IS 436 - Structured System Analysis & Design

Deliverable 3 - Process Modeling

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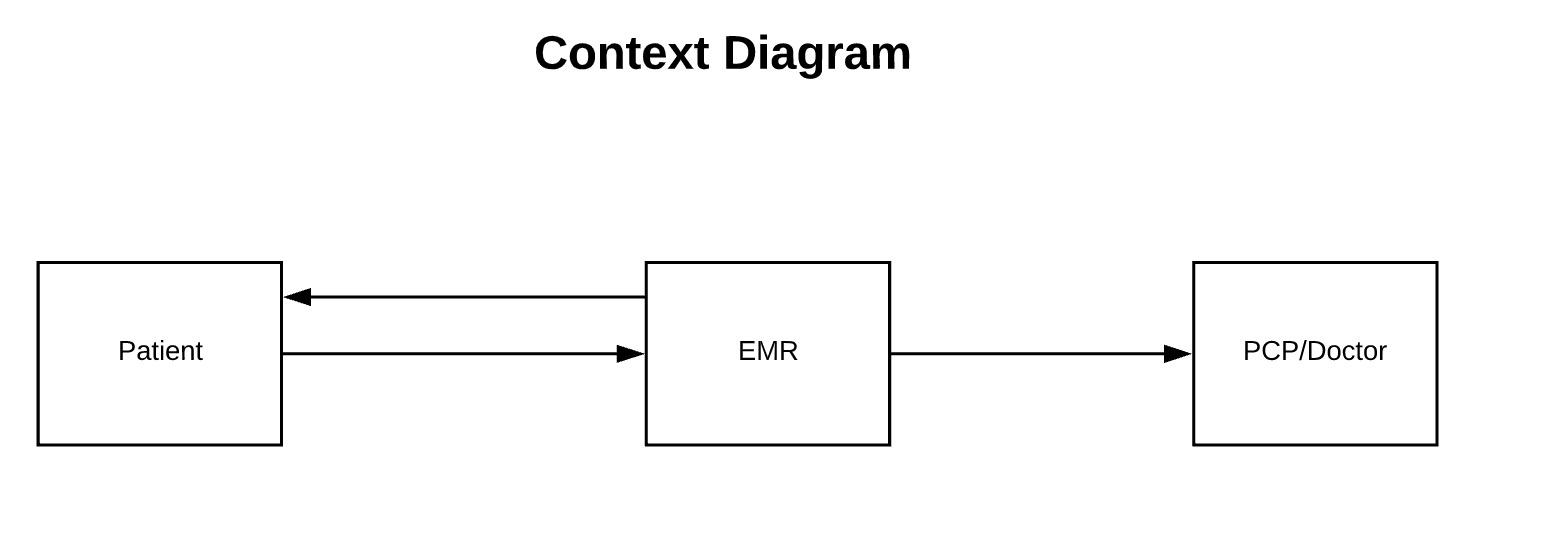
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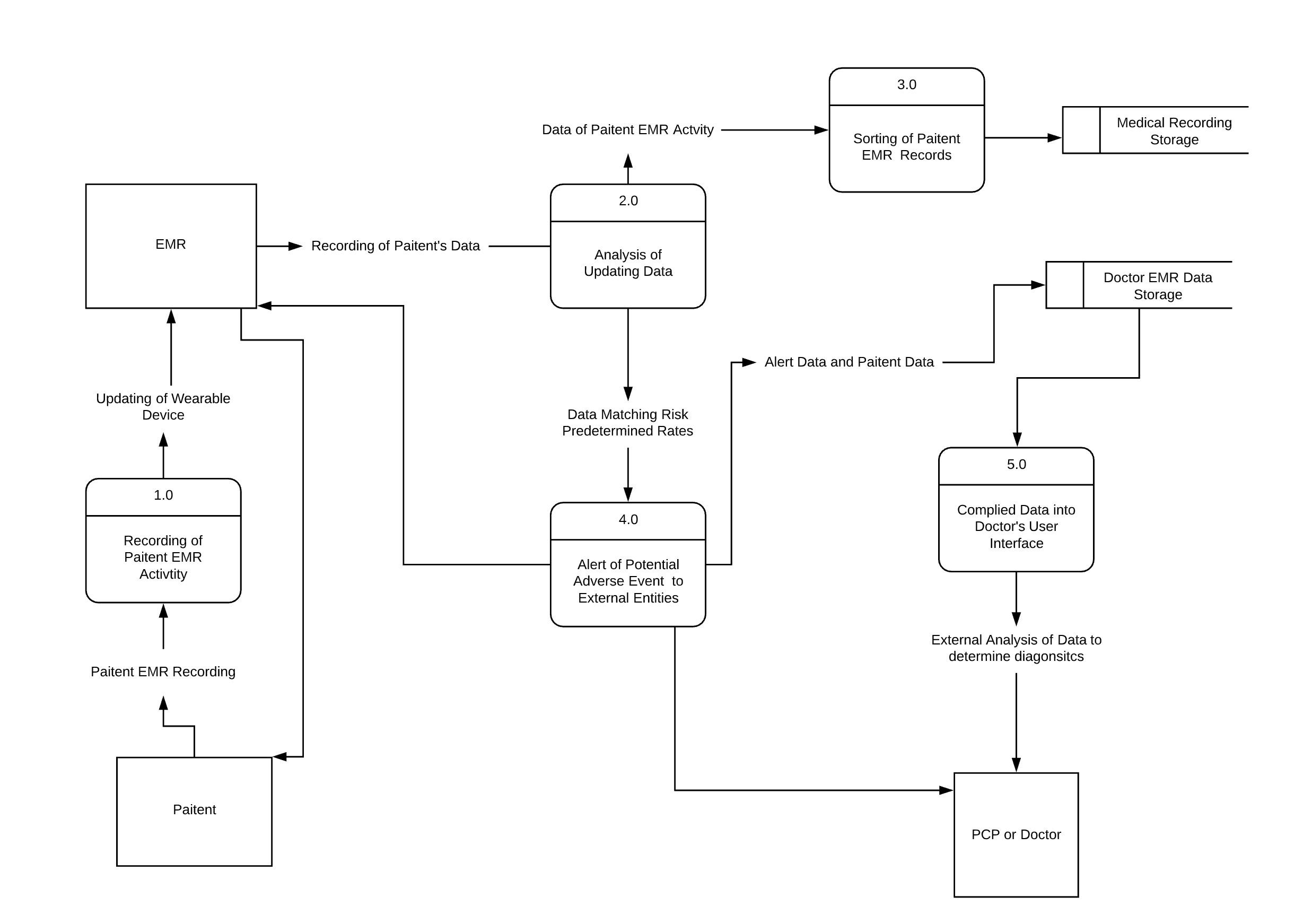
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**Context Diagram**

