Indian Health Service

4 Directions Warehouse

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WHERE WE ARE

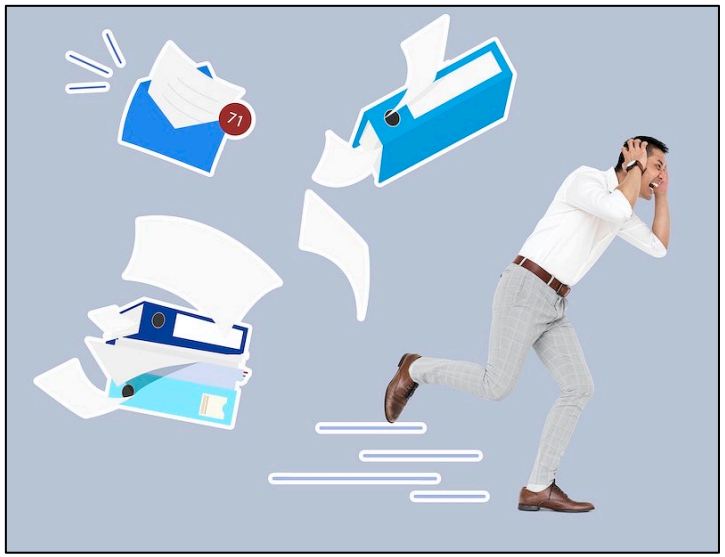
AND HOW WE GOT HERE

RPMS is 780 years old in “Technology Years”

- Resource and Patient Management System (RPMS) was born in 1984
- The first deployment for testing was in 1986
- There are years of clinical data in RPMS systems
  - Active Instances
  - Look-up Instances
  - Dormant Instances
- IHS is undertaking an effort to retire RPMS and move to a different EHR system.

WHAT TO DO ABOUT RPMS DATA?

Legacy Data Questions



- Maintain RPMS as a look up/reference system for a period of time
- Incorporate all the RPMS data into the new EHR (EEHR)
- Run away screaming
- Create an enterprise level repository to consolidate all the legacy data

Discussion on Data Options

Maintaining an RPMS instance

- Does not facilitate universal use of the data
- Will be increasingly cumbersome to operate and maintain
- Increases the risk that a local incident damages or deletes data
- Requires maintenance of software licenses

Incorporating all the legacy data into the EEHR

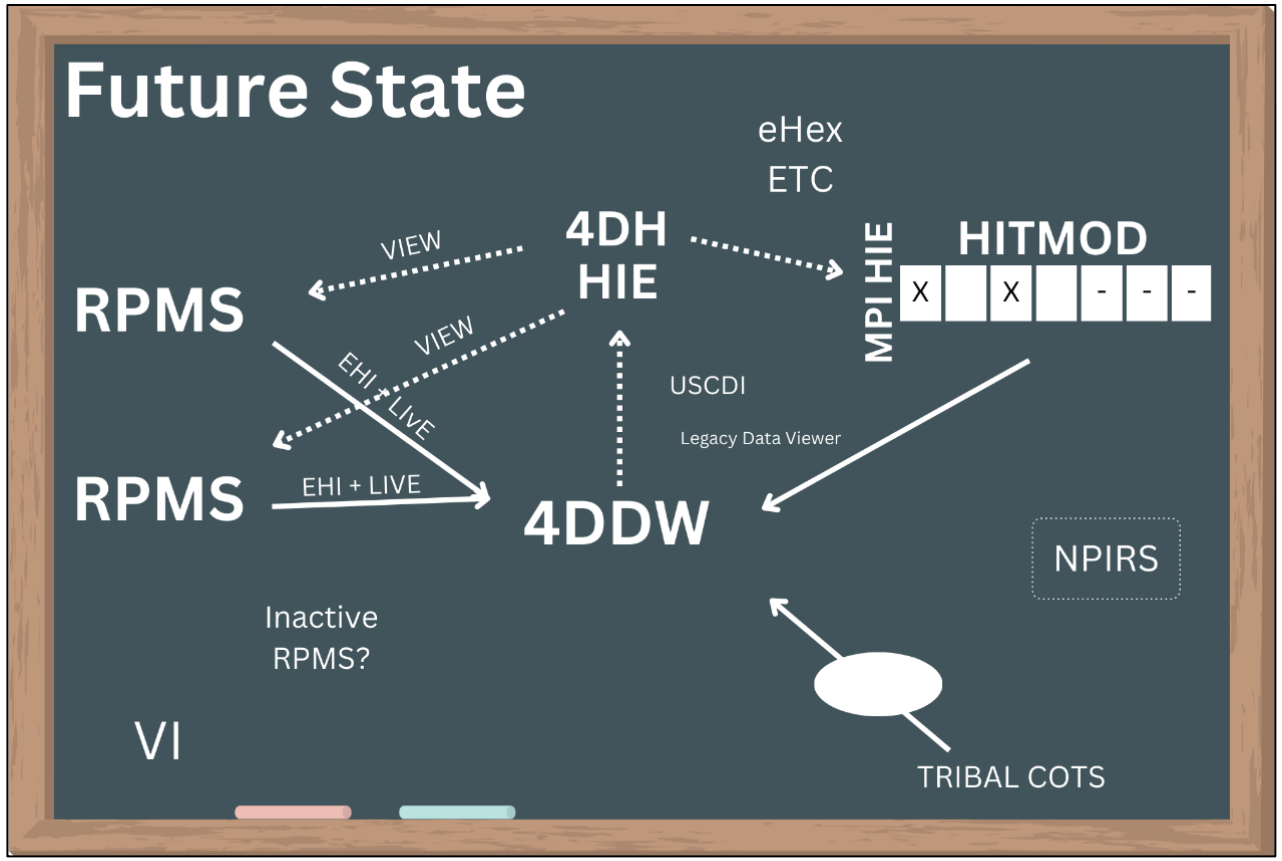
- Very difficult from a technology standpoint
- Would increase the implementation time
- Large possibility of introducing instability in the EEHR

Run away screaming

- My personal favorite, but not really a viable choice

A Repository

4DW is Born in a Brainstorm Session



The Concept

Creation of a central repository for clinical data:

- To provide a method for providers to utilize legacy information from multiple sources without needing that data to be loaded into Enterprise Electronic Health Record (EEHR)
- Would not require maintenance of RPMS systems with associated overhead
- Allow “seeding” of EEHR with a small subset of data
- Provides a method to satisfy record retention requirements
- EEHR submits data to the repository on a continuous basis, creates a central longitudinal record regardless of the EEHR product used
- Allow for robust security controls with fewer resources
- Allow for a comprehensive enterprise data analytics environment

PROTOTYPE

LET’S CONFIRM THIS WILL WORK

Initiation

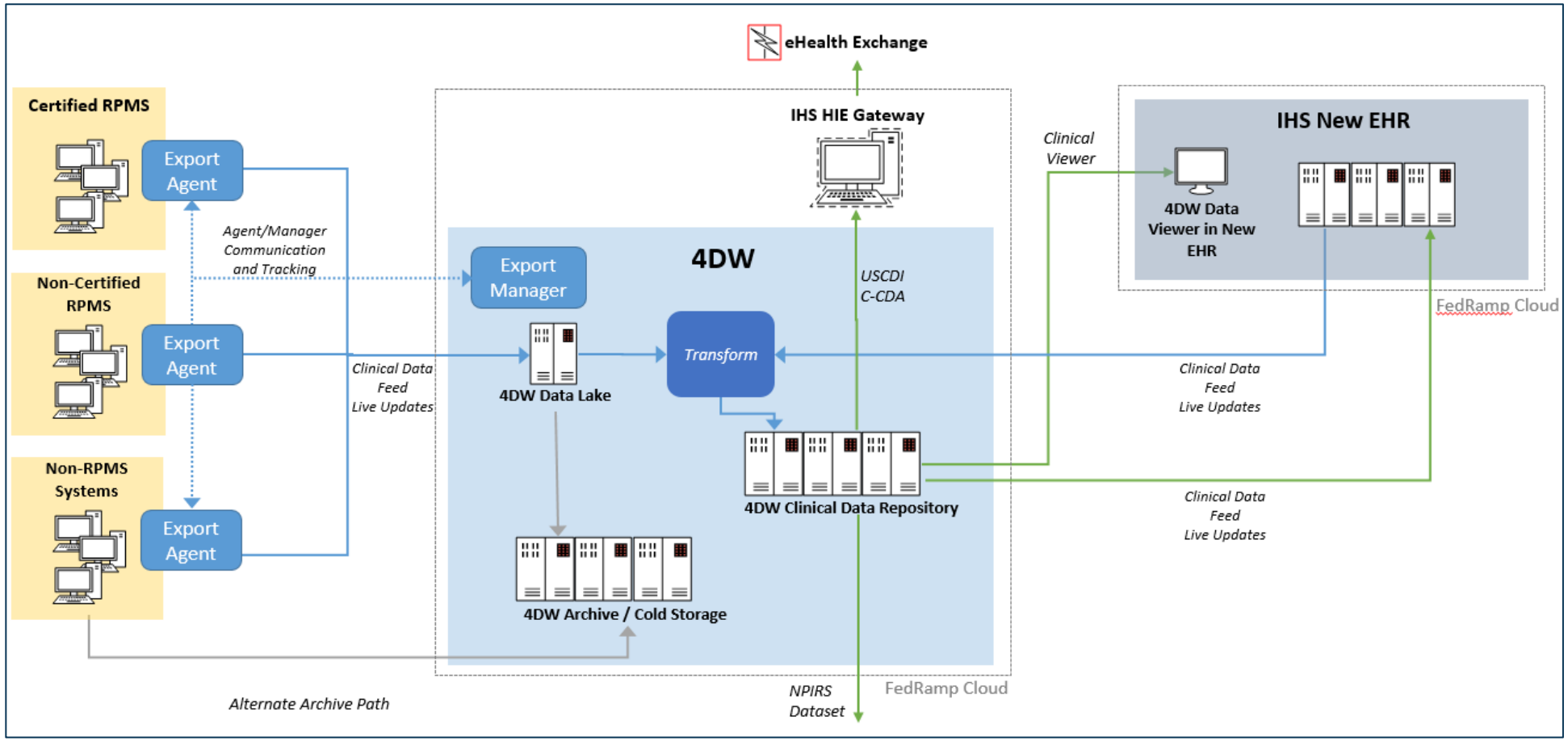
A central repository was determined to be “the” solution.

