National Immunization Record System

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# Entity Relationship Diagram



# Minimum and Maximum Cardinality Description

1. One immunization belongs to only one vaccine; one vaccine contains a minimum of one and a maximum of many immunizations.
2. A vaccine belongs to one inventory; one inventory contains a minimum of one and a maximum of many vaccines.
3. One appointment has one immunization; one immunization can appear in many appointments.
4. One appointment contains one patient; one patient can be in a minimum of one and a maximum of many appointments.
5. One appointment includes one health unit; one health unit can be in a minimum of one and a maximum of many appointments.
6. One provider service has one provider; a provider provides many services.
7. One provider service includes one health unit; a health unit administers a minimum of one and a maximum of many services.
8. A patient can have many relationships; a relationship identifies related individuals for one patient.
9. A patient allergy has one patient; a patient can have a minimum of one and a maximum of many patient allergy combinations.
10. A patient allergy includes one allergy; one allergy appears in patient allergy for a minimum of one and a maximum of many times.
11. An occurrence has one and only one immunization; an immunization can have a minimum of one and a maximum of many occurrences.
12. An occurrence attaches one and only one adverse reaction; one adverse reaction has a minimum of one and a maximum of many occurrences.

# Database Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of tables:** | 13 |  |  |  |
| **Number of columns:** | 77 |  |  |  |
| **Number of foreign keys:** | 14 |  |  |  |
| **Last build date:** | Not built |  |  |  |
|  |  |  |  |  |
| **Tables** | **Columns** | **Indexes** | **Foreign Keys** | **Notes** |
| **Immunization** | 10 | 0 | 3 | Contains immunization information (i.e. immunization unique identifier, immunization name, immunization date, patient body site of immunization, immunization dosage, reason for immunization and whether the informed consent has been obtained) |
| **Vaccine** | 5 | 0 | 1 | Contains vaccine information (i.e. vaccine unique identifier, vaccine name, vaccine lot number and the expiry date for the vaccine) |
| **Vaccine Inventory** | 5 | 0 | 0 | Contains vaccine inventory information (i.e. vaccine inventory unique identifier, the name of the vaccine batch, the expiry date for the vaccine batch, manufacture identification number and manufacture name) |
| **Appointment** | 5 | 0 | 3 | Contains detailed information about the appointment (i.e. appointment unique identifier and appointment date) |
| **Health Unit** | 7 | 0 | 0 | Contains health unit information (i.e. health unit unique identifier, name, address, city, province, postal code and health unit's health authority name) |
| **Provider Service** | 6 | 0 | 2 | Contains detailed information about the service provided by a provider (i.e. provider service unique identifier, service date and service description) |
| **Provider** | 9 | 0 | 0 | Contains provider information (i.e. provider unique identifier, provider name, address, city, province, postal code, phone number and provider specialty) |
| **Patient** | 13 | 0 | 0 | Contains patient information (i.e. patient unique identifier, patient name, gender, birthdate, address, city, province, postal code, phone number, patient personal health number, patient emergency contact and emergency phone) |
| **Relationship** | 6 | 0 | 1 | Contains relationship information between patient and guardian (i.e. relationship unique identifier, relationship code, description, dependent name and guardian name) |
| **Patient Allergy** | 2 | 0 | 2 | Contains patient allergy information to avoid the many-to-many relationship between patient and allergy. This table includes a composite key consists of two foreign keys: Patient ID from the patient table and Allergy ID from the allergy table. |
| **Allergy** | 2 | 0 | 0 | Contains allergy information (i.e. allergy unique identifier and allergy description) |
| **Occurrence** | 3 | 0 | 2 | Contains occurrence information between an immunization and an adverse reaction (i.e. occurrence unique identifier and occurrence date) |
| **Adverse Reaction** | 4 | 0 | 0 | Contains adverse reaction information (i.e. adverse reaction unique identifier, adverse reaction type, description and severity) |

