except the third name which may be absent. Names in both Arabic and English are mandatory for all nationalities.

15. [KHPD-025] hcSpecialisation **SHALL** minimally support the "KSA Provider Specialty" value set. This **SHALL** include an instance of the human readable text and the coded value that can be used for machine processing. The human readable text **SHALL** use Saudi Print Name.

The human readable text and the coded value **SHALL** be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority **SHALL** be "SCHS".
- Code System **SHALL** be the Coding System identifier (OID)
- Code **SHALL** be the Concept Code.
- CodeDisplayName **SHALL** be the Saudi Print Name

16. [KHPD-026] hpdProviderLanguageSupported contains the languages that the provider supports. The Language **SHALL** use the code from the "Language" value set. This **SHALL** minimally include indication of at least one of "Arabic", or "English" or both "Arabic" and "English". Other language values **MAY** be used, provided a secure mechanism allows for the management of additional languages. The format of this attribute is constrained as defined by IHE HPD for hpdProviderLanguageSupported

17. [KHPD-027] gender **SHALL** be populated using the "KSA Gender" value set.

18. [KHPD-028] Access to personal e-mail address, reflected in mail attribute **SHALL** be restricted to authorized entities.

19. [KHPD-046] The used email address format **SHALL** be restricted to this pattern [0-9A-Za-z\.\-\_{1,127}@[0-9A-Za-z\.\-\_{1,127}

20. [KHPD-029] hpdProviderPracticeAddress

- **SHALL** implement Postal Code, PO Box, City, and Country using the "Country" value set, and the "KSA City", and "KSA Postal Code" value sets
- **SHALL** be Mandatory for Saudi Citizens only
- Multiple addresses **MAY** be included
- Inactive addresses **MAY** be included

21. [KHPD-030] hpdProviderMailingAddress  
See Requirement [KHPD-015].

22. [KHPD-031] hpdCredential **SHALL** support University credentials with associated attributes:

- University
- College
- Country
- Date

23. [KHPD-032] KSAHPDProvider Object Class **SHALL** extend the HPDProvider Object Class to add the Category attribute.  
 Category **SHALL** be included and **SHALL** include the Saudi Print Name and corresponding coded value as recorded by SCHS and mapped to standard codes in "KSA Provider Category" value set.
24. [KHPD-033] KSAHPDProvider Object Class **SHALL** extend to the HPDProvider ObjectClass to add the following attribute:

Attribute	OID	Description	Syntax	Matching rules	Multi-Valued
HL7Religion	1.0.21091.2.1.16	The HL-7 defined Religion	Directory String	Case Ignore Match, Case Ignore Substrings Match	Yes

HL7Religion **SHALL** include the KSA text and corresponding coded value as mapped to standard codes in the "KSA Religion" value set. Values are maintained in Arabic and English.

25. [KHPD-034] KSAHPDProvider Object Class **SHALL** extend the HPDProvider Object to add the following attribute.

Attribute	OID	Description	Syntax	Matching rules	Multi-Valued
KSANationality	2.16.840.1.113883.3.3731.1.2.5	The KSA Registered Nationality	Directory String	Case Ignore Match, Case Ignore Substrings Match	Yes

Nationality **SHALL** include the text description of the nationality and corresponding coded values in the "Nationality" value set.

### 2.3.5 Organizational Provider Attributes

1. [KHPD-035] –Provider type **SHALL** be populated with "KSA Organizational Provider Type" value set code.

The human readable text and the coded value **SHALL** be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority **SHALL** be "MOH".
  - Code System **SHALL** be the Coding System identifier (OID)
  - Code **SHALL** be the Concept Code.
  - CodeDisplayName **SHALL** be the Saudi Print Name
2. [KHPD-036] –description **SHALL** be populated with the Saudi Print Name corresponding to the coded value in "KSA Organization Provider Type" .
  3. [KHPD-037] –status **SHALL** be populated with the status of the organization and **SHALL** minimally support the "KSA Organization Status" value set codes.
  4. [KHPD-038] HcRegisteredName **SHALL** be populated with the legal Arabic name of the regulated healthcare organization as recorded by the Ministry of Health (MOH), and **SHALL** contain the English name **IF KNOWN**.
  5. [KHPD-039] The ClinicalInformationContactIndividual Role **SHALL** be selected from the "KSA Contact Role" Value Set. The “Patient Relations” role **SHALL** be used for referrals. For patients, the “Director of Patient Relations” **SHALL** be used. For general medical inquiries, the “Medical Director” **SHALL** be used, while for official communication, the “Hospital Director” **SHALL** be used.
  6. [KHPD-040] hpdProviderPracticeAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value set, and the "KSA City", and "KSA Postal Code" value sets.
  7. [KHPD-041] Language, containing the languages that the organization provider supports **SHALL** use the "Language" value set. This **SHALL** minimally include indication of at least one of “Arabic”, “English” or both “Arabic” and “English”. Other language values **MAY** be used, provided a secure mechanism allows for the management of additional languages.
  8. [KHPD-042] HcSpecialisation, when used, **SHALL** minimally support the "KSA Organization Specialty" value set and the "KSA Organization Sub-Specialty" to reflect this specialty of the organization provider.

The human readable text and the coded value **SHALL** be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority **SHALL** be "MOH".
- Code System **SHALL** be the Coding System identifier (OID)
- Code **SHALL** be the Concept Code.
- CodeDisplayName **SHALL** be the Saudi Print Name

9. [KHPD-043] –hcIdentifier **SHALL** be populated with the MOH unique Identification using 2.16.840.1.113883.3.3731.1.2.2 for the OID representing MOH as the issuing authority.

The human readable text and the coded value **SHALL** be structured as three colon delimited strings:

<MOH-OID>:<Provider Type Code>:<Provider SCHS License ID>:<Status Code>

Where: Provider Type Code SHALL be populated with "KSA Individual Provider Type" value set

Status Code SHALL be populated with the status of the provider credential and SHALL minimally support the code in the "KSA License Status" value set.