A design for a prototype was initiated to have at least these objectives:

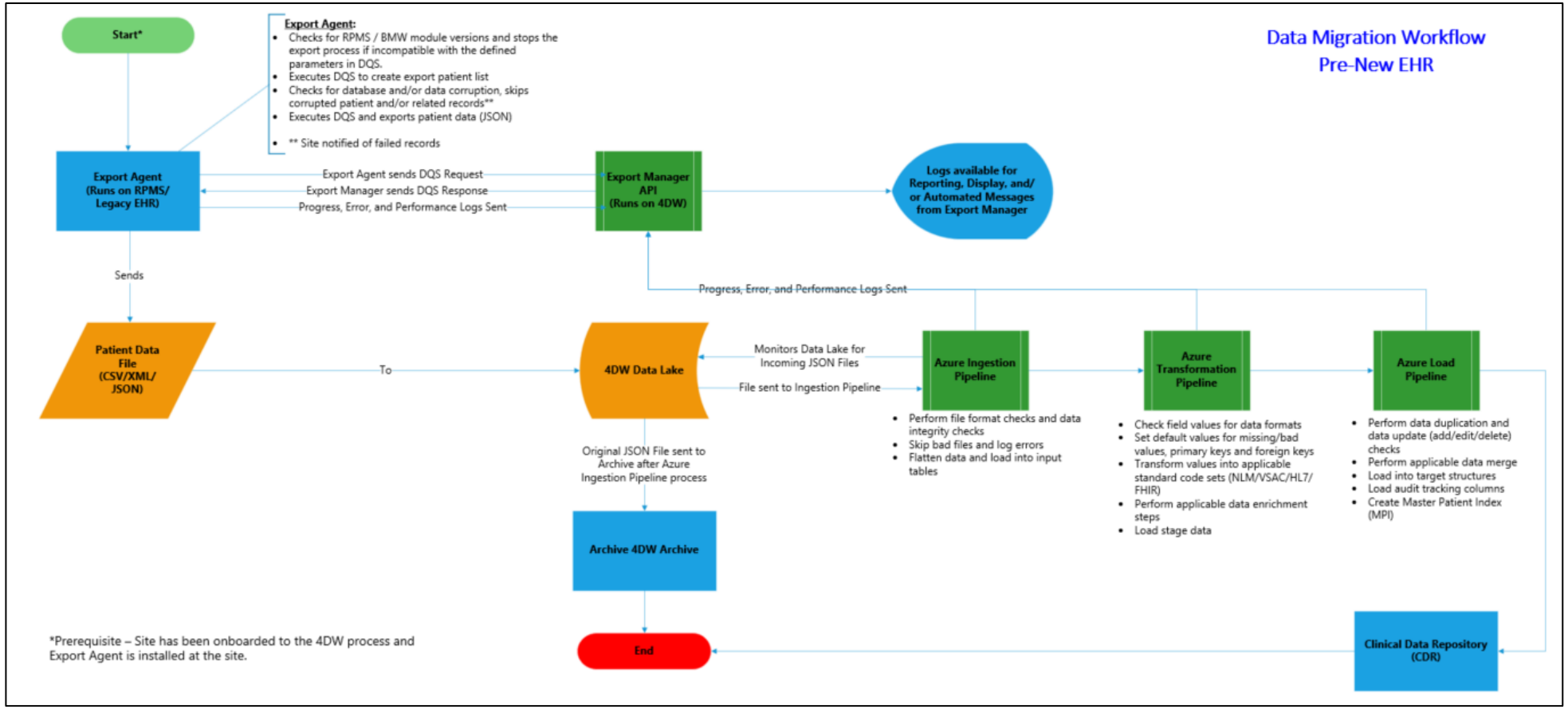
- Pull data from RPMS and transform it into a standards based repository
- Define requirements for a production environment
- Identify what policies required to support the environment
- Identify the magnitude of system implementation
- Identify requirement for security controls and contingency plans
- Identify operation and maintenance requirements for production
- Inform the business case to stand up the investment

The projected completion of the prototype was August 2023.

Prototype Architecture



Prototype Workflow



Prototype – Data Domains

Prototype data will include focus on these data domains:

- Patient
- **P**roblems
- **A**llergies
- **M**edication
- **P**rocedures
- **I**mmunizations

Considered the basic data domains that will “seed” the EEHR.

4DW Patient "PAMPI" Data

Patient

Criteria: Alive, Active Status, Visit within 3 Years

- Patient Name
- Address
- Contact Info
- Emergency Contacts
- Next of Kin
- Date of Birth
- Language
- Race/Ethnicity
- Gender
- Tribal Affiliation

Problems

Criteria: All Chronic Problems for Selected Patients

- Problem Code/Dx
- Description
- Body Location Code
- Related Visit
- Start/Stop Dates
- Status
- Resolved Date
- Rendering Provider
- Comments

Allergies

Criteria: All Active Allergies for Selected Patients

- Allergy Code
- Criticality
- Status
- Related Visit
- Date of Onset
- Record Date
- Resolution Date
- Reaction Type
- Asserting Provider

Medications

Criteria: Act. Meds, Out Pt Rx Last TBD Yrs, Act. Outside Rx

- Drug Codes (RxNorm/NDC)
- Drug Name
- Start/Stop Dates
- Category
- Dose Info
- Frequency/Route
- Prescribing Provider
- Status
- Comments/ Instructions

Procedures

Criteria: All Except 99XXX, for last TBD Years

- Procedure Code
- Procedure Date/Time
- Recorded Date/Time
- Status
- Performing Provider
- Location
- Body Site
- Notes
- Reason
- Outcome

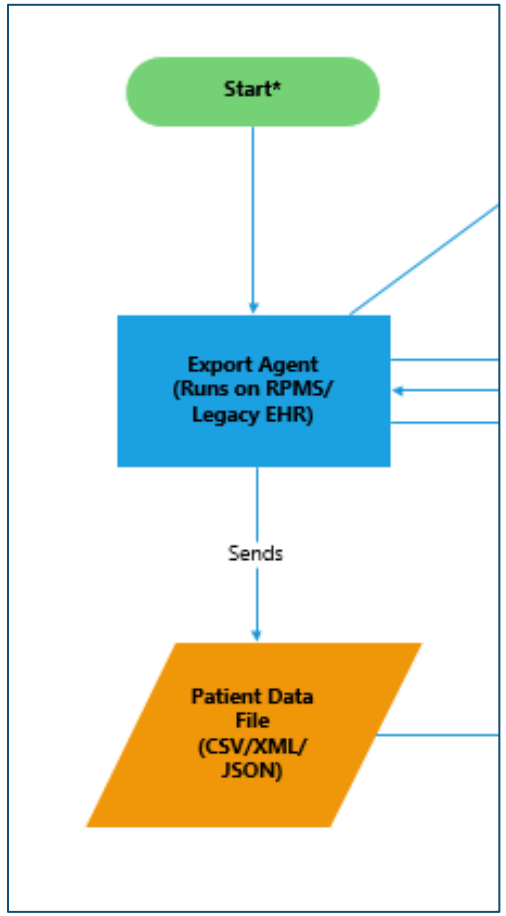
Immunizations

Criteria: All Immunizations for Selected Patients

- Vaccine Code
- Vaccine Lot
- Dosage Info
- Manufacturer
- Administered Date
- Administer Location
- Ordering Provider
- Administering Provider
- Related Visit
- Dispensing Type
- Body Loc. Code

Note: The data shown in this image is summarized. A full catalog of the planned data fields are still being finalized.

