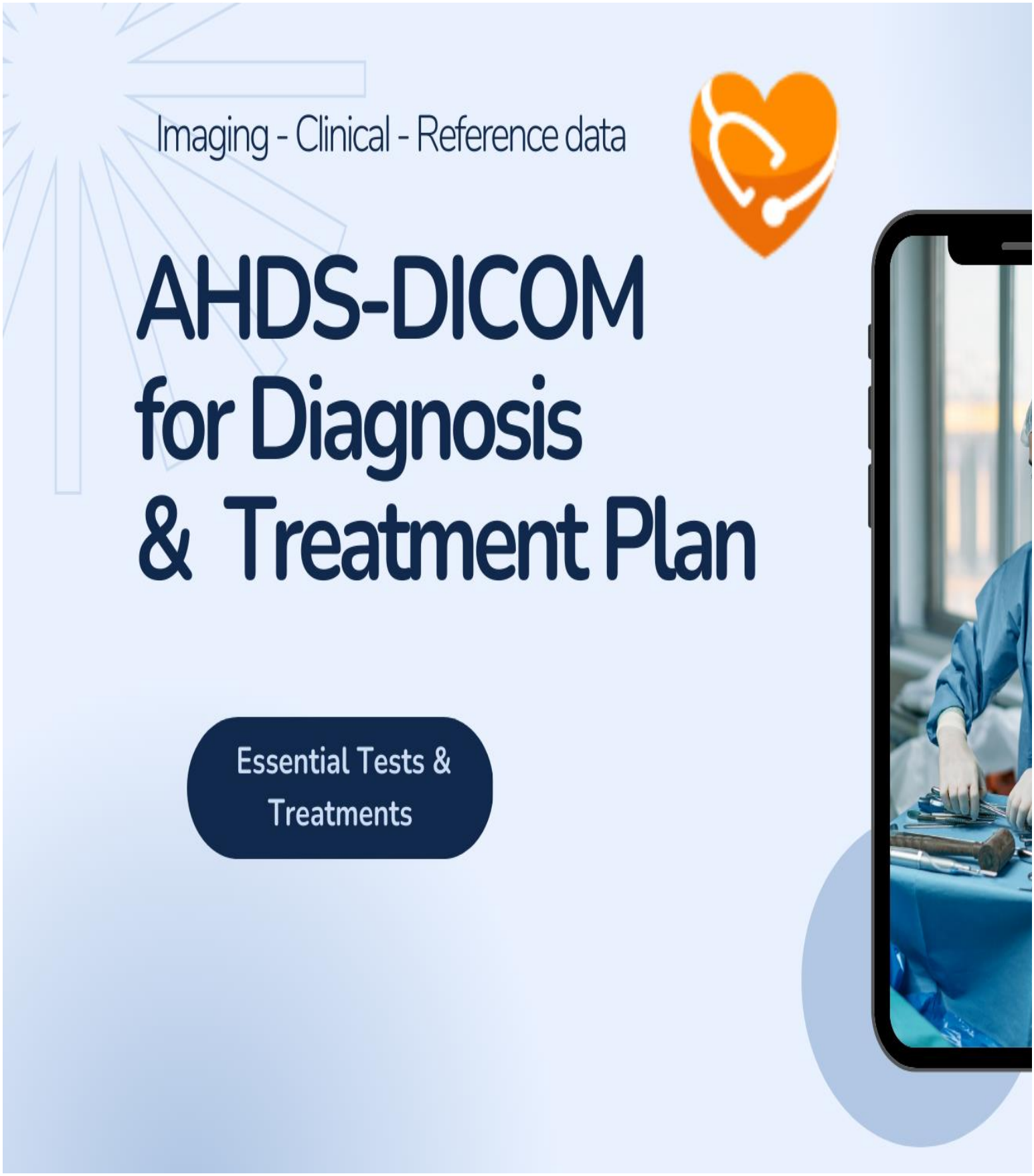
Imaging - Clinical - Reference data
AHDS-DICOM
for Diagnosis
& Treatment Plan
Essential Tests &
Treatments

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AHDS-DICOM Service for diagnosis of diseases & development of treatment plans using reference data

Introduction:

This article discussed how AHDS-DICOM service using the patient reference data, cohort discovery, patient imaging information, and clinical data, assists in the diagnosis of disease to allow for treatment plans for the patient.

This discussion mainly focused on a patient suffering from Brugada syndrome[i], and how AHDS-DICOM service will benefit a patient with Brugada syndrome, a rare form of heart disease in which the heart beats very rapidly and is associated with a high risk of stroke. This fast heartbeat, an arrhythmia[ii], could be fatal and life-threatening.

Azure Health Data Services (AHDS)

Azure Health Data Services (AHDS) is a set of managed API services based on open standards and frameworks to enable workflows to improve healthcare. AHDS platform is a platform as a service (PaaS).
It provides three services.

1. **Azure API for FHIR**

- It is a manages PaSS service and utilizes data storage and access.
- It includes SMART API service for mobile and web clients.

2. **DICOM** ((Digital Imaging and Communications in Medicine)

AHDS DICOM is a managed service that ingests and persists DICOM objects at a rate of multiple thousand images per second. It is a PaSS enables service. DICOM is a recognize standard in the healthcare industry can be used for transmit, storage process , retrieve and display images .It uses DICOM web's standard APIs, such as Store (STOW-RS), Search (QIDO-RS), and Retrieve (WADO-RS) for communication of imaging data with web enables systems and applications. The DICOM service enables organizations to store imaging data in FHIR and to execute queries that span clinical and imaging data.

3.**MedTech**

MedTech service is used for processing IoMT[i], Monitors, and Wearable devices data.