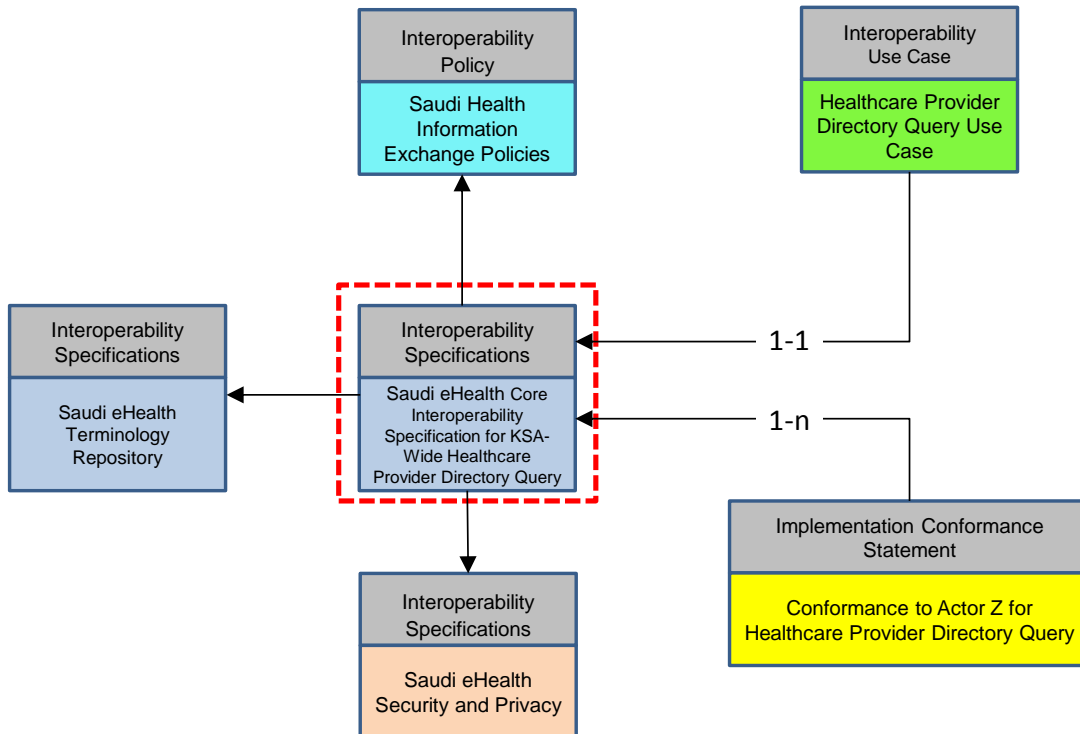
## 2.4 QUERY RESPONSE – PROVIDER INFORMATION DIRECTORY ACTOR

- [KHPD-044] The Provider Information Directory Actor **SHALL** respond only with content and values as maintained in the provider directory. If a value is empty (attribute not valued) or if a value is not implemented, the response encoding **SHALL** follow the IHE HPD Profile requirements.

## 2.5 BEHAVIOR RULES FOR THE PROVIDER INFORMATION DIRECTORY ACTOR

No constraints.

Referenced Documents And Standards.



**FIGURE 1.5-1 SAUDI EHEALTH CORE INTEROPERABILITY SPECIFICATION FOR HEALTHCARE PROVIDER DIRECTORY QUERY DOCUMENT ORGANIZATION**

These Saudi Interoperability Specifications include precise references to internationally adopted profiles and standards as well as Saudi specific requirements.

Implementations are required to conform to the requirements within this Core Interoperability Specification as well as all Saudi eHealth referenced Interoperability Specifications and the standards and profiles they specify.

## **2.5.1 Document Conventions**

### **2.5.1.1 REQUIREMENTS NUMBERING CONVENTIONS:**

All Saudi eHealth Interoperability Specifications contain numbered requirements that follow this format:

- [ABCD-###], where ABCD is a three or four letter acronym unique to that Interoperability Specification for convenient purposes, and ### is the unique number for that requirement within the Interoperability Specification.
- “Where a specific value set or code is required to be used, it can be found in the “IS0200 Saudi eHealth Terminology Repository”. The location and process to access the terminology repository will be specified in mechanisms external to this document.

Saudi eHealth numbered requirements are the elements of the Interoperability Specification that the system can claim conformance to. In other words, in order to implement a system that fully supports the Use Case and Interoperability Specification, the system shall be able to demonstrate that it conforms to every numbered requirement for the system actors to which it is claiming conformance.

Please note that all Saudi eHealth numbered requirements are numbered uniquely, however numbered requirements are not always sequential.

### **2.5.1.2 REQUIREMENTS LANGUAGE**

Throughout this document the following conventions<sup>1</sup> are used to specify requirement levels:

**SHALL:** the definition is an absolute requirement of the specification.

(Note: “SHALL ..... IF KNOWN” means that the tag must be sent. However, if there were no information, then this tag should be sent with a <nullflavor>)

**SHALL NOT:** the definition is an absolute prohibition of the specification.

**SHOULD:** there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

---

<sup>1</sup> Definitions based upon RFC 2119

**SHOULD NOT:** there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

**MAY or OPTION/AL:** means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item.



### 3. USE CASE

This section describes the driving Use Case, including all design constraints and assumptions as well as the flows of information that will be specified in this IS. This section also introduces the scenarios that describe how the specified workflows may be used in the Saudi eHealth context.

#### 3.1 SYSTEM COMPONENTS AND SERVICES

The Use Case Actors and the Services that are used by this Core Interoperability Specification are described at a functional level in the Healthcare Provider Directory Query Use Case document.

Readers that wish to understand the mapping of System Components to real world products are recommended to read this Saudi eHealth Interoperability Use Case document. A summary is provided in the following tables.

*TABLE 3.1-1 USE CASE ACTORS*

ACTOR NAME	DESCRIPTION
Provider Information Directory	Performs the function of processing queries to search for provider individuals and/or organizations based on search criteria received from the Provider Information Consumer actor. It returns matches to the Provider Information Consumer actor.
Provider Information Consumer	Queries the Provider Information Directory Actor indicating search criteria for provider individual and/or organizational information. It receives the query response and makes the returned information available to local applications and users.

*TABLE 3.1-2 SYSTEM COMPONENTS*

SERVICE NAME	DESCRIPTION
Provider Information Query	A service initiated by the Provider Information Consumer that includes search criteria for matching one or more provider individual and/or organizational entities. There may be many types of queries performed using provider's national id, and other information such as location, type of practice, provider role, etc. There are many variants of queries. The Provider Information Supplier responds with information for all provider individuals and/or organizations matching the search provided by the Patient Information Consumer.

#### 3.2 DESIGN CONSTRAINTS AND ASSUMPTIONS

The following design principles underlie this interoperability specification:

- It is expected that all services initiated or provided by these Actors operate in accordance to the Saudi eHealth Information Exchange Polices.
- The Use Case Flow of Events and the additional scenarios provided in Section 3.3 provide workflow assumptions.

- The support for the use of Arabic and Western spellings of names is supported through a ‘fuzzy’ matching process that returns the results of the query. This is required to support translation from Arabic to Western spellings which is not always precise (e.g. Mohammad, Muhammad, Mohamed are typical spellings of the same name in Arabic). The creation, management, and maintenance of the “national healthcare provider directory” are performed using interfaces outside the scope of this interoperability specification.
- Saudi Commission for Health Specialties is responsible for the registration and regulation of healthcare provider licenses. Classifications and terminologies associated with these credentials are reflected in the IS0200 Saudi eHealth Terminology Repository.
- Sponsored Providers in the Kingdom must be registered through the Provider portal by the Healthcare Organization sponsoring their entry.
- The MOH is responsible for the registration and regulation of organizations providing health services for the Ministry of Health and private organizations. Other ministries and agencies may be responsible for their own organization registrations.
- Privacy considerations for Healthcare Provider Directory information **SHALL** conform to the Saudi eHealth Information Exchange Policies.

### 3.3 USE CASE FLOW OF EVENTS

The Saudi eHealth Interoperability Use Case document describes the key workflows that are supported by this Core Interoperability Specification. A brief summary of the Use Case flows are provided below. It is recommended to read the Use Case document for in-depth details.