Get the Data



See Slide 13 for full diagram.

JavaScript Object Notation (JSON) – Provenance


```
{
  "metadata": {
    "dqs_version": "7",
    "time_zone": "EDT",
    "extracted_on": "2023-07-14T10:01:17",
    "name": "2013 DEMO HOSPITAL",
    "short_name": "DEMO HOSP",
    "area_name": "HEADQUARTERS WEST",
    "service_unit_name": "ALBUQUERQUE",
    "unique_rpms_db_id": "99999",
    "production": "0",
    "asufac_code": "232101",
    "document_id": "B6619B5B-25C1-47DE-9D94-62C429A74A1E",
    "patient_id": "27447"
  },
```


Images containing examples of data throughout this presentation are used for demonstration purposes only and do not contain any real data.

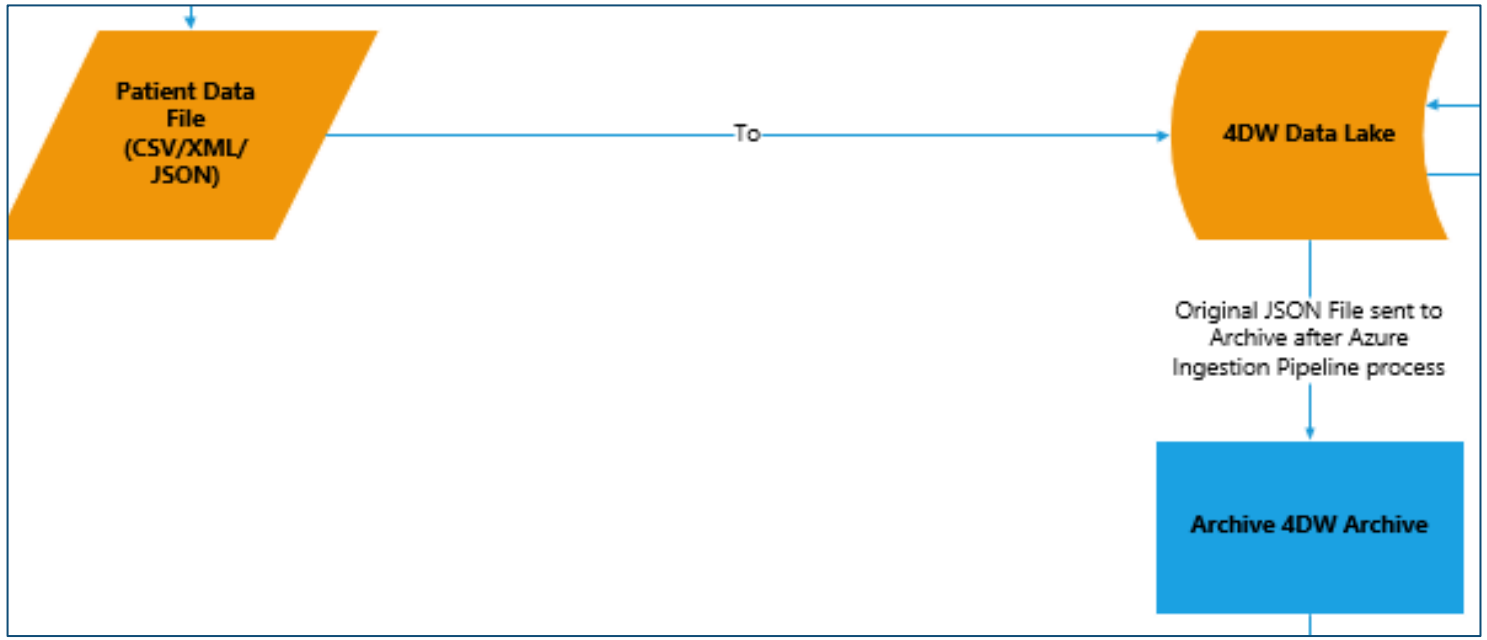
JavaScript Object Notation (JSON) - Demographics


```
"demographics": {
  "id": "27447",
  "name": "GONZALEZ,WOZNIACKI,GIMBLE",
  "preferred_name": null,
  "other_names": [{"id":"27447||1","alias":"GONZALEZ,ASTERRR,LIZA"}],
  "date_of_birth": "1958-04-02",
  "place_of_birth_city": "DUMAGUETTE",
  "place_of_birth_state": {"id":"CT","name":"CONNECTICUT"},
  "religious_preference": {"id":"9","name":"MORMON"},
  "social_security_number": "123452022",
  "datetime_of_last_update": "2023-06-16T12:20:23",
  "health_record_no": [{"id":"27447||978","number":"1004","inactivation_date":null,"facility":{"id":"978","name":"2013 DEMO TRIBE"},"record_disposition":{"id":"4","
  "sex": {"id":"U","name":"UNKNOWN"},
  "marital_status": {"id":"1","name":"DIVORCED"},
  "employer": {"id":"7735","name":"1ST IMPRESSN SCRTY DOORS"},
  "spouse_employer": {"id":"5483","name":"1ST CAUSE MAINTANCE DS"},
  "employment_status": {"id":"2","name":"PART-TIME"},
  "race": [{"id":"19","name":"CAMBODIAN","code":"2028-9"},{"id":"42","name":"BOTSWANAN","code":"2054-5"},{"id":"49","name":"BARBADIAN","code":"2054-5"},{"id":"70","
  "ethnicity": [{"id":"8","name":"CASTILLIAN","code":"2135-2"},{"id":"10","name":"BELEARIC ISLANDER","code":"2135-2"},{"id":"13","name":"CANARIAN","code":"2135-2"},
  "eligibility_status": {"id":"C","name":"CHS & DIRECT"},
  "eligibility_reasons": [{"id":"27447||1","eligibility_modifier":{"id":"11","name":"NON-INDIAN CHILD LIVING IN AN ELIGIBLE INDIAN HOUSEHOLD"}}],
  "beneficiary": {"id":"19","name":"NOAA PERSONNEL"},
  "indian_blood_quantum": "FULL",
  "tribe_of_membership": {"id":"660","name":"AHKIOK-KAGUYAK NATIVE CORP.","code":"711"},
  "tribe_quantum": "FULL",
  "other_tribes": [{"id":"27447||1","tribe_quantum":"1/4","tribe":{"id":"507","name":"AGDAAGUX TRIBE OF KING COVE","code":"597"}},{"id":"27447||2","tribe_quantum":"
```


Images containing examples of data throughout this presentation are used for demonstration purposes only and do not contain any real data.

Move the Data

See Slide 13 for full diagram.



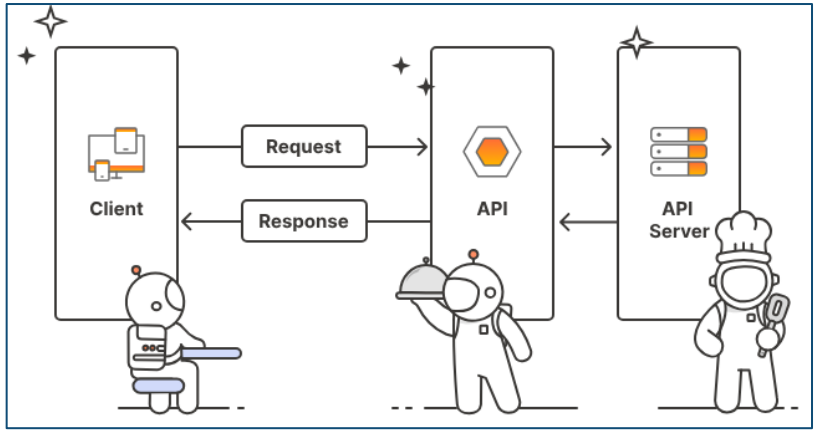
Move Source Data

Manager and Agent communicate using an application programming interface (API).