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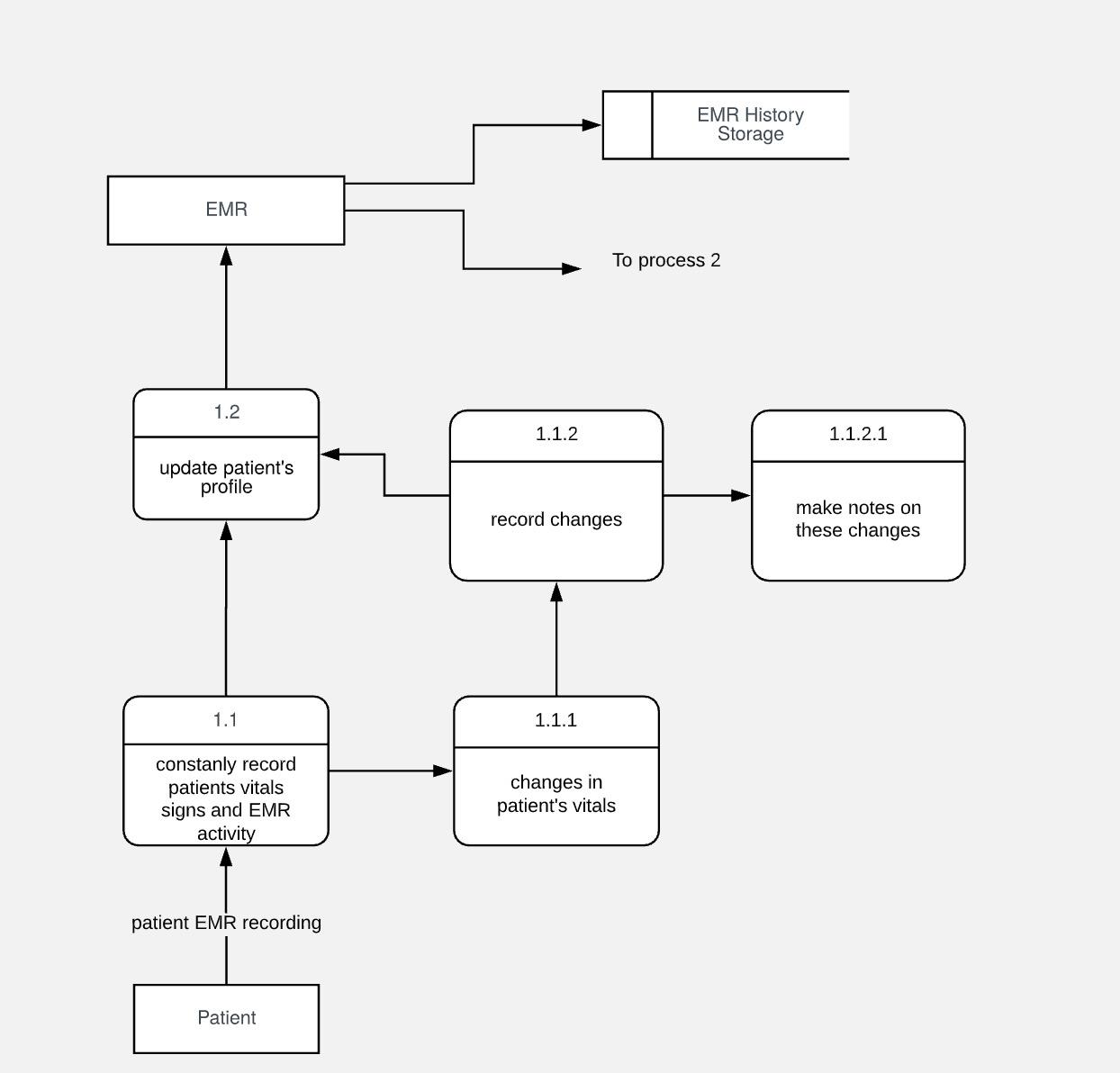
**Level-0**