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| **Immunization** |  |  |  |
| **Number of Columns:** | 10 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 3 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Immunization\_ID (PK)** | Number(12) | Not allowed | Unique identifier for the immunization |
| **Patient\_ID (FK)** | Number(10) | Not allowed | Patient unique identifier |
| **Vaccine\_ID (FK)** | Number(11) | Not allowed | Vaccine unique identifier |
| **Provider\_ID (FK)** | Number(5) | Not allowed | Provider unique identifier |
| **Immunization\_name** | Varchar2(50) | Not allowed | Name of immunization |
| **Immunization\_date** | Datetime | Not allowed | Date of immunization |
| **Immunization\_site** | Varchar2(50) | Not allowed | The site of patient's body where immunization is injected |
| **Immunization\_dosage** | Decimal(3,2) | Not allowed | Dosage of immunization |
| **Reason\_for\_immunization** | Varchar2(500) | Not allowed | Reason for patient to get immunized |
| **Informed\_consent** | Varchar2(5) | Not allowed | This is a boolean value for provider to check the box when informed consent is obtained. If informed consent is not obtained, the box will be blank, hence the field will record FALSE and immunization should not be given.  |

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| --- | --- | --- | --- |
| **Vaccine** |  |  |  |
| **Number of Columns:** | 5 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 1 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Vaccine\_ID (PK)** | Number(11) | Not allowed | Unique identifier for the vaccine |
| **Vaccine\_inventory\_ID (FK)** | Number(10) | Not allowed | Vaccine inventory unique identifier |
| **Vaccine\_name** | Varchar2(50) | Not allowed | Vaccine's name |
| **Vaccine\_lot\_number** | Number(11) | Not allowed | Vaccine's lot number for provider to associate a specific vaccine with a manufacture and expiry date |
| **Vaccine\_expiry\_date** | Datetime | Not allowed | vaccine's expiry date |

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| --- | --- | --- | --- |
| **Vaccine Inventory** |  |  |  |
| **Number of Columns:** | 5 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 0 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | Data Type | Allow NULLs | Note |
| **Vaccine\_Inventory\_ID (PK)** | Number(10) | Not allowed | Unique identifier for vaccine inventory |
| **Vaccine\_batch\_name** | Varchar2(50) | Not allowed | Name of a vaccine batch |
| **Vaccine\_batch\_expiry\_date** | Datetime | Not allowed | Expiry date for a vaccine batch |
| **Manufacture\_identification\_number** | Number(8) | Not allowed | Unique identifier for manufacture supplying a vaccine |
| **Manufacture\_name** | Varchar2(50) | Allowed | Name of manufacture |

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| --- | --- | --- | --- |
| **Appointment** |  |  |  |
| **Number of Columns:** | 5 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 3 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Appointment\_ID (PK)** | Number(15) | Not allowed | Unique identifier for the appointment |
| **Patient\_ID (FK)** | Number(10) | Not allowed | Patient unique identifier |
| **Health\_unit\_ID (FK)** | Number(4) | Not allowed | Health unit unique identifier |
| **Immunization\_ID (FK)** | Number(12) | Not allowed | Immunization identifier |
| **Appointment\_date** | Datetime | Allowed | Date of the appointment |

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| --- | --- | --- | --- |
| **Health Unit** |  |  |  |
| **Number of Columns:** | 7 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 0 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Health\_unit\_ID (PK)** | Number(4) | Not allowed | Unique identifier for the health unit |
| **Health\_unit\_name** | Varchar2(50) | Not allowed | Health unit's name |
| **Health\_unit\_address** | Varchar2(50) | Allowed | Health unit's address |
| **Health\_unit\_city** | Varchar2(50) | Allowed | Health unit's city |
| **Health\_unit\_province** | Varchar2(50) | Allowed | Health unit's province |
| **Health\_unit\_postal\_code** | Varchar2(10) | Allowed | Health unit's postal code |
| **Health\_authority** | Varchar2(50) | Not allowed | Health unit's health authority |

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| **Provider Service** |  |  |  |
| **Number of Columns:** | 6 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 2 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Provider\_service\_ID (PK)** | Number(12) | Not allowed | Unique identifier for the service provided |
| **Health\_unit\_ID (FK)** | Number(4) | Not allowed | Health unit unique identifier |
| **Provider\_ID (FK)** | Number(5) | Not allowed | Provider unique identifier |
| **Service\_type** | Varchar2(50) | Not allowed | Type of service |
| **Service\_date** | Datetime | Not allowed | Date of the service |
| **Service\_description** | Varchar2(200) | Allowed | Service description |

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| **Provider** |  |  |  |
| **Number of Columns:** | 9 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 0 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Provider\_ID (PK)** | Number(5) | Not allowed | Unique identifier for provider |
| **Provider\_last\_name** | Varchar2(20) | Not allowed | Provider's last name |
| **Provider\_first\_name** | Varchar2(20) | Not allowed | Provider's first name |
| **Provider\_address** | Varchar2(50) | Allowed | Provider's address |
| **Provider\_city** | Varchar2(50) | Allowed | Provider's city |
| **Provider\_province** | Varchar2(50) | Allowed | Provider's province |
| **Provider\_postal\_code** | Varchar2(10) | Allowed | Provider's postal code |
| **Provider\_phone\_number** | Number(12) | Allowed | Provider's phone number |
| **Provider\_specialty** | Varchar2(50) | Allowed | Provider's specialties |