Manager sets schedule

Agent performs queries

Agent replies using HTTPS POST operation with the JSON objects created by the queries.



https://www.postman.com/what-is-an-api/

Steps for Moving Source Data

Steps + Add another step

- demographics {.}
- problem [.]
- immunization [.]
- allergy [.]
- visit [.]
- hospitilization [.]
- ervisit [.]
- cpt [.]
- procedure [.]
- immunization-due [.]
- pov [.]
- radiology [.]
- medication [.]
- prescription [.]
- contra-indication [.]

Section: demographics

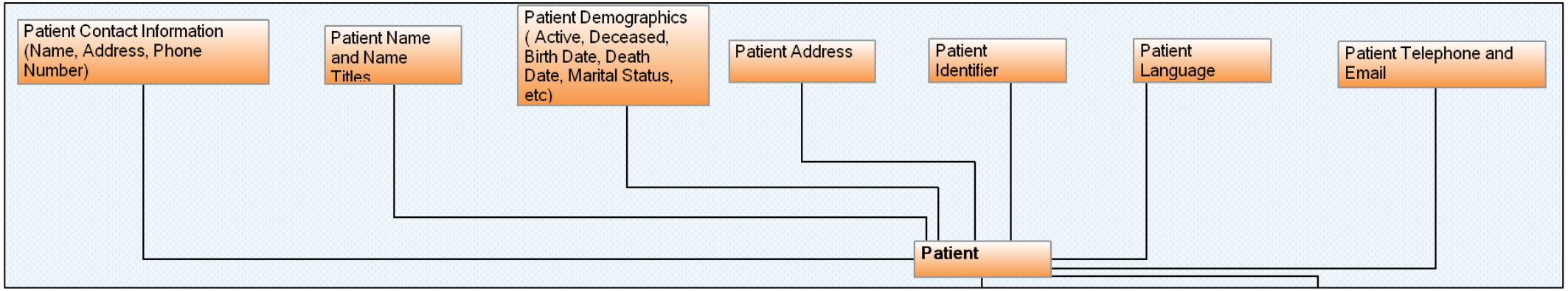
Type: object

```sql
SELECT
  VP.IEN as Id,
  VP.NAME,
  IP.PREFERRED_NAME,
  (
    SELECT
      JSON_ARRAYAGG(OtherName)
    FROM
      (
        select
          JSON_OBJECT('id' : AL.ROWID, 'alias' : AL.ALIAS) as OtherName
        FROM
          BMW.ALIAS_2C2_01 as AL
        where
          AL.VA_PATIENT = VP.IEN
      )
  ) as OTHER_NAMES,
  VP.DATE_OF_BIRTH,
  VP.PLACE_OF_BIRTH_CITY,
  JSON_OBJECT(
    'id' : VP.PLACE_OF_BIRTH_STATE -> Abbreviation,
    'name' : VP.PLACE_OF_BIRTH_STATE -> Name ABSENT ON NULL
  ) as PLACE_OF_BIRTH_STATE,
  JSON_OBJECT(
    'id' : VP.RELIGIOUS_PREFERENCE, 'name' : VP.RELIGIOUS_PREFERENCE -> NAME ABSENT ON NULL
  ) as RELIGIOUS_PREFERENCE,
  VP.SOCIAL_SECURITY_NUMBER,
```

Model the Data

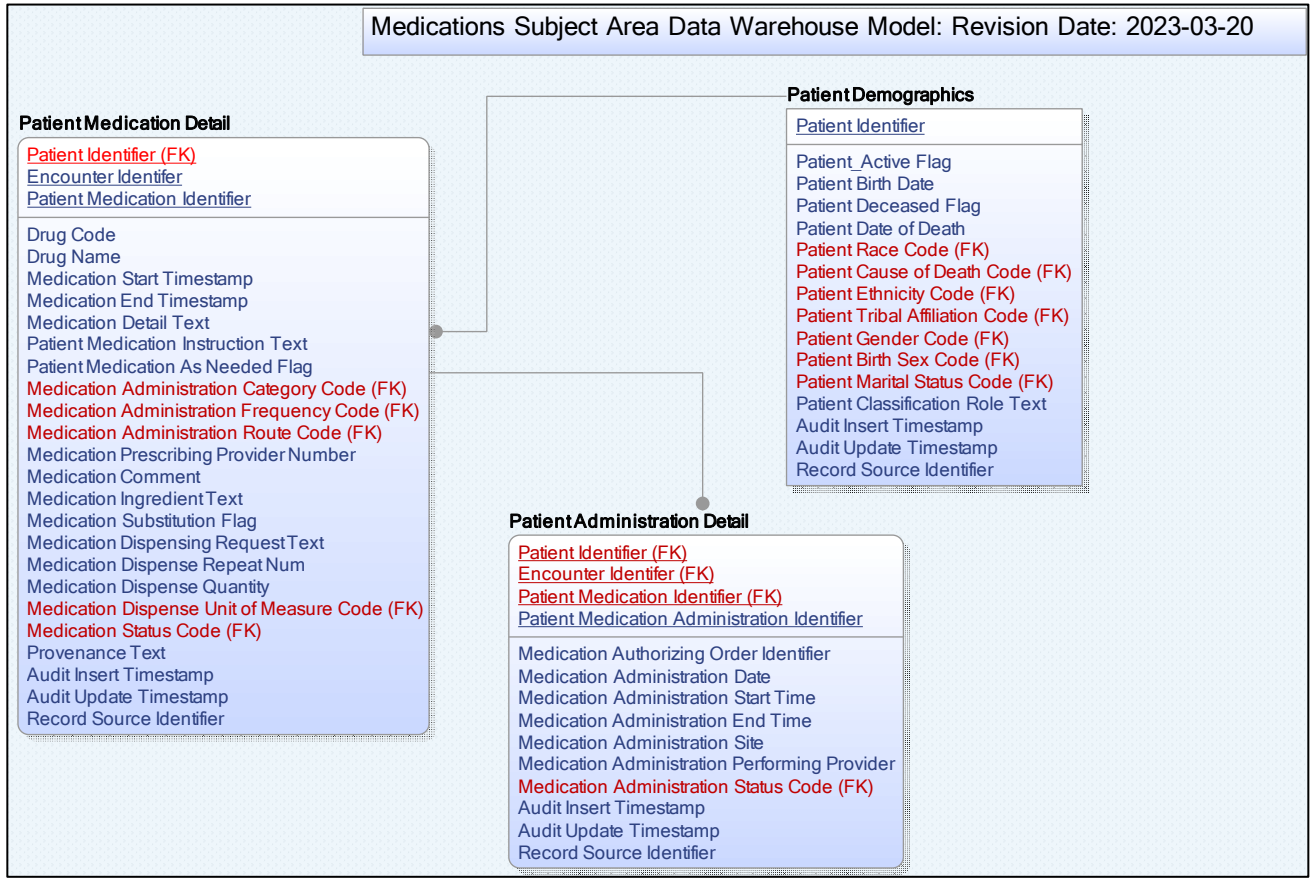
Developing Conceptual Models

Each of the data domains are conceptualized and modeled



Conceptual data models focus on identifying the data used in the business but not its processing flow or physical characteristics

Logical Model



A logical data model establishes the structure of data elements and the relationships among them.

There are several types of Logical Models. This example is a relational data model.

Data Dictionary

A data dictionary for each domain is created.

Contains information about the data in a centralized repository

- Meaning
- Relationships
- Origin
- Usage
- Format

Adopts a convention for naming elements

Conceptually, the data dictionary identifies which data is appropriate for different use cases