**Main Flow:** A Provider Information Consumer queries the Provider Information Directory in order to find an individual provider or provider organization location and availability to book a specific service. The Provider Information Directory matches the search criteria and returns the attributes (provider name, specialty, phone numbers, addresses, business contacts, credentials, etc.) for each one of the known matches to the Provider Information Consumer.

#### 3.3.1 Specific Workflow Scenarios

The following sections provide various scenarios that complement the use case flow of events, by using the defined transactions in a specific way. Some of these scenarios highlight variants to the use case flow of events while others describe local workflow situations that are beyond the scope of the use case but consistent with it. These workflow scenarios are not intended to be an exhaustive list.

##### 3.3.1.1 SCENARIO 1: LOOK-UP PROVIDER CONTACT AND SPECIALTY INFORMATION TO SUPPORT PATIENT REFERRAL

A patient is seen in a Primary Health Center. The physician determines that the patient should be seen by a specialist. The Physician uses the Provider Directory to look-up the individual providers and organizations with the appropriate specialty that is in a location convenient to the patient. The provider initiates a patient referral to the selected specialist.

**3.3.1.2 SCENARIO 2: REQUEST OF INFORMATION FROM AN IDENTIFIED PROVIDER**

A patient is visiting Saudi Arabia from another country for an extended period and needs to locate a healthcare provider for management of his chronic condition. The patient uses a SeHE authorized portal to query the directory for the appropriate specialty, location, and supporting his native language.

## 4. CORE INTEROPERABILITY SPECIFICATION REQUIREMENTS

This section establishes the Core Interoperability Requirements for the Interoperability Specification. These requirements are outlined through tables, diagrams and supporting text.

### 4.1 ACTOR MAPPING TO SAUDI EHEALTH IS SPECIFICATIONS

A system conforming to this core interoperability specification shall claim conformance at the level of a Use Case Actor. A system may claim conformance to one or more Use Case Actors. Multiple systems may fulfill a Use Case Actor.

The Use Case Actors and the Services they support are described at a functional level in the Saudi eHealth Interoperability Use Case document. Services may be required, conditional or optional. The Use Case Actor, Service(s) and Optionality are conveyed in the first three columns of Interoperability Conformance Requirement tables shown below.

The second part of the table (columns 4-7) provides the mapping for the Use Case Actor to the detailed specifications (such as IHE Profiles, Technical Actors, Optionality) that systems shall implement to exchange healthcare information in the context of this Use Case.

For a selected Use Case Actor (a single row in the table), all the requirements listed in the second part of the table (columns 4-7) shall be implemented. This includes the referenced profiles and the standards specified (terminology or other). For each Technical Actor (whether required or optional), the last column references the detailed specification that constrain and extend of the implementation of this profile for KSA specific requirements. These specifications may be found in Appendices to this core specification or in other referenced KSA eHealth Interoperability Specifications (e.g. Saudi eHealth Security and Privacy Interoperability Specification, etc.).

TABLE 4.1-1 INTEROPERABILITY CONFORMANCE REQUIREMENTS FOR PROVIDER INFORMATION CONSUMER

HEALTHCARE PROVIDER DIRECTORY QUERY			MAPPING TO TECHNICAL SAUDI EHEALTH SPECIFICATIONS			DOCUMENTS OF INTEROPERABILITY
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND COMMENTS
Provider Information Consumer	Provider Information Query	R	Provider Information Consumer	R	IHE Healthcare Provider Directory (HPD)	IS0002 Saudi eHealth Core Interoperability Specification for KSA-Wide Healthcare Provider Directory Query – Section 4.1 and 4.2 IS0200 Saudi eHealth Terminology Repository

HEALTHCARE PROVIDER DIRECTORY QUERY			MAPPING TO TECHNICAL SAUDI EHEALTH SPECIFICATIONS			DOCUMENTS OF INTEROPERABILITY
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/STANDARD	REFERENCED SPECIFICATION AND COMMENTS
			X-Service User	R	IHE Cross-Enterprise User Assertion (XUA)	IS0101 Saudi eHealth Security and Privacy Interoperability Specification – Section 3.4.1
			Secure Node	R	IHE Audit Trail and Node Authentication (ATNA)	IS0101 Saudi eHealth Security and Privacy Interoperability Specification – Section 3.2 and 3.3.2
			Time Client	R	IHE Consistent Time (CT)	IS0101 Saudi eHealth Security and Privacy Interoperability Specification – Section 3.1.2

R=Required, O = Optional, C= Conditional

TABLE 4.1-2 INTEROPERABILITY CONFORMANCE REQUIREMENTS FOR PROVIDER INFORMATION DIRECTORY

HEALTHCARE PROVIDER DIRECTORY QUERY			MAPPING TO TECHNICAL SAUDI EHEALTH SPECIFICATIONS			CONSTRUCTS OF INTEROPERABILITY
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/STANDARD	REFERENCED SPECIFICATION
Provider Information Directory	Provider Information Query	R	Provider Information Directory	R	IHE Healthcare Provider Directory (HPD)	IS0002 Saudi eHealth Core Interoperability Specification for KSA-Wide Healthcare Provider Directory Query – Section 4.3, 4.4 and 4.5 IS0200 Saudi eHealth Terminology Repository
			X-Service Provider	R	IHE Cross-Enterprise User Assertion (XUA)	IS0101 Saudi eHealth Security and Privacy Interoperability Specification – Section 3.4.2
			Secure Node	R	IHE Audit Trail and Node	IS0101 Saudi eHealth Security and Privacy

					Authentication (ATNA)	Interoperability Specification – Section 3.2 and 3.3.1
			Time Client	R	IHE Consistent Time (CT)	IS0101 Saudi eHealth Security and Privacy Interoperability Specification – Section 3.1.2

R=Required, O = Optional, C= Conditional

#### 4.1.1 Interoperability Sequence Diagrams

The following Sequence Diagrams provide an overview of the combined flow of transactions resulting from the above selected profiles and standards. These Sequence diagrams are not intended to cover all cases and variants of information exchange between the actors.

##### 4.1.1.1 MAIN FLOW – SEQUENCE DIAGRAM

The Healthcare Provider Directory may be queried using multiple criteria allowing for flexibility. Typical search criteria would be queries for a specific provider (e.g. filter by name and location), or queries for a list of specialists (e.g. filter by provider type, provider specialty, and location).

A query may return one or more provider entries fulfilling the requested criteria. The operator will select a preferred provider from the list returned.

Figure 4.1-1 KSA-Wide Healthcare Provider Directory Query Sequence Diagram provides a high level sequence of events for the exchange of information when querying for a healthcare provider along with the typical security exchanges for authorized network communications. This figure depicts a number of transactions between IHE Profile Actors specified in

Table 4.1-1 Interoperability Conformance Requirements:

1. Time synchronization occurs independently. These transactions may take place at any time and are shown at the beginning of the sequence diagram [IHE CT Profile: Maintain Time ITI-1].
2. The provider needs to query the Healthcare Provider Directory to locate credential and/or communication information for another individual provider or provider organization. Before the query transaction can take place, an authentication process and the establishment of an encrypted channel between the Provider Information Consumer/Secure Node actor and the Healthcare Provider Directory/Secure Node actor takes place [IHE ATNA Profile: Authenticate Node ITI-19].
3. Further user assertion and authorization is communicated by the X-Service User to the X-Services Provider which validates the identity assertion for permissible access to the Provider Directory Resource enforcing Role Based Access Control (RBAC) and protecting any non-public sensitive information if access to query information is limited by the eHealth Information Exchange Policies. This is done using the Provide X-User Assertion transaction [ITI-40].