* **External Entities**
  + Patient: a person wearing the EMR and will be monitored for any health risk and produce data to the EMR.
  + EMR: a wearable device that shall be used to record a patient EMR data. The device is used mainly for the collection of data and to transmit processed data to proper end data storage
  + Doctor: a person who EMR data is reported to and has access to all data storages to analyze information from data to diagnose the patient.
* **Processes**:
  + 1.0 Recording of Data Activity: Data from the activity of the Patient is being recorded by the EMR technology. It is constantly being updated as the Patient goes wearing the device.
  + 2.0 Analysis of Updating Data: Data is going through predetermined sets constantly and being recorded for the status of behavior over time. Any data that alerts and predetermined sets will send out an alert to follow processes set for that data.
  + 3.0 Sorting of Patient EMR Records: Patient data of activity is sorted into the correct storage place to be requested by a Doctor if ever needed for the desired patient.
  + 4.0 Alert of Potential Adverse Event: Data is processed to follow protocols to transmit data to a doctor or proper persons of interest who will require the data from the EMR. Alert external entity incase of emergency.
  + 5.0 Compiled Data into User Interface: During the data collected inside data storage to an application Doctor can use to visualize the information sent by the EMR device.
* **Data Storages**
  + Medical Recording Storage: Data stored to be used by the Doctor user interface for past activity collected by the EMR.
  + Doctor EMR Data Storage: Data processed that alerted the system of possible health risk or activity that required quick doctor attention for quicker diagnosis.