Sample Data Dictionary

Subject Area Name	Entity Logical Name	Table Physical_Name	Attribute Name	Column Name	Attribute.Physical.USCDI/FHIR Field Name	Column Definition
Patient	Patient Demographics	Patient_Demographics	Patient Identifier	Patient_Identifier	Patient.Id	Unique Identifier for this Patient
Patient	Patient Demographics	Patient_Demographics	Patient_Active Flag	Patient_Active_Flag	Patient.Active	Flag to indicate whether the patient is considered active
Patient	Patient Demographics	Patient_Demographics	Patient Birth Date	Patient_Birth_Date	Patient.BirthDate	Known or estimated year, month, and day of the patient's birth.
Patient	Patient Demographics	Patient_Demographics	Patient Deceased Flag	Patient_Deceased_Flag	Patient.Deceased.DeceasedBoolean	Flag to indicate whether patient is deceased
Patient	Patient Demographics	Patient_Demographics	Patient Date of Death	Patient_Date_of_Death	Patient.Deceased.DeceasedDateTime	Known or estimated year, month, and day of the patient's death.
Patient	Patient Demographics	Patient_Demographics	Patient Classification Role Text	Patient_Classification_Role_Text	Encounter.Hospitalization.SpecialCourtesy	A Flag indication of confidentiality that allows different functionality around privacy or special treatment of a Patient. Possible values are EMPLOYEE, DONOR, SENSITIVE PATIENT.
Patient	Patient Demographics	Patient_Demographics	Patient Cause of Death Code	Patient_Cause_of_Death_Code		The cause of death code for a given patient
Patient	Patient Demographics	Patient_Demographics	Patient Ethnicity Code	Patient_Ethnicity_Code	USCoreEthnicityExtension	The ethnicity of the patient code
Patient	Patient Demographics	Patient_Demographics	Patient Tribal Affiliation Code	Patient_Tribal_Affiliation_Code		Tribe or a band the individual associates with
Patient	Patient Demographics	Patient_Demographics	Patient Birth Sex Code	Patient_Birth_Sex_Code	Patient.Gender	Supporting US Core - Sex code of the patient at birth
Patient	Patient Demographics	Patient_Demographics	Patient Gender Code	Patient_Gender_Code	Patient.Gender	Documentation of a specific instance of sex and/or gender information.
Patient	Patient Demographics	Patient_Demographics	Patient Marital Status Code	Patient_Marital_Status_Code		The marital status code of a patient
Patient	Patient Demographics	Patient_Demographics	Audit Insert Timestamp	Audit_Insert_Timestamp	Derived	The insert timestamp of when the record was inserted in the table
Patient	Patient Demographics	Patient_Demographics	Audit Update Timestamp	Audit_Update_Timestamp	Derived	The update timestamp of whne the record was updated in the table
Patient	Patient Demographics	Patient_Demographics	Record Source Identifier	Record_Source_Identifier	Derived	The source code of the record (e.g. 1 -RPMS, 2-EHR system, etc)
Patient	Patient Demographics	Patient_Demographics	Patient Race Code	Patient_Race_Code	USCoreRaceExtension	The race of the patient code
Patient	Patient Name	Patient_Name	Patient Identifier	Patient_Identifier	Patient.Id	Unique Identifier for this Patient
Patient	Patient Name	Patient_Name	Patient Name	Patient_Name	HumanName.Text, HumanName.Given, HumanName.Family	The name of the patient tied to the type and class of the patient name
Patient	Patient Name	Patient_Name	Patient Prefix	Patient_Prefix	HumanName.Prefix	The prefix portion of the Patient / Member / Consumer 's name.
Patient	Patient Name	Patient_Name	Patient Suffix	Patient_Suffix	HumanName.Suufix	The suffix portion of the Patient / Member / Consumer 's name.
Patient	Patient Name	Patient_Name	Patient Name Effective Date	Patient_Name_Effective_Date	HumanName.Period.Start	The start of the time period when the name was or is in use. The dates between the effective and obsolete dates should be non overlapping

Fast Healthcare Interoperability Resources (FHIR)

FHIR a standard created in 2012 and maintained by the HL7 organization

Defines health care information used for exchange between different computer systems regardless of the architecture and storage on the source or destination systems

Supported by major vendors and open-source communities.

Uses the concept of “resources”, provides for extensions to the resources if needed for a particular use.

Broadly, organized into three (3) category groups:

- Infrastructure (Level 1 and Level 2)
- Content (Level 3 and Level 4)
- Reasoning (Level 5)

FHIR V5.0.0 R5 – Infrastructure

Level 1 Basic framework on which the specification is built

Foundation	Base Documentation, XML, JSON, RDF, Datatypes, Extensions

Level 2 Supporting implementation and binding to external specifications

Implementer Support	Security & Privacy	Conformance	Terminology	Exchange
Downloads, Version Mgmt, Use Cases, Testing	Security, Consent, Provenance, AuditEvent	StructureDefinition, CapabilityStatement, ImplementationGuide, Profiling	CodeSystem, ValueSet, ConceptMap, Terminology Svc	REST API + Search Documents Messaging Services Databases Subscriptions

https://build.fhir.org/modules.html

FHIR V5.0.0 R5 – Content

Level 3 Linking to real-world concepts in the healthcare system

Administration	Patient, Practitioner, CareTeam, Device, Organization, Location, Healthcare Service

Level 4 Record-keeping and Data Exchange for the healthcare process

Clinical	Diagnostics	Medications	Workflow	Financial
Allergy, Problem, Procedure, CarePlan/Goal, Family History, RiskAssessment, etc.	Observation, Report, Specimen, ImagingStudy, Genomics, etc.	Medication, Request, Dispense, Administration, Statement, Immunization, etc.	Introduction + Task, Appointment, Schedule, Referral, PlanDefinition, etc.	Claim, Account, Invoice, ChargeItem, Coverage + Eligibility Request & Response, ExplanationOfBenefit, etc.

https://build.fhir.org/modules.html

FHIR V5.0.0 R5 – Reasoning

Level 5 Providing the ability to reason about the healthcare process

Clinical Reasoning

Library, PlanDefinition & GuidanceResponse, Measure/MeasureReport, etc.

Medication Definition

Medicinal, Packaged & Administrable product definitions, Regulated Authorization, etc.

https://build.fhir.org/modules.html

Master Person Index (MPI)

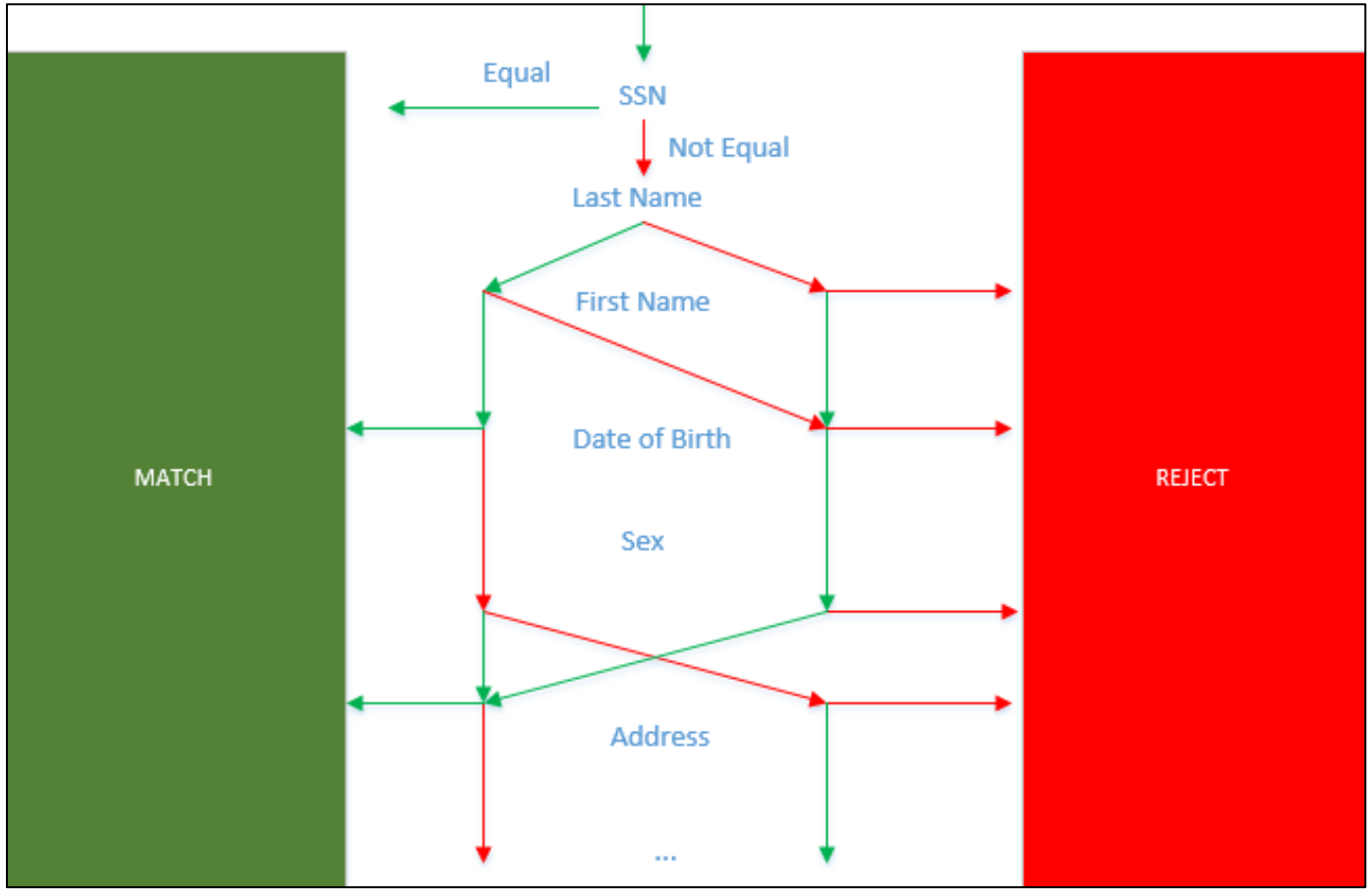
Provides a method to uniquely identify a patient across the enterprise

Four Directions Hub (4DH) services were used for the prototype

MPI's use various pieces of data associated with a person

- Data with a high likelihood of being the same identifiers across different locations
- Algorithms are used to compare these pieces of data
- Data is scored and if the score is high enough, a match is declared
- Once declared, the same identifier is assigned to the record sets.