4. The Provider Information Consumer issues the query request to the Provider Information Directory using the [IHE HPD Provider Information Query Request [ITI-58]].
5. The Provider Information Directory processes the query request (i.e. query for specialist or by provider demographics) and responds with one or more providers [IHE HPD Provider Information Query Response [ITI-58]].

Note: Audit logging is not required on provider directory query as only professional information will be available through the provider directory query.

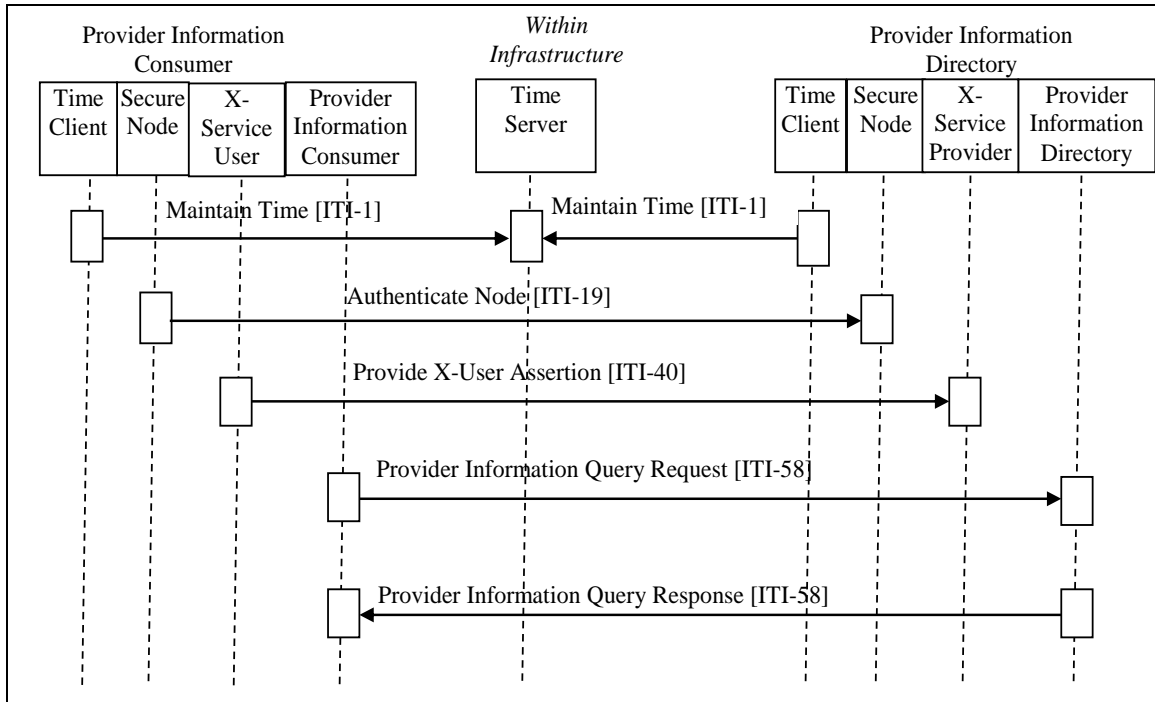


FIGURE 4.1-1 KSA-WIDE HEALTHCARE PROVIDER DIRECTORY QUERY SEQUENCE DIAGRAM

## 4.2 CONFORMANCE TO THE KSA-WIDE HEALTHCARE PROVIDER DIRECTORY QUERY INTEROPERABILITY SPECIFICATION

### 4.2.1 Provider Information Directory Consumer Conformance

Systems may claim conformance to the KSA-Wide Healthcare Provider Directory Query Interoperability Specification as a Provider Information Directory Consumer as follows:

“KSA-Wide Healthcare Provider Directory Query as a Provider Information Directory Consumer Actor”

This requires:

- [KHPD-001] IHE Healthcare Provider Directory (HPD) Profile as a Provider Information Directory Consumer Actor with the additional constraints specified in:
  - IS0002 *Saudi eHealth Core Interoperability Specification for KSA-Wide Healthcare Provider Directory Query* -- Section 5.1 and 5.2
  - IS0200 *Saudi eHealth Terminology Repository*
- [KHPD-002] Retired
- [KHPD-003] IHE Consistent Time (CT) Integration Profile as a Time Client Actor with the additional constraints specified in:
  - IS0101 *Saudi eHealth Security and Privacy Interoperability Specification* – Section 3.1.2
- [KHPD-004] IHE Audit Trail and Node Authentication (ATNA) Integration Profile as a Secure Node Actor with the additional constraints specified in:
  - IS0101 *Saudi eHealth Security and Privacy Interoperability Specification* – Section 3.2 and 3.3.2
- [KPDQ-005] IHE Cross-Enterprise User Assertion (XUA) Integration Profile as a X-Service User Actor with the additional constraints specified in:
  - IS0101 *Saudi eHealth Security and Privacy Interoperability Specification* – Section 3.4.1

#### 4.2.2 Provider Information Directory Conformance

Systems may claim conformance to the IHE Healthcare Provider Directory (HPD) Profile as a Provider Information Directory as follows:

“KSA-Wide Healthcare Provider Directory Query as a Provider Information Directory Actor”

This requires:

- [KHPD-006] IHE Healthcare Provider Directory (HPD) Profile as a Provider Information Directory Actor with the additional constraints specified in:
  - IS0002 *Saudi eHealth Core Interoperability Specification for KSA-Wide Healthcare Provider Directory Query* -- Section 4.3, Section 4.4 and Section 4.5
  - IS0200 *Saudi eHealth Terminology Repository*
- [KHPD-008] IHE Consistent Time (CT) Integration Profile as a Time Client Actor with the additional constraints specified in:
  - IS0101 *Saudi eHealth Security and Privacy Interoperability Specification* – Section 3.1.2
- [KHPD-009] IHE Audit Trail and Node Authentication (ATNA) Integration Profile as a Secure Node Actor with the additional constraints specified in:
  - IS0101 *Saudi eHealth Security and Privacy Interoperability Specification* – Section 3.2 and 3.3.1



- [KHPD-010] IHE Cross-Enterprise User Assertion (XUA) Integration Profile as a X-Service Provider Actor with the additional constraints specified in:
  - IS0101 *Saudi eHealth Security and Privacy Interoperability Specification* – Section 3.4.2

### 4.3 PROVIDER DIRECTORY DATA ELEMENTS

The following tables provide a high-level overview of the data elements applicable to this specification. The naming conventions of the data elements are consistent with the IHE Healthcare Provider Directory (HPD) profile.