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| --- | --- | --- | --- |
| **Patient** |  |  |  |
| **Number of Columns:** | 13 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 0 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Patient\_ID (PK)** | Number(10) | Not allowed | Unique identifier for patient |
| **Patient\_last\_name** | Varchar2(20) | Not allowed | Patient's last name |
| **Patient\_first\_name** | Varchar2(20) | Not allowed | Patient's first name |
| **Patient\_gender** | Varchar2(10) | Allowed | Patient's gender |
| **Patient\_birthdate** | Datetime | Allowed | Patient's birthdate |
| **Patient\_address** | Varchar2(50) | Allowed | Patient's address |
| **Patient\_city** | Varchar2(50) | Allowed | Patient's city |
| **Patient\_province** | Varchar2(50) | Allowed | Patient's province |
| **Patient\_postal\_code** | Varchar2(10) | Allowed | Patient's postal code |
| **Patient\_phone\_number** | Number(12) | Allowed | Patient's phone number |
| **Personal\_health\_number** | Number(12) | Not allowed | Patient's personal health number |
| **Patient\_emergency\_contact** | Varchar2(20) | Allowed | Patient's emergency contact |
| **Patient\_emergency\_phone** | Number(12) | Allowed | Patient's emergency phone number |

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| --- | --- | --- | --- |
| **Relationship** |  |  |  |
| **Number of Columns:** | 6 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 1 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Relationship\_ID (PK)** | Number(5) | Not allowed | Unique identifier for relationship |
| **Patient\_ID (FK)** | Number(10) | Not allowed | Patient unique identifier |
| **Relationship\_code** | Varchar2(4) | Not allowed | Relationship code (i.e. MOTH = mother) |
| **Relationship\_description** | Varchar2(20) | Not allowed | Relationship description |
| **Dependent\_name** | Varchar2(20) | Not allowed | Patient's dependent's name |
| **Guardian\_name** | Varchar2(20) | Not allowed | Patient's guardian's name |
|  |  |  |  |
|  |  |  |  |
| **Patient Allergy** |  |  |  |
| **Number of Columns:** | 2 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 2 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Patient\_ID (FK)** | Number(10) | Not allowed | Patient unique identifier. Together with Allergy\_ID forms a composite key for this table. |
| **Allergy\_ID (FK)** | Number(7) | Not allowed | Allergy unique identifier. Together with Patient\_ID forms a composite key for this table. |
|  |  |  |  |
|  |  |  |  |
| **Allergy** |  |  |  |
| **Number of Columns:** | 2 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 0 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Allergy\_ID (PK)** | Number(7) | Not allowed | Unique identifier for allergy |
| **Allergy\_description** | Varchar2(50) | Not allowed | Allergy's description |
| **Occurrence** |  |  |  |
| **Number of Columns:** | 3 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 2 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Immunization\_ID (FK)** | Number(10) | Not allowed | Immunization unique identifier. Together with Adverse\_reaction\_ID forms a composite key for this table. |
| **Adverse\_reaction\_ID (FK)** | Number(6) | Not allowed | Adverse reaction unique identifier. Together with Immunization\_ID forms a composite key for this table. |
| **Occurrence\_date** | Datetime | Allowed | The date of the occurrence |
|  |  |  |  |
|  |  |  |  |
| **Adverse Reaction** |  |  |  |
| **Number of Columns:** | 4 |  |  |
| **Number of indexes:** | 0 |  |  |
| **Number of foreign keys:** | 0 |  |  |
| **Codes:** | 0 |  |  |
| **Type:** | Table |  |  |
|  |  |  |  |
| **Columns** | **Data Type** | **Allow NULLs** | **Note** |
| **Adverse\_reaction\_ID (PK)** | Number(6) | Not allowed | Unique identifier for adverse reaction |
| **Adverse\_reaction\_type** | Varchar2(20) | Not allowed | Adverse reaction's type |
| **Adverse\_reaction\_description** | Varchar2(50) | Not allowed | Adverse reaction's description |
| **Adverse\_reaction\_severity** | Varchar2(30) | Allowed | Severity of adverse reaction |