MPI Decision Tree

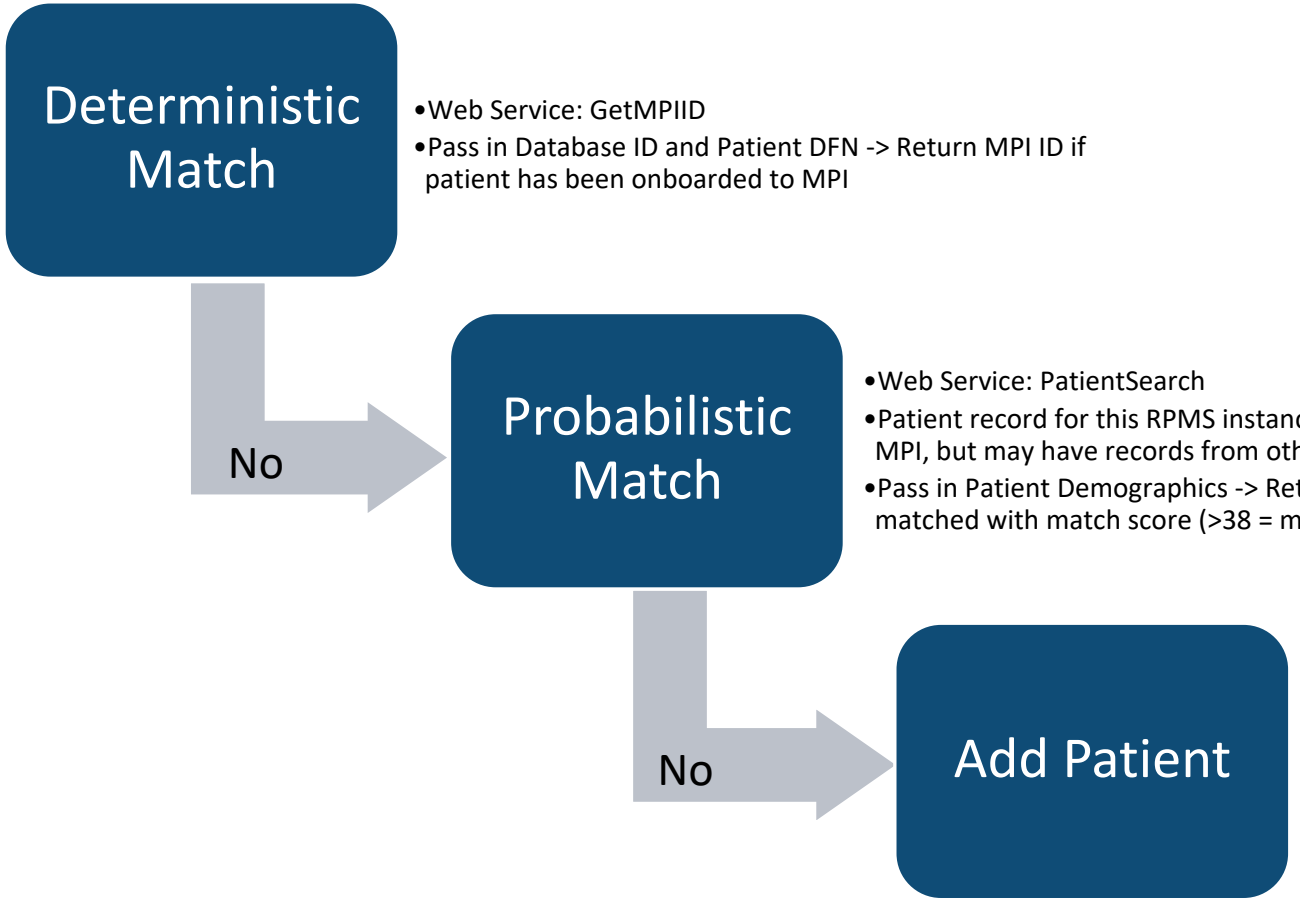


MPI Matching Values

Parameter	Agreement	Disagreement
Facility		
MRN		
names	14	-11
ssn	13.152	-9.7
gender	2.1	-1
birthdatetime	12.127	-9
identifiers	0	0
addresses	5.237	0
telecoms	5.286	0
(total)	51.902	-30.700

MRN in this context is the internal entry number (IEN or DFN) of the patient record, not the Health Record Number.

4DW MPI Decision Flow



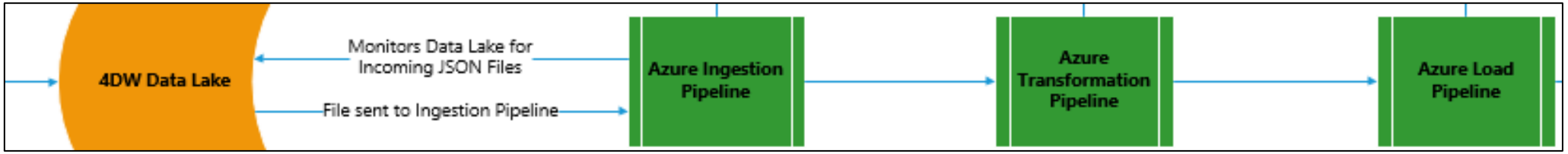
- Web Service: GetMPIID
- Pass in Database ID and Patient DFN -> Return MPI ID if patient has been onboarded to MPI

- Web Service: PatientSearch
- Patient record for this RPMS instance is not in the MPI, but may have records from other RPMS facilities
- Pass in Patient Demographics -> Return patient matched with match score (>38 = match)

- Web Service: Add Patient
- Pass in Patient Demographics -> Return Assigned MPI ID

Transform the Data

See Slide 13 for full diagram.

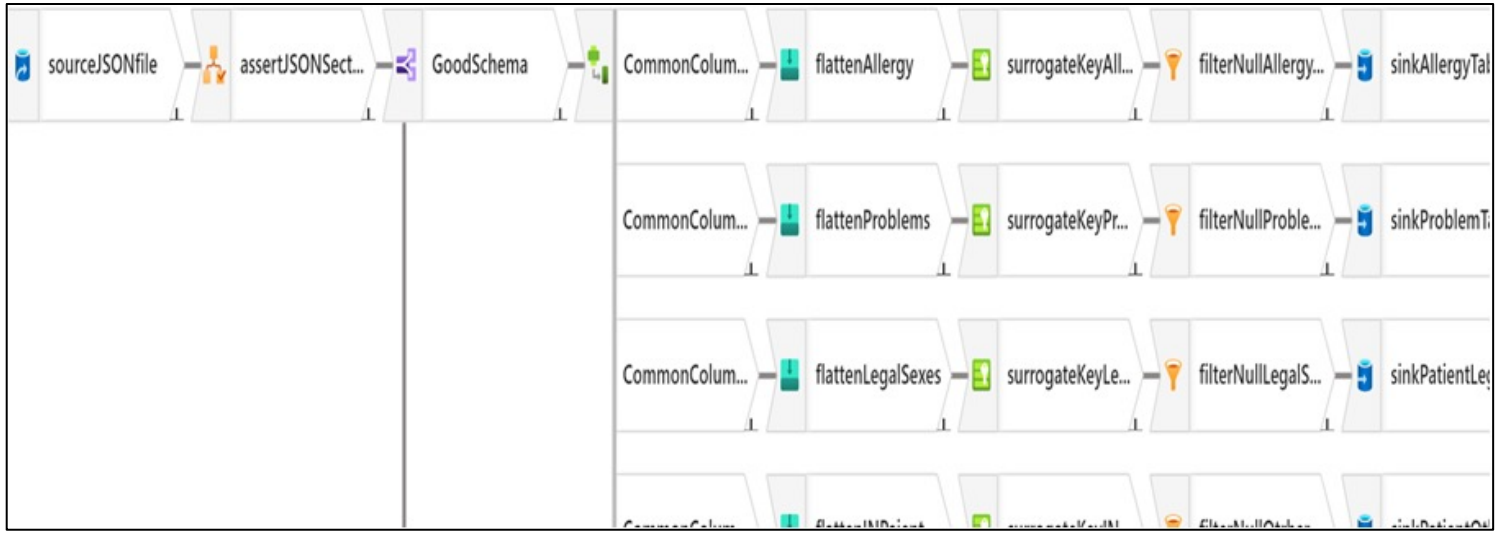


Transform the Data Dashboard

The data is extracted, structured defined, processing of the data begins

Data Flow Example for splitting arrays and validation checks on input files

(Work in progress)