In addition to providing information on the data elements, this table also provides information on whether the data element includes terminology constraints and whether the information is required, required if known, or optional. Other HPD attributes not referenced below are constrained as per the underlying HPD profile.

TABLE 4.3-1 KSA OBJECT CLASS FOR INDIVIDUAL PROVIDERS

<u>OBJECT CLASS</u>	<u>SUPERIOR OBJECT CLASS</u>	<u>OID</u>	<u>OBJECT CLASS TYPE</u>
KSAHPDProvider	HPDProvider	2.16.840.1.113883.3.3731.1.2.3	Auxiliary

TABLE 4.3-2 DATA ELEMENTS FOR INDIVIDUAL PROVIDERS

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Unique Entry Identifier	The Unique ID for the provider entry	Text	R	Populated with a SeHE unique Identification using SeHE as the issuing authority: (see [KHPD-019])	N/A
Provider "Identifier"	National identifier that uniquely identifies an individual.	Text	R	Reflects The national ID of the provider using one of the National ID Issuing Authorities from the set of (Citizen's ID, Iqama Identifier, Border Control ID) (see [KHPD-020])	N/A
	Professional ID	Text	R	Populated with the Provider's Professional ID (the SCHS unique Identification using SCHS OID as the issuing authority. (see [KHPD-021])	N/A
Provider Type	Description of the individual provider's type.	Text	R	Includes the coded value as mapped to standard codes. (see [KHPD-022])	KSA Individual Provider Type

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Provider Type Description	Description of individual provider's type	Text	R	Populated with the Saudi Print name (identical to the Print Name in the Provider Type Attribute above) corresponding to the Provider Type reflected in the coded value (see [KHPD-022])	KSA Individual Provider Type
Status	The status of this individual. (Accredited, Expired, Pending, Registered, Registered / Classified, Suspended, Temporary, Temporary Suspended)	Text	R	Includes the print name representation from the designated terminology (see [KHPD-023])	KSA License Status
Provider Primary Name	Names that a provider has, or is, known by. May include (4) name components: [First Name, Second Name, Third Name, and Family Name]	Text	R	Populated with the legal name of the provider as recorded by MOI (see [KHPD-024])	N/A
Provider Last Name	Family name of the provider	Text	R	Includes names in both Arabic and English are mandatory for all nationalities. (see [KHPD-024]) Note: one these two Provider last Names is the provider family name in the above Attribute "Provider Primary Name".	N/A

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Provider First Name	Given name(s) of the provider	Text	R	Includes names in both Arabic and English are mandatory for all nationalities. First and Second Name are required (see [KHPD-024]) Note: One of the two language representations of these Provider-given first and second names is identical to the provider first and second given name in the above Attribute "Provider Primary Name".	N/A
Provider Specialty	Individual's specialization, a specific medical service, a specialization in treating a specific disease. Some specialties are: Psychiatry, Radiology , Endocrinology	Text and coded	RE	includes the Saudi Print Name and corresponding coded value as mapped to standard codes (see [KHPD-025])	KSA Provider Specialty
Provider Language Supported	Language(s) that the provider uses.	Coded	R	Populated using the Language Value Set. Minimally <b>SHALL</b> reflect Arabic and English. Other languages may be recorded but may not be available from source systems (see [KHPD-026])	Language
Provider Gender	The gender of the provider	Coded	R	Populated using the KSA Gender Value Set (see [KHPD-027])	KSA Gender
Provider Medical Records Delivery e-mail Address	Electronic mailing address of an individual where medical or administrative records can be sent to. Supports multiple e-mail addresses (e.g. individual belongs to multiple practices).	Text	RE	N/A	N/A

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Provider e-mail address	Electronic mailing address to receive general purpose communication not related to medical records	Text	R	Restricts access to personal email address (see [KHPD-028])	N/A
Electronic Service URI	Reference to an entry in a systems directory or to a service definition page where this individual provider has electronic access points defined.	Text	O	N/A	N/A
Provider Practice Address	Practice or Service address	Postal Address	RE	Supports Quarter, Street name, Building number, Postal Code, POBox, City, and Country, and is Mandatory for Saudi Citizens only (see [KHPD-029])	Country KSA City KSA Postal Code
Provider Mailing Address	Primary address for mailing purposes for the individual provider	Postal Address	O	Supports Quarter, Street name, Building number, Postal Code, POBox, City, and Country, restricts Access to any home address, and allows for multiple and inactive addresses (see [KHPD-030])	Country KSA City KSA Postal Code
Provider Credential	Detailed Health related credentials earned by provider	Text	R	Supports University credentials with associated attributes: University College Country Date (see [KHPD-031])	N/A
Relationship	Business associations with an organization. There can be multiple types of relationship but generically categorizes all relationship as – 'member-of'.	Coded	O	N/A	N/A
KSA Extended Attributes					

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Category	Business Category indicating Seniority level. For example, Registrar, Consultant, etc.	Text and coded	R	includes the Saudi Print Name and corresponding coded value as mapped to standard codes in the KSA Provider Category as recorded by SCHS (see [KHPD-032])	KSA Provider Category
Religion	Religion of the provider	Text and coded	O	includes the Saudi Print Name and corresponding coded value as mapped to standard codes in the KSA Religion, with values maintained in Arabic and English (see [KHPD-033])	KSA Religion
Nationality	Nationality of the provider	Text and coded	O	includes the text description of the nationality and corresponding coded value for the Nationality value set (see [KHPD-034])	Nationality

\*See referenced constraints in section 4 for full description.

TABLE 4.3-3 DATA ELEMENTS FOR ORGANIZATIONAL PROVIDERS

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Unique Entry Identifier	The Unique ID for the provider organization entry	Text	R	Populated with a SeHE unique Identification using SeHE as the issuing authority: (see [KHPD-019])	N/A
Org Type	The type of organization represented. Some values are: Hospital, PHC, Laboratory Clinics, Imaging Centers, Pharmacies Practice, etc.	Coded	R	Populated with KSA Organizational Provider Type value set. (see [KHPD-035])	KSA Organization Provider Type

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Org Type Description	The type of organization represented. Some values are: Hospital, PHC, Laboratory Clinics, Imaging Centers, Pharmacies Practice, etc.	Text	R	Populated the Saudi Print Name corresponding to the coded value in KSA Organization Provider Type (see [KHPD-036])	KSA Organization Provider Type
Org Status	The status of the organization. Active – This organization is currently in existence. Inactive – This organization is no longer in existence	Coded	R	Populated with the status of the organization and <b>SHALL</b> minimally support the KSA Organization Status value set (see [KHPD-037])	KSA Organization Status
Organization Name	Multiple names used for an organization.	Text	R	Arabic name is required (R). English name is required if known (RE) (see [KHPD-038])	N/A
Org Contact	Multiple individuals who can be contacted in reference to this organization, including a phone number and e-mail address. An individual role can be included in the name, instead of an individual.	Text and Coded	R	The Individual Role is selected from the KSA Contact Role Value Set The “Patient Relations” role is used for referrals For patients, the “Director of Patient Relations” is used. For general medical inquiries, the “Medical Director” is used, while for official communication, the “Hospital Director” is used (see [KHPD-039])	KSA Contact Role
Electronic Service URI	Reference to an entry in a systems directory or to a services definition page where this organization has its electronic access points defined.	Text	O	N/A	N/A

ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Medical Records Delivery E-mail Address	Electronic mailing address of an organization where medical or administrative records can be sent to.	Text	RE	N/A	N/A
Org Address	<p>Physical address information for an organization. Each type of address can be a primary or secondary address. Addresses that are no longer valid are marked as Inactive.</p> <p><b>Billing Address</b>                      One primary address-the preferred billing address for the organization                      Multiple secondary billing addresses                      Multiple inactive addresses which were once used as billing addresses but are no longer valid.</p> <p><b>Mailing Address</b>                      One primary address-the preferred mailing address for the organization                      Multiple secondary mailing addresses                      Multiple inactive addresses which were once used as mailing addresses but are no longer valid.</p> <p><b>Practice Address</b>                      Multiple primary addresses-All locations where healthcare services are provided                      There are no secondary practice addresses                      Multiple inactive</p>	Postal Address	R: practice address N/A/ Physical address location is always the same as the practice address O: Billing	Supports Quarter, Street name, Building number, Postal Code, POBox, City, and Country using the Country value set, the KSA City Value Set and the Postal Code Value Set (see [KHPD-040])	Country KSA City KSA Postal Code



ATTRIBUTE NAME	ATTRIBUTE DEFINITION	FORMAT	REQUIREMENT	CONSTRAINT SUMMARY*	HEALTHCARE PROVIDER DIRECTORY TERMINOLOGY
Provider Language Supported	Language(s) that an Organization support	Coded	O	Reflects Arabic and English Other languages may be recorded but may not be available from source systems. (see [KHPD-041])	Language
Org Credentials	This includes certifications or licenses earned by an organization.	Text	O	N/A	N/A
Org Specialty	Organization's specialization, a specific medical service, a specialization in treating a specific disease. Some specialties are: Psychiatry, Radiology, Endocrinology	Coded	RE	Minimally supports the KSA Organization Specialty and the KSA Organization Sub-Specialty value sets to reflect the specialty of the organization provider (see [KHPD-042])	KSA Organization Specialty KSA Organization Sub-Specialty
Org Identifiers	National identifier that uniquely identifies an organization	Text	R Managed as INT	Populated with the MOH unique Identification using MOH as the issuing authority: (See [KHPD-043])	N/A
Provider Relationship	Business associations either between an organization and an individual provider or between an organization and another organization. There can be multiple types of relationship but generically categorizes all relationship as – 'member-of'.	Text	RE	It is 'DN' which is a pointer to other directory entries. In this case, it is intended to allow for membership to things like Roles, and other structures that we are not specifying for HPD – these tend to be used for directory-based authentication.	N/A
Date/Time of last update	Attribute that the LDAP directory server maintains to capture the time when an entry was modified.	Date	R	N/A	N/A

\*See referenced constraints in section 4 for full description.

## **5. SAUDI EHEALTH CONSTRAINTS ON THE IHE HPD PROFILE**

This Section specifies Saudi eHealth extensions and constraints to the IHE Healthcare Provider Directory (HPD) Profile. The reader not familiar with the IHE HPD integration profile and transactions should review IHE ITI HPD Trial Implementation Supplement (See Section 5).

### **5.1 REQUIREMENTS FOR PROVIDER INFORMATION QUERY REQUEST ATTRIBUTES – PROVIDER INFORMATION CONSUMER ACTOR**

This transaction does not limit any restriction on the search scope, size limit, time limit or list of attributes. If needed, those can be constrained by the Provider Information Directory actor implementer.

### **5.2 BEHAVIOR RULES FOR THE PROVIDER INFORMATION CONSUMER ACTOR**

[KHPD-045] - Implementations of the Provider Information Consumer Actor **SHALL** support the return of at least 50 matching directory entries.

### **5.3 REQUIREMENTS FOR THE HPD PROVIDER DIRECTORY SCHEMA STRUCTURE**

[KHPD-011] The directory naming context **SHALL** be c=SA, o=SeHE, dc=HPD

#### **5.3.1 HPDProvider Optional Attributes**

11. [KHPD-012] Retired
12. [KHPD-013] Retired
13. [KHPD-014] hpdProviderBillingAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value, and the "KSA City", and "KSA Postal Code" value sets.
14. [KHPD-015] hpdProviderMailingAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value set, and the "KSA City", and "KSA Postal Code" value sets.
15. [KHPD-016] hpdProviderPracticeAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value set , and the "KSA City", and "KSA Postal Code" value sets
16. [KHPD-017] hpdCredential **SHALL** minimally support expression of University credentials with associated attributes: University, College, Country, and Date

#### **5.3.2 HPDProviderCredential Mandatory Attributes**

17. [KHPD-018] credentialType **SHALL** minimally support expression of the credential to reflect the individual provider University, College, Country, and date of the degree

### 5.3.3 HPDProviderCredentialOptional Attributes

18. No Further constraints

### 5.3.4 HCProfessionalAttributes

19. [KHPD-019] uid **SHALL** be populated as a Unique ID = Issuing Authority Identifier : National Professional/Orgnaizational Identifier, where the Issuing Authority Identifier is:

- 2.16.840.1.113883.3.3731.1.2.4 as the OID representing SeHE and the National Professional Identifier issued by the Provider Information Directory Actor.
- 2.16.840.1.113883.3.3731.1.2.6 as the OID representing SeHE and the National Organizational Identifier issued by the Provider Information Directory Actor.

20. [KHPD-020] hcIdentifier **SHALL** minimally include two instances reflecting the provider Professional ID and the National ID of the provider. Those two values shall conform to the IHE specifications that means that they are structured as colon-delimited strings.

c) The provider license **SHALL** be populated as hcidentifier = <Issuing Authority Identifier>:<Type>:<National Professional Identifier>:<Status>, where Issuing Authority Identifier = 2.16.840.1.113883.3.3731.1.2.1 as the OID representing SCHS as the issuing authority for National Professional Identifiers, where the National/Regional Professional Identifier is the provider License Number.

Type **SHALL** be populated with "KSA Individual Provider Type" value set code.

Status **SHALL** be populated with the status of the provider credential and **SHALL** minimally support the code in the "KSA License Status" value set.

d) The national ID of the provider **SHALL** be populated as hcIdentifier = <Issuing Authority Identifier>:<Type>:<National Identifier>:<Status>, where Issuing Authority is **SHALL** one of the following National ID Issuing Authorities:

- Citizen's ID - 2.16.840.1.113883.3.3731.1.1.100.2
- Iqama Identifier - 2.16.840.1.113883.3.3731.1.1.100.3
- Border Control ID - 2.16.840.1.113883.3.3731.1.1.100.5

Note: The OID referenced is the same as the OID specified by IS0001 Saudi eHealth Core Interoperability Specification for KSA-Wide Patient Demographic Query. Only the subset of possible issuing authorities listed above is allowable for healthcare provider identifiers.