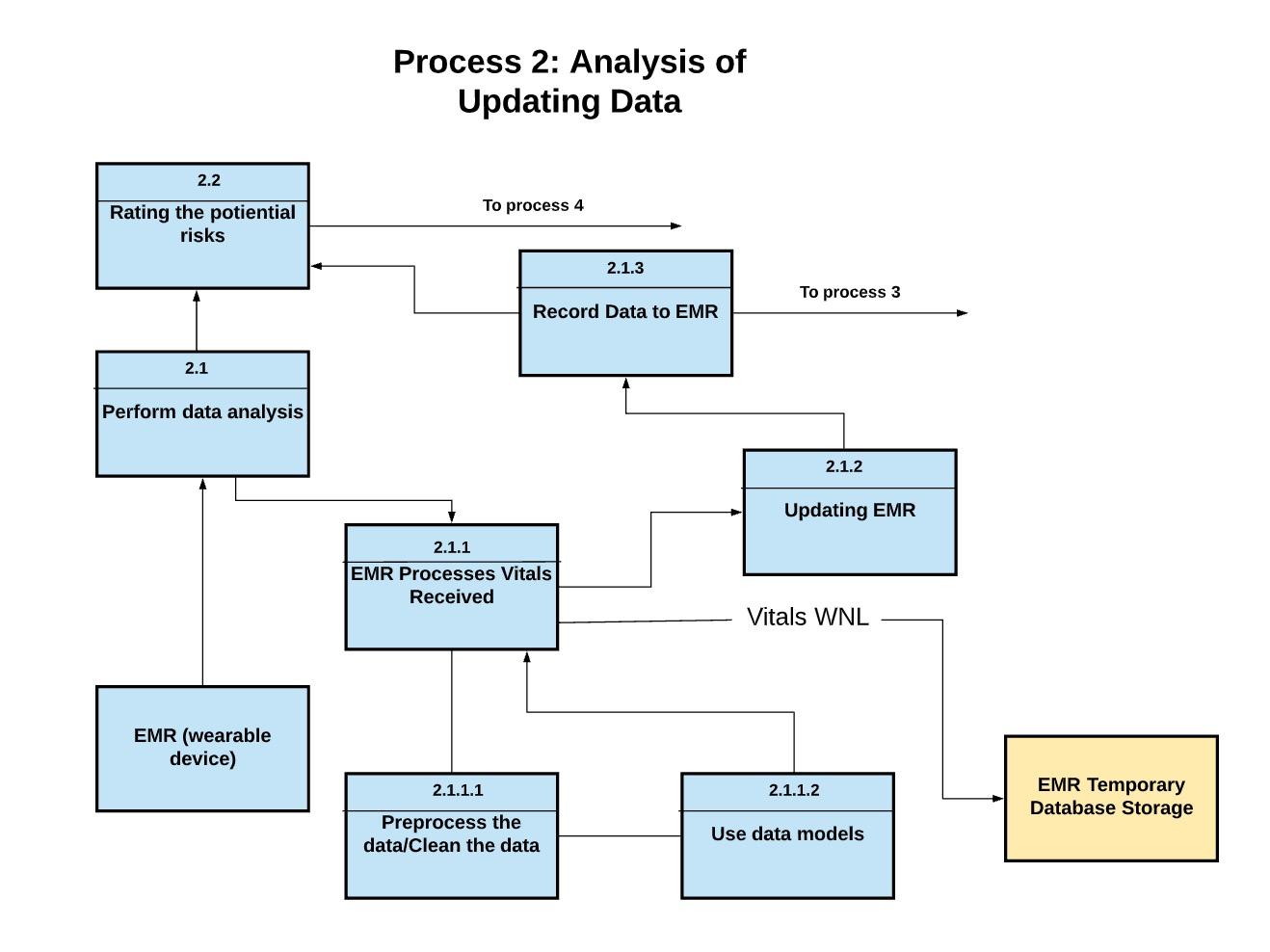
**Process 1**

* **External Entities**
  + Patient: Monitored for any changes in vitals
  + EMR: a wearable device that shall be used to record a patient EMR data. The device is used mainly for the collection of data and to transmit processed data to proper end data storage
* **Levels and Processes:**
  + 1.1 - Constantly Record Patients Vital Signs and EMR Activity - records the vital signs of the patient and compares it to past EMR activity.
    - 1.1.1 - Changes in Patient’s Vitals - detects changes in patient vitals and compares them to previous EMR activity.
    - 1.1.2 - Records Changes - records vitals in EMR database storage.
      * 1.1.2.1 - Make Notes on Changes
  + 1.2 - Updates patient profile - once changes are detected and recorded, the patient profile is updated for future use.
* **Data Storages**
  + EMR database storage: Data that includes a collection of all activity monitored on the device.