Receipt and Control checks:

Parameterization:

- File Path
- DQS version
- Audit timestamp
- Environment Variable

Node checks:

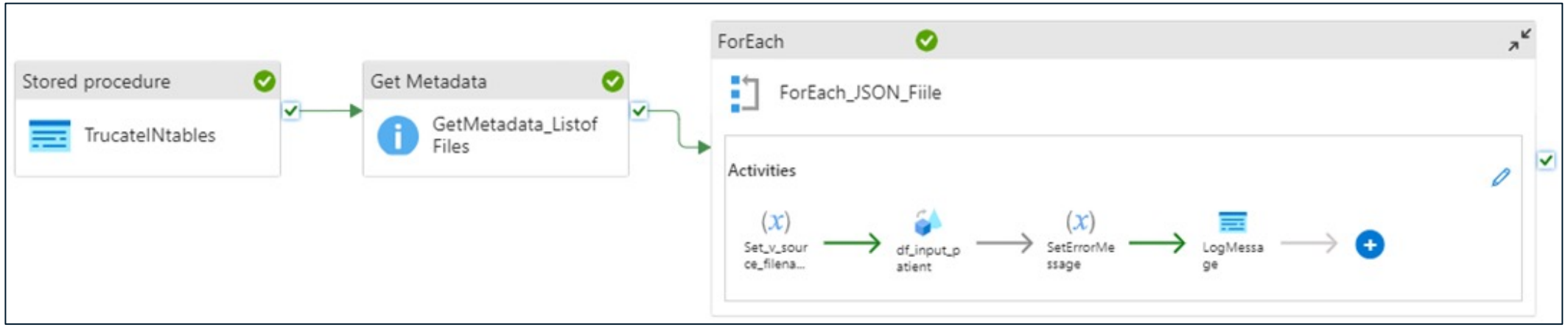
- Input file includes all nodes as expected (with or without data)

Logging bad data in error tables:

- Bad file information
- Flags – Information or Reject errors
- Check for no files in the path or completely empty files.
- Filter out null values for ids at primary node level

Data Flow Example for Procedures - Input, Stage and Target

Handling of large volume of JSON loads to CDR



This step in the master input pipeline allows to call a stored procedure to truncate tables, get the list of files and for each JSON file follows the process flow of setting the file name, running the data flow, set error messages and log messages.

Sample Viewer

GONZALEZ,WOZNIACKI,GIMBLE
FEMALE - 4/2/1958 (65 years, 3 months)

2013 DEMO HOSPITAL	232101	9	7/27/2023 2:45 PM	Test
Location	ASUFAC code	DQS Version	Exported On	

- Demographics
- Problem 16
- Immunization 3
- Allergy 2
- Visit 9
- Hospitilization 0
- Ervisit 0
- Cpt 14
- Procedure 3
- Immunization Due 2
- Pov 0
- Radiology 0
- Medication 3
- Prescription 2
- Contra Indication 2

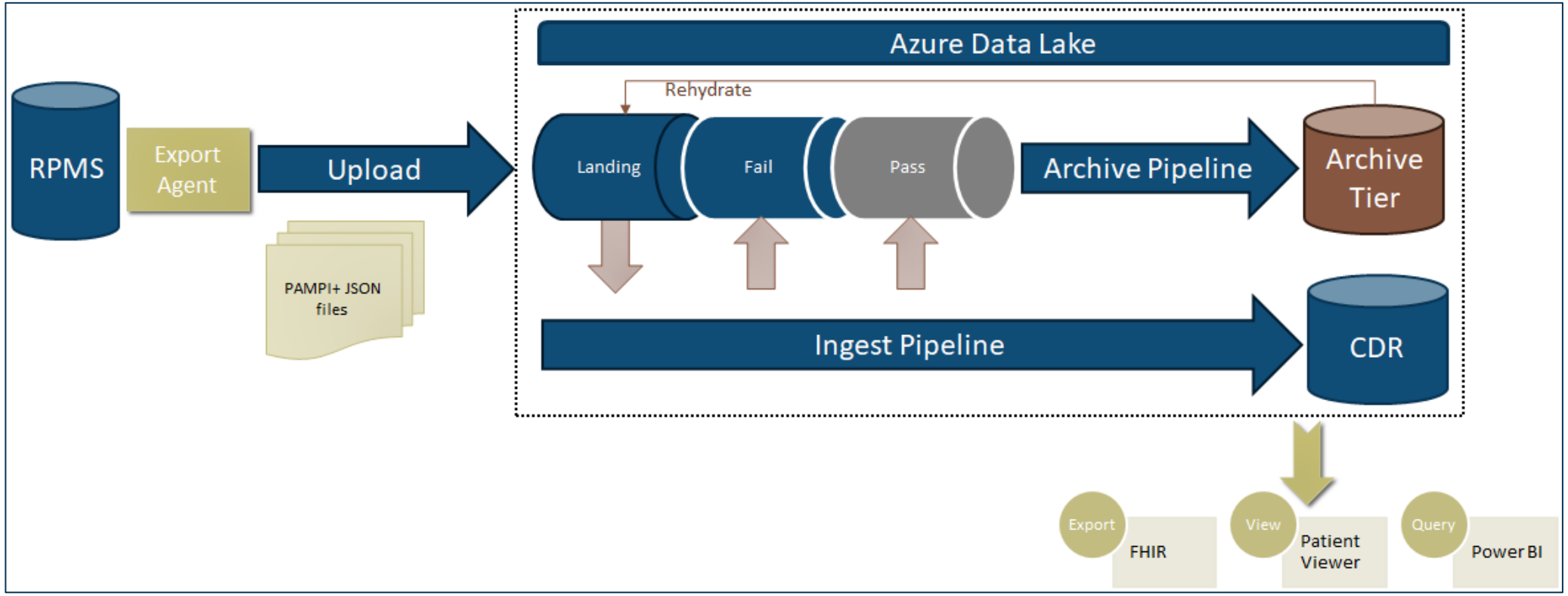
Id	27447	
Name	GONZALEZ,WOZNIACKI,GIMBLE	
Preferred Name	WOZNIACKI	
Other Names	id: 27447||1	alias: GONZALEZ,ASTERRR,LIZA
Legal Names	id: 652 date changed: 2023-06-02 13:08:48 proof provided: DISSOLUTION DECREE	name changed to: GONZALEZ,WOZNIACKI,GIMBLE document number: 235689
Date of Birth	1958-04-02	
Place of Birth City	DUMAGUETTE	
Place of Birth State	id: CT	name: CONNECTICUT
Religious Preference	id: 9	name: MORMON

Images containing examples of data throughout this presentation are used for demonstration purposes only and do not contain any real data.

Archive the Data

Option	A	B	C
Mode	PAMPI+ Archive	Fileman Archive	Database File Archive
File Type	JSON	JSON	DAT/BCK (Binary)
Toolset	4DW Agent / BMW	EHI / Fileman	Native (Cache/SQL etc)
Data Definition	Specific Domains (DQS)	Generic File/Field range	Native Backup
Export	Available (prototype)	Available (baseline)	Available (native)
Transport	Available (prototype)	TBD	TBD
Browsing	Patient Viewer (prototype)	Basic JSON Viewer	Requires VM/Lab InterSystems setup
Querying	Yes - Cosmos DB or Synapse	Yes - Cosmos DB	Requires VM/Lab InterSystems setup

Archive Model – Option A



Non-functional Requirements

Security Requirements

- Encryption in Transit and Encryption of Data at Rest
- Defined information flow enforcement
- Audit Tracking
- No direct End User Access
  - Privilege separation. Management capabilities and application functionality separated.
  - Defined access through System and Service Accounts
  - User interaction occurs through new EHR/potential viewer application
- Use of Infrastructure as Code to support version control and to support resiliency and disaster recovery
  - Backup and restore capabilities
- Use of FedRAMP High approved services and undergo formal assessment for an Authority to Operate

Prototype Documentation

Documents drafted for the prototype project serve as a basis for completing the required documentation for the operational system. These include:

- Draft source site preparation/considerations document
- Draft System Security Plan (SSP), prepare for Authorize to Operate (ATO)
- Draft Business Case to implement as an investment
- Draft Security Impact Assessment (SIA)
- Draft Privacy Impact Assessment (PIA)
- Draft Business Impact Assessment (BIA)
- Draft Incident Response Plan
- Draft Contingency/Disaster Recovery Plan
- Draft Disposition Plan (includes records management plan)
- Draft Plan of Action & Milestones (PO&A)

Prototype Accomplishments

- Demonstrated an effective and efficient method to extract data
- Demonstrated a method to transmit extracted data
- Demonstrated a method to ingest the data as received
- Demonstrated the transform and load of data into a central, cloud-based, repository.
- Demonstrated the MPI process.
- Demonstrated archival of data prior to processing.
- Described the architecture for imaging data.