The National Identifier is a national identifier number issued by the above authority Type **SHALL** be populated with a static value of 'NationalID'.

Status **SHALL** be populated with the status of the provider National/Regional and **SHALL** be set to 'Registered'

26. [KHPD-021] hcProfession **SHALL** minimally support expression of the credential to reflect the individual provider license type such that credentialName@organization\_domain\_name and such that credentialName **SHALL** minimally support the Saudi print name associated with the "KSA Individual Provider Type" value set and organization\_domain\_name = 2.16.840.1.113883.3.3731.1.2.1 as the OID representing SCHS

27. [KHPD-022] Provider type SHALL be populated with "KSA Individual Provider Type" value set, and description SHALL be populated with the Saudi print name corresponding to the "KSA Individual Provider Type" value set.
28. [KHPD-022] Provider type SHALL be populated with "KSA Individual Provider Type" value set, and description SHALL be populated with the Saudi print name corresponding to the "KSA Individual Provider Type" value set.

The human readable text and the coded value SHALL be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority SHALL be "SCHS".
- Code System SHALL be the Coding System identifier (OID)
- Code SHALL be the Concept Code.
- CodeDisplayName SHALL be the Saudi Print Name

14. [KHPD-023] hpdProviderStatus SHALL be populated with the status of the provider credential and SHALL minimally support the code in the "KSA License Status" value set to reflect this status. The hpdProviderStatus SHALL be set to "Temporary" for visiting providers.

The human readable text and the coded value SHALL be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority SHALL be "SCHS".
- Code System SHALL be the Coding System identifier (OID)
- Code SHALL be the Concept Code.
- CodeDisplayName SHALL be the Saudi Print Name

29. [KHPD-024] displayName SHALL be populated with the legal name of the provider as recorded by the Ministry of Interior (MOI). This SHALL be structured as:

- First name
- Second name
- Third name
- Family name

All names are mandatory except the third name which may be absent. Names in both Arabic and English are mandatory for all nationalities.

30. [KHPD-025] hcSpecialisation SHALL minimally support the "KSA Provider Specialty" value set. This SHALL include an instance of the human readable text and the coded value that can be used for machine processing. The human readable text SHALL use Saudi Print Name.

The human readable text and the coded value **SHALL** be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority **SHALL** be "SCHS".
- Code System **SHALL** be the Coding System identifier (OID)
- Code **SHALL** be the Concept Code.
- CodeDisplayName **SHALL** be the Saudi Print Name

31. [KHPD-026] hpdProviderLanguageSupported contains the languages that the provider supports. The Language **SHALL** use the code from the "Language" value set. This **SHALL** minimally include indication of at least one of "Arabic", or "English" or both "Arabic" and "English". Other language values **MAY** be used, provided a secure mechanism allows for the management of additional languages. The format of this attribute is constrained as defined by IHE HPD for hpdProviderLanguageSupported
32. [KHPD-027] gender **SHALL** be populated using the "KSA Gender" value set.
33. [KHPD-028] Access to personal e-mail address, reflected in mail attribute **SHALL** be restricted to authorized entities.
34. [KHPD-046] The used email address format **SHALL** be restricted to this pattern [0-9A-Za-z\.\-\_{1,127}@[0-9A-Za-z\.\-\_{1,127}
35. [KHPD-029] hpdProviderPracticeAddress
  - **SHALL** implement Postal Code, PO Box, City, and Country using the "Country" value set, and the "KSA City", and "KSA Postal Code" value sets
  - **SHALL** be Mandatory for Saudi Citizens only
  - Multiple addresses **MAY** be included
  - Inactive addresses **MAY** be included
36. [KHPD-030] hpdProviderMailingAddress  
See Requirement [KHPD-015].
37. [KHPD-031] hpdCredential **SHALL** support University credentials with associated attributes:
  - University
  - College
  - Country
  - Date
38. [KHPD-032] KSAHPDProvider Object Class **SHALL** extend the HPDProvider Object Class to add the Category attribute.  
Category **SHALL** be included and **SHALL** include the Saudi Print Name and corresponding

coded value as recorded by SCHS and mapped to standard codes in "KSA Provider Category" value set.

39. [KHPD-033] KSAHPDProvider Object Class **SHALL** extend to the HPDProvider ObjectClass to add the following attribute:

Attribute	OID	Description	Syntax	Matching rules	Multi-Valued
HL7Religion	1.0.21091.2.1.16	The HL-7 defined Religion	Directory String	Case Ignore Match, Case Ignore Substrings Match	Yes

HL7Religion **SHALL** include the KSA text and corresponding coded value as mapped to standard codes in the "KSA Religion" value set. Values are maintained in Arabic and English.

40. [KHPD-034] KSAHPDProvider Object Class **SHALL** extend the HPDProvider Object to add the following attribute.

Attribute	OID	Description	Syntax	Matching rules	Multi-Valued
KSANationality	2.16.840.1.113883.3.3731.1.2.5	The KSA Registered Nationality	Directory String	Case Ignore Match, Case Ignore Substrings Match	Yes

Nationality **SHALL** include the text description of the nationality and corresponding coded values in the "Nationality" value set.

### 5.3.5 Organizational Provider Attributes

10. [KHPD-035] –Provider type **SHALL** be populated with "KSA Organizational Provider Type" value set code.

The human readable text and the coded value **SHALL** be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority **SHALL** be "MOH".
- Code System **SHALL** be the Coding System identifier (OID)
- Code **SHALL** be the Concept Code.

- CodeDisplayName **SHALL** be the Saudi Print Name

11. [KHPD-036] –description **SHALL** be populated with the Saudi Print Name corresponding to the coded value in "KSA Organization Provider Type" .
12. [KHPD-037] –status **SHALL** be populated with the status of the organization and **SHALL** minimally support the "KSA Organization Status" value set codes.
13. [KHPD-038] HcRegisteredName **SHALL** be populated with the legal Arabic name of the regulated healthcare organization as recorded by the Ministry of Health (MOH), and **SHALL** contain the English name **IF KNOWN**.
14. [KHPD-039] The ClinicalInformationContactIndividual Role **SHALL** be selected from the "KSA Contact Role" Value Set. The "Patient Relations" role **SHALL** be used for referrals. For patients, the "Director of Patient Relations" **SHALL** be used. For general medical inquiries, the "Medical Director" **SHALL** be used, while for official communication, the "Hospital Director" **SHALL** be used.
15. [KHPD-040] hpdProviderPracticeAddress **SHALL** support Postal Code, PO Box, City, and Country using the "Country" value set, and the "KSA City", and "KSA Postal Code" value sets.
16. [KHPD-041] Language, containing the languages that the organization provider supports **SHALL** use the "Language" value set. This **SHALL** minimally include indication of at least one of "Arabic", "English" or both "Arabic" and "English". Other language values **MAY** be used, provided a secure mechanism allows for the management of additional languages.
17. [KHPD-042] HcSpecialisation, when used, **SHALL** minimally support the "KSA Organization Specialty" value set and the "KSA Organization Sub-Specialty" to reflect this specialty of the organization provider.