**Process-2**

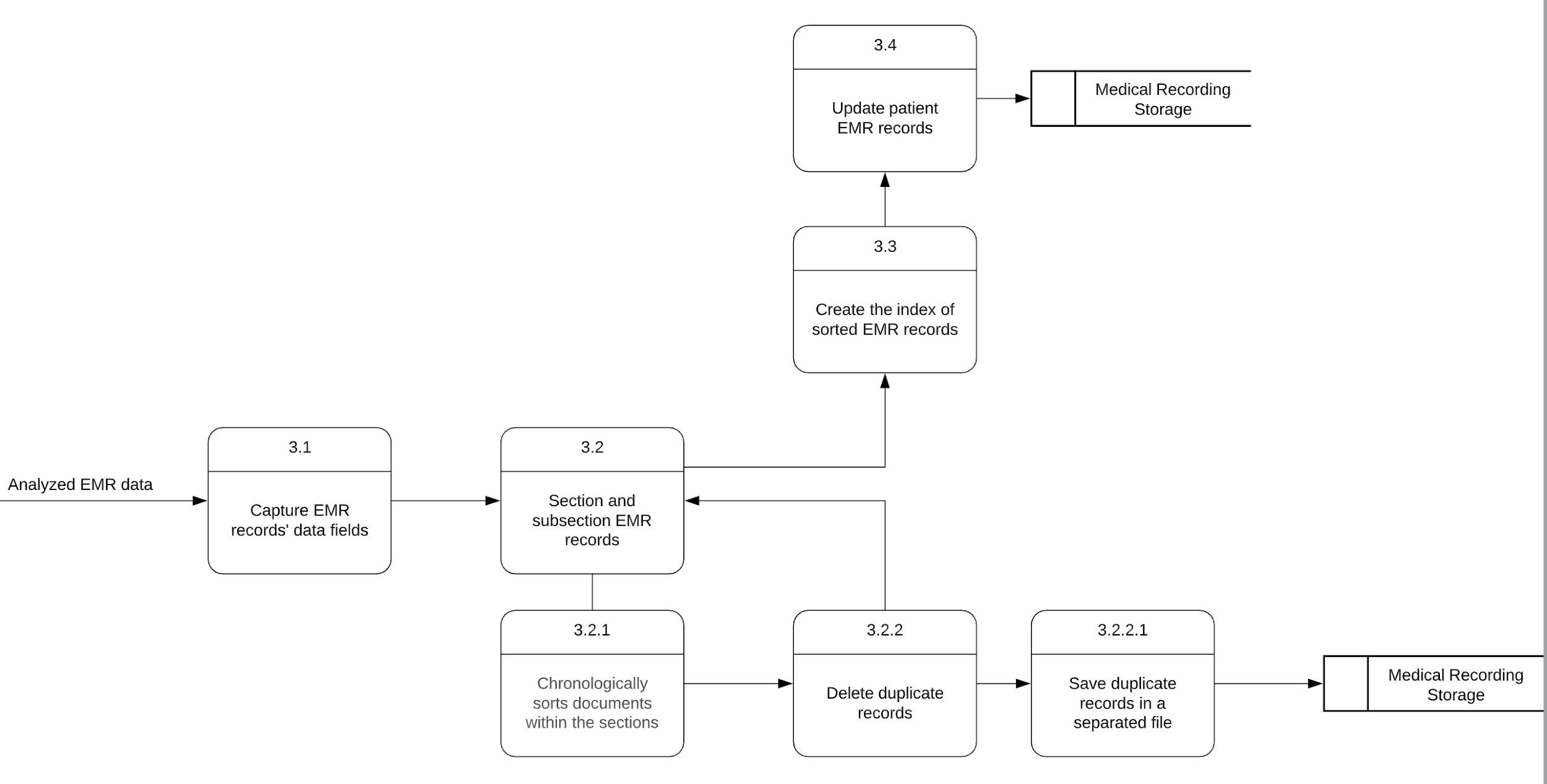
* **External Entities**
  + EMR: receipt of patient vitals and pertinent medical data.
* **Levels and Processes**:
  + 2.1 - Perform Data Analysis - after recording vital activity, the EMR device analyzes the incoming data.
    - 2.1.1 - EMR Processes Vitals Received - patient’s vitals are checked based on predetermined sets. If vitals are within normal range, data is transferred to recycled EMR data storage for temporary storage.
      * 2.1.1.1 - Preprocesses the Data and Cleans the Data - removes any repetitive or corrupted data.
      * 2.1.1.2 - Use data models - identify relationships using statistical data models.
    - 2.1.2 - Updating EMR - EMR updated based on high alert data, predetermined sets, or manual entry by healthcare providers.
    - 2.1.3 - Records Data in EMR - Data recorded to EMR. Predetermined sets will prompt recording to EMR and further monitoring for behavior status to determine other processes. Some data may require gathering of vitals over specified periods of time or transmission of specific data to certain providers.
  + 2.2 - Reading the Potential Risks - data matching risks to predetermined rates.
* **Data Storages**
  + EMR Temporary database storage: Data that is filtered out of the system but retained for a short period of time (in the event it becomes relevant at a later, proximate time).