Imaging Considerations

A need to describe the migration activities for Vista Imaging (VI) data is required.

Architecture creation for VI data has started.

- The Vista Imaging data will be migrated in conjunction with the clinical data using similar workflows.
- The migrated data will be stored in a “Vendor Neutral Archive (VNA)”
  - A technology that stores medical images in a standard format and interface.
  - TBD – If VNA will hold both administrative and diagnostic images in one archive or separate archives
  - VNA will not replace local PACS, but will receive updates
- Diagnostic evaluation of images will follow current process
- Central radiology services are possible if a sufficient throughput is available via the VNA

Data Loading Considerations

Data loading onto the 4DW system will be conducted in phases.

- Phase 1 - A subset of data that will “seed” the new EEHR. This can be conducted anytime before beginning the EEHR on-boarding process. Updates to data elements will flow to the 4DW until Phase 2 begins.
- Phase 2 – A full clinical data set load will coincide with the “go-live”. Exact timing is to be determined. Updates to the clinical data made after the export will be made in subsequent differential exports if needed.
- Phase 3 – A complete export of the existing RPMS system. The RPMS system will continue to be operated for a period of time after the organization is live on the new EEHR to support billing and purchase referred care closeout. This final export will be placed in long-term archive to satisfy record management timeline. Upon completion and validation of the export, the RPMS system can be decommissioned.

Historical Data Viewer Considerations

A viewer will be created on top of the data in the clinical data repository.

A full specification for the capabilities of the viewer will be created during the development of the operational system.

Since the data is being mapped into the FHIR framework, it is anticipated that standard views will be easily incorporated.

4DW Next Steps

Finalize prototype documentation, expected by September 30, 2023.

Finalize 4DW business case

Finalize acquisition package for the development, operations, and maintenance of 4DW

Policy Next Steps

Federal, Tribal and Urban Operational Terms & Conditions of Use

Record Management policy - Data Archiving Requirements

Boarding school data policy

Potential changes to patient privacy forms

Tribal withdrawal policy/procedure

42 CFR Part 2 data policy

4DW and Patient Consent

Data Use Agreements

Data Governance and Management Plans

Preparing for 4DW

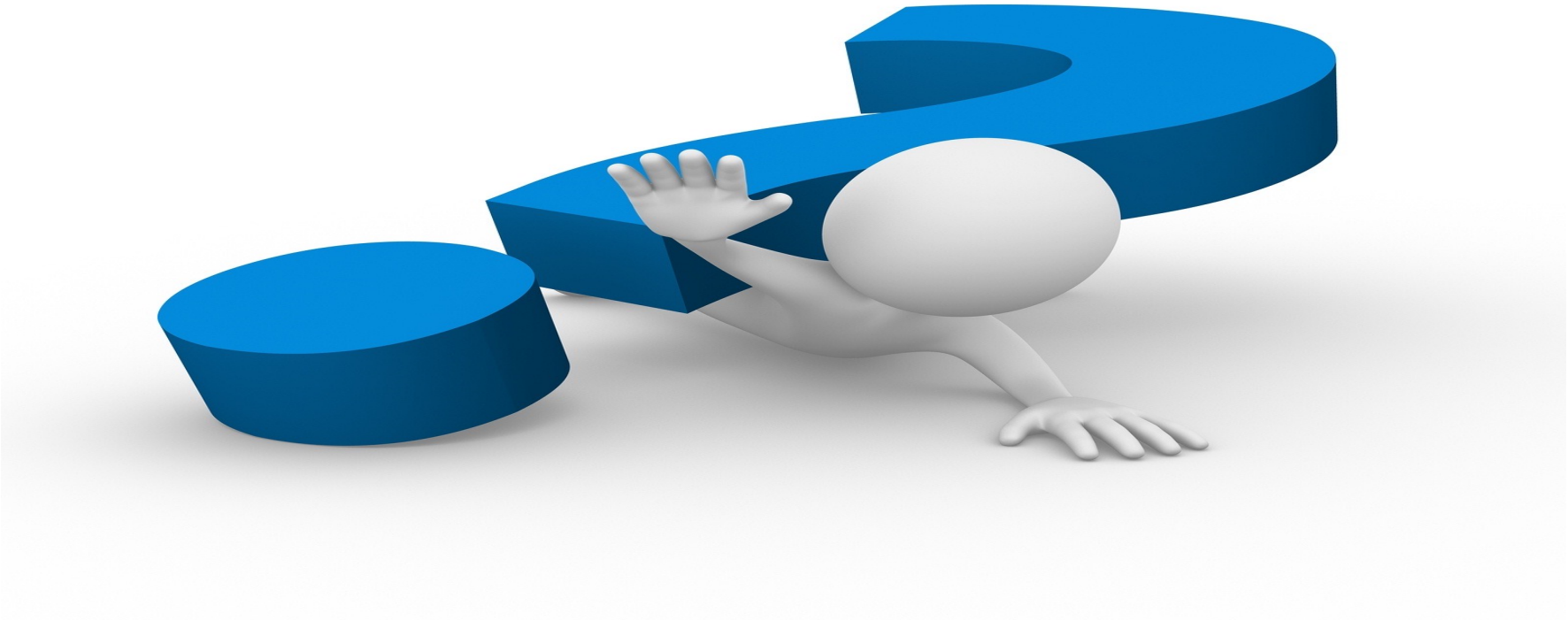
Ensure that the RPMS Systems are up to date with certified software

As common RPMS data issues are discovered and communicated, begin fixing that data (LOINC codes for Laboratory tests, Appropriate RxNorm nomenclature and NDCs for formulary items, mapping Radiology procedures to appropriate CPT codes, etc.)

Ensure that the integrated problem list is maintained

Many RPMS systems have data that require special handling rules

- i.e. Substance abuse treatment records, behavioral health provider notes, employee health records, etc.
- We will need to be able to identify these types of data.
- Local personnel will need to assess for this type of data and assist with creating the methods necessary to identify the elements.



Questions

Let’s Talk Modernization

The Division of Health IT Modernization (DHITMO) Organizational Change Management Team will be conducting Modernization Awareness interviews throughout the Partnership Conference.

Everyone is invited to participate!

- IHS Employees
- Tribal Leaders/Tribal Organizations
- Urban Leaders/Urban Organizations

Want to learn more about Modernization?

Join us for the “*Organizational Change Management: How to Ensure EHR Implementation Success*” session.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Acronym Definitions (1 of 2)

Acronyms	Description
4DW	Four Directions Warehouse
API	Application Programing Interface
C-CDA	Consolidated Clinical Document Architecture
CDR	Clinical Data Repository
CPT®	Current Procedural Terminology
CSV	Comma-separated values
DFN	Data File Number, also IEN
DQS	Domain Query Specification
EHI	Electronic Health Information
EEHR	Enterprise Electronic Health Record
EHR	Electronic Health Record
HIE	Health Information Exchange
HL7® FHIR®	Health Level Seven International Fast Healthcare Interoperability Resources
HRN	Health Record Number sometimes Chart Number

Acronym Definitions (2 of 2)

Acronym	Description
ICD	International Classification of Diseases
IEN	Internal Entry Number, also DFN
IHS	Indian Health Service
JSON	JavaScript Object Notation
LOINC®	Logical Observation Identifers Names and Codes
MPI	Master Patient Index
MRN	Medical Record Number
NARA	National Archives and Records Administration
NPIRS	National Patient Information Reporting System (IHS)
PAMPI	Problems, Allergies, Medication, Procedures, Immunizations
RPMS	Resource Patient Management System
SNOMED CT®	Systematized Nomenclature of Medicine Clinical Terms
TBD	To be Determined
USCDI	United States Core Data for Interoperability
XML	Extensible Markup Language