The human readable text and the coded value **SHALL** be structured as four colon delimited strings:

<Issuing Authority>:<Code System>:<Code>:<CodeDisplayName>.

- Issuing Authority **SHALL** be "MOH".
- Code System **SHALL** be the Coding System identifier (OID)
- Code **SHALL** be the Concept Code.
- CodeDisplayName **SHALL** be the Saudi Print Name

18. [KHPD-043] –hcIdentifier **SHALL** be populated with the MOH unique Identification using 2.16.840.1.113883.3.3731.1.2.2 for the OID representing MOH as the issuing authority.

The human readable text and the coded value **SHALL** be structured as three colon delimited strings:

<MOH-OID>:<Provider Type Code>:<Provider SCHS License ID>:<Status Code>

Where: Provider Type Code **SHALL** be populated with "KSA Individual Provider Type" value set

Status Code **SHALL** be populated with the status of the provider credential and **SHALL** minimally support the code in the "KSA License Status" value set.

## **5.4 QUERY RESPONSE – PROVIDER INFORMATION DIRECTORY ACTOR**

2. [KHPD-044] The Provider Information Directory Actor **SHALL** respond only with content and values as maintained in the provider directory. If a value is empty (attribute not valued) or if a value is not implemented, the response encoding **SHALL** follow the IHE HPD Profile requirements.

## **5.5 BEHAVIOR RULES FOR THE PROVIDER INFORMATION DIRECTORY ACTOR**

No constraints.



## 6. REFERENCED DOCUMENTS AND STANDARDS

The following Saudi eHealth documents are referenced by this interoperability specification.

*TABLE 5-1 INTERNAL REFERENCES*

DOCUMENT OR STANDARD	DESCRIPTION
IS0101 Saudi eHealth Security and Privacy Interoperability Specification	Specifies the interoperability standards and profiles along with the Saudi specific constraints that are required to provide the technical security measures, data protection, and privacy management that will facilitate the implementation of the Saudi eHealth Policies for Health Information Exchange in the Kingdom of Saudi Arabia among communicating IT systems.
IS0200 Saudi eHealth Terminology Repository.	Specifies the terminology concepts and associated coded value sets for data elements used throughout the Saudi eHealth Interoperability Specifications.
Saudi Health Information Exchange Policies	The Saudi eHealth Interoperability Policies document contains the policies and supporting definitions that supporting the security and privacy aspects of the Saudi Health Information Exchange. The Saudi Health Information Exchange Policies apply to all individuals and organizations that have access to the Saudi Health Information Exchange managed health records, including those connected to the Saudi Health Information Exchange, their Business Associates, as well as any subcontractors of Business Associates. These policies apply to all information provided to or retrieved from the Saudi Health Information Exchange.
UC0002 Saudi eHealth Provider Identification Interoperability Use Case	This Use Case describes the ability to access information about health professionals and the organizations where they practice. This information is centrally managed by a national healthcare provider directory; the directory which supports searches for providers and organizations and conveys authoritative attributes related to them. This information describes organizations that provide patient care, such as public and private hospitals, primary care centers, laboratories, pharmacies, etc. It is used by these organizations and by the MOH business applications.
UC0003 Saudi eHealth Laboratory Interoperability Use Case	The Laboratory Use Case describes the capability to share laboratory test results and to initiate a coded laboratory order, and making them accessible via the national Saudi Health Information Exchange (HIE) platform.
UC0005 Saudi eHealth Imaging Interoperability Use Case	The Imaging Use Case describes the capability to share imaging reports and images and also supports the submission of a tele-radiology order to a remote tele-radiology service via the national Saudi Health Information Exchange (HIE) platform.
IS0106 Saudi eHealth Clinical Documents Constrains Interoperability Specifications	Specifies common constraints for clinical documents such as data elements of document headers that are common across the Saudi eHealth Project.

*TABLE 5-2 EXTERNAL REFERENCES*

DOCUMENT OR STANDARD	DESCRIPTION
IHE IT Infrastructure (ITI) Technical Framework – Volume 1 (ITI TF-1) Integrations Profiles, Final Text Section 7 – IHE Consistent Time (CT);	The Consistent Time Integration Profile (CT) provides a means to ensure that the system clocks and time stamps of the many computers in a network are well synchronized. This profile specifies synchronization with a median error less than 1 second. This is sufficient for most purposes. May be obtained at <a href="http://www.ihe.net/Technical_Frameworks/#iti">http://www.ihe.net/Technical_Frameworks/#iti</a>

DOCUMENT OR STANDARD	DESCRIPTION
IHE IT Infrastructure (ITI) Technical Framework – Volume 1 (ITI TF-1) Integrations Profiles, Final Text Section 9: Audit Trail and Node Authentication (ATNA)	The Audit Trail and Node Authentication (ATNA) Integration Profile establishes security measures which, together with the Security Policy and Procedures, provide patient information confidentiality, data integrity and user accountability. May be obtained at <a href="http://www.ihe.net/Technical_Frameworks/#iti">http://www.ihe.net/Technical_Frameworks/#iti</a>
IHE IT Infrastructure (ITI) Technical Framework – Volume 1 (ITI TF-1) Integrations Profiles Section 13 Cross-Enterprise User Attestation (XUA) profile;	Cross-Enterprise User Assertion Profile (XUA) - provides a means to communicate claims about the identity of an authenticated principal (user, application, system...) in transactions that cross enterprise boundaries. To provide accountability in these cross-enterprise transactions there is a need to identify the requesting principal in a way that enables the receiver to make access decisions and generate the proper audit entries. The XUA Profile supports enterprises that have chosen to have their own user directory with their own unique method of authenticating the users, as well as others that may have chosen to use a third party to perform the authentication. May be obtained at <a href="http://www.ihe.net/Technical_Frameworks/#iti">http://www.ihe.net/Technical_Frameworks/#iti</a>
IHE IT Infrastructure (ITI) Technical Framework – Volume 1 (ITI TF-1) Integrations Profiles, Trial Implementation, September 20, 2013 – Healthcare Provider Directory (HPD);	The Healthcare Provider Directory (HPD) supports management of healthcare provider information, both individual and organizational, in a directory structure May be obtained at <a href="http://www.ihe.net/Technical_Frameworks/#iti">http://www.ihe.net/Technical_Frameworks/#iti</a>

## **7. APPENDIX A – SAMPLES**

EXAMPLES WILL BE PROVIDED AS PART OF THE IS SPECIFICATION VALIDATION PROCESS. UNTIL THEN THIS SECTION WILL REMAIN BLANK.

### **7.1 SAMPLE HEALTHCARE PROVIDER DIRECTORY QUERY**

This example provides a sample Healthcare Provider Directory Query.

### **7.2 SAMPLE HEALTHCARE PROVIDER DIRECTORY RESPONSE**

This example provides a response to a Healthcare Provider Directory Query.

### **7.3 SAMPLE INDIVIDUAL PROVIDER ENTRY**

This example provides a sample Individual Provider Entry.

### **7.4 SAMPLE ORGANIZATIONAL PROVIDER ENTRY**

This example provides a sample Organizational Provider Entry.