DICOM Service for the diagnosis and treatment plan for Brugada syndrome

The patient is suffering from **Brugada syndrome**, a rare form of heart disease where the heart beats very fast and this is very dangerous. This fast heart beats known as arrhythmia, it could be very fatal and life threatening.

Solution Adoption:

The patient has multiple cardiac MRIs and CTs scans of the heart. DICOM Medical Image Server used as a diagnostic tool for interpreting CT scans and cardiac MRI images and determining a treatment plan based on the cohort reference data.

Services:

The AHDS DICOM service is used for recommendations and suggestions. DICOM is used to analyze image metadata in conjunction with EHR[ii] data.

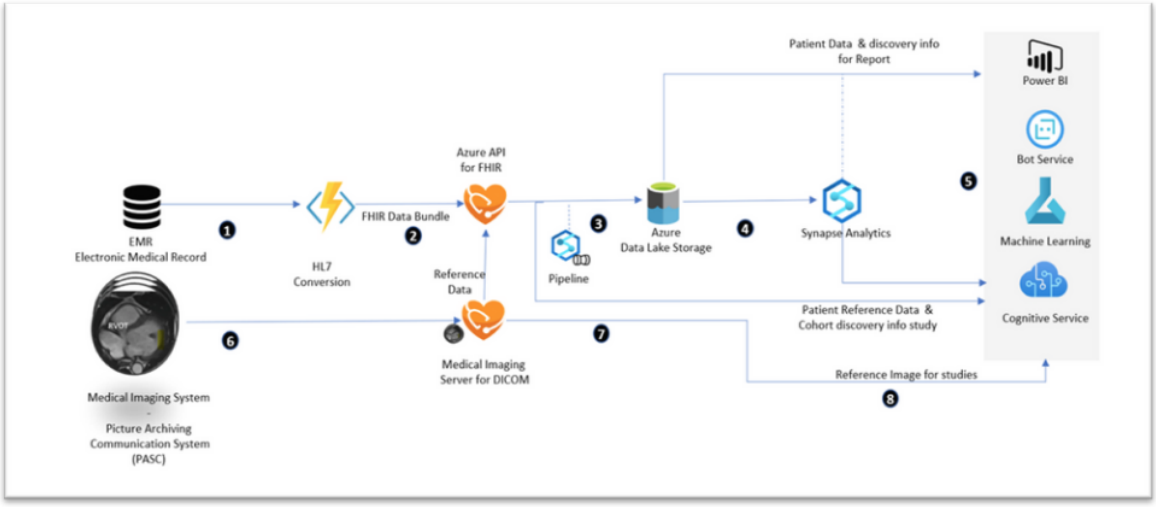
Reference Data:

The system provides the previous six years' recommendations, CT scans, and Cardiac MRIs of patients under 60 with an arrhythmia. This information helps the doctor develop a treatment plan. PASC -Picture Archiving Communication System and Medical Imaging Server for DICOM is used as a source for providing the reference data as requested. With DICOMcast[iii], DICOM metadata can be injected into an FHIR[iv] (hl7[v].org/fhir) service or FHIR server. This will provide a single source of truth for both clinical[vi] data and imaging metadata. This feature is available on demand.

Security:

All the data/metadata/images are PHI[vii] compliant.

AHDS-DICOM Service Reference Architecture: Disease diagnosis and treatment recommendation



Reference Architecture Flow:

1. EMR records Converted to FHIR Standards using HL7 Converter
2. FHIR Data Bundle available to consume using the Azure API for FHIR for further activities
3. Data from Azure API for FHIR storage moved to Azure Data Lake Storage (ADLS) by Synapse pipeline
4. Data from ADLS analyzed by Synapse Analytics make it available for the downstream reporting /other analytics requirements
5. 9 Data in the ADLS, FHIR storage & Synapse Analytics available for downstream consumptions purpose such as Cognitive , ML ,Healthcare Bot and Data

   Patient data and Coherent study information available for the further analysis and it is used for recommendation purpose

   Healthcare Bot : Provides healthcare information based on the input source data

   ML : Pre-trained predictive models provides recommendations for diagnosis and treatment plans based on the input data
6. Medical Imaging data from PASC system available for processing using the Medical Imaging Server for DICOM this generates the reference data
7. Medical Imaging Server for DIACOM processed the data and make it available for FURTHER analysis
8. Reference images data and EMR data readily available for the further analysis

Conclusion:

DICOM is a highly adopted PHI-secured image standard that can be useful for diagnosing the images and the reference data in combination with clinical data using DICOMCast. With these features, physicians can make a quick, accurate diagnosis and develop an immediate treatment plan.

References & Further Reading

[i] IoMT(Internet of Medical Things)

[ii] EHR (electronic health record) is a digital record of health information.
[iii] DICOMCAST : With DICOMcast, DICOM metadata can be injected into a FHIR service, or FHIR server, in order to provide a single source of truth for both clinical data and imaging metadata. This feature is available on demand.

[iv] FHIR or Fast Healthcare Interoperability Resources (hl7.org/fhir)**:** FHIR, or Fast Healthcare Interoperability Resources (hl7.org/fhir), is a next-generation standard developed by HL7 and introduced in 2014[ii]. The proposed standard is an essential alternative to HL7 V2 and V3.

[v] Health Level Seven International (HL7) Data Standards:
Hence, Health Level Seven International (HL7), which was founded in 1987 and is a not-for-profit organization with a vision of "To enable global health data interoperability by establishing standards that enable secure access and use of the right health data." and a mission of "Providing health data standards that enable secure access and use."

[vi]Clinical data related to patient diagnosis, demographics, exposures, laboratory tests, medication, symptoms and family relationships.

[vii] Protected Health Information https://www.hhs.gov/answers/hipaa/what-is-phi/index.html