**Process-3**

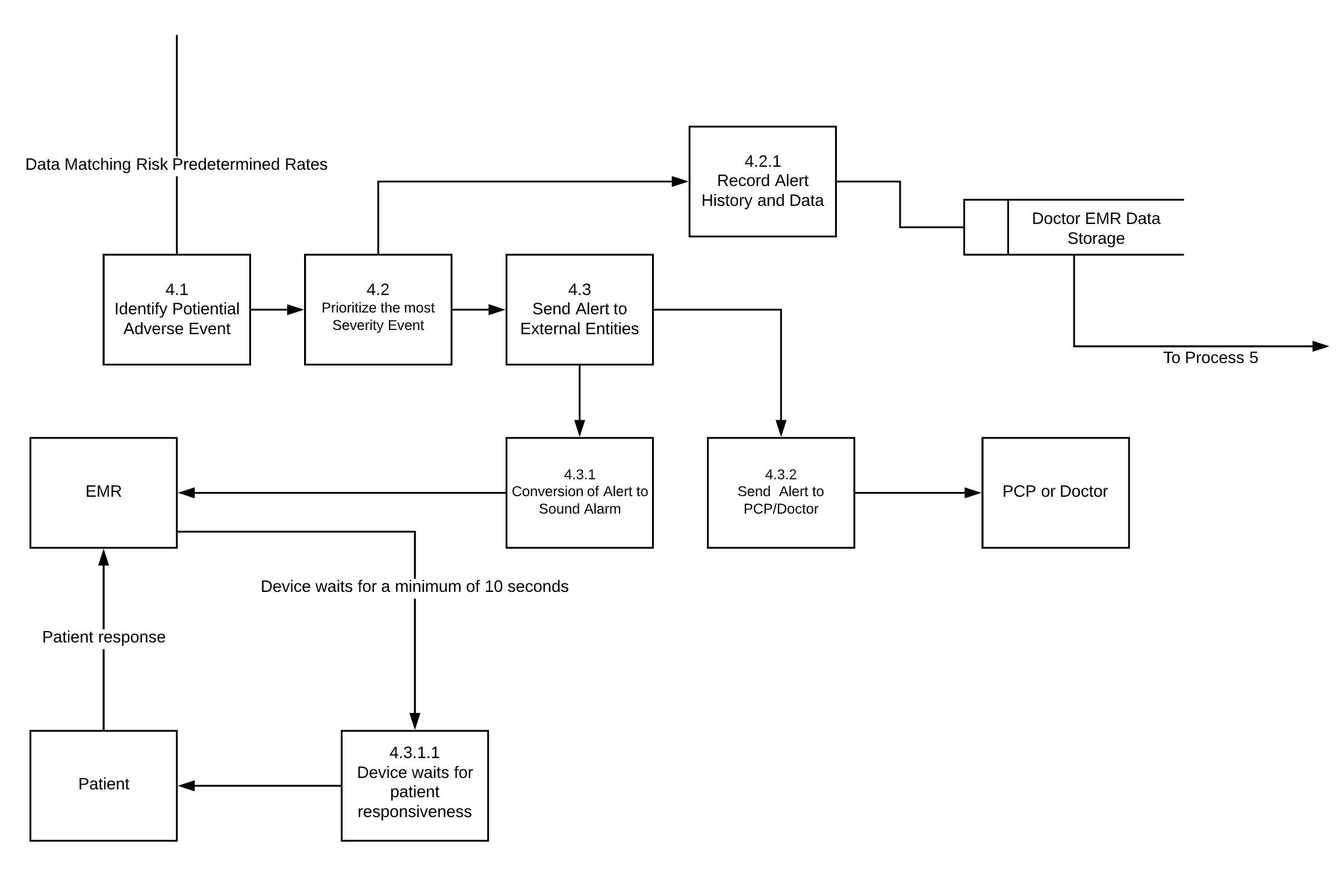
Patient data of activity is sorted into the correct storage place to be requested by a Doctor if ever needed for the desired patient.

* **External Entities:**
  + None
* **Levels and Processes**:
  + 3.1 - Capture EMR records' data fields: The data fields of patient’s medical records and vital signs are captured. The data fields that need to accurately captured include medical records’ document type, provider, data, etc.
  + 3.2 - Section and subsection EMR records: Arrange and category the medical records into sections and subsections. Some specific record will have its own section. For example, GP record will be sectioned by itself. Then, Chronologically sorting the documents within the sections by date range.
    - 3.2.1 - Chronologically sort documents within the sections
    - 3.2.2 - Delete duplicate records: Check the sectioned EMR records to see if there is any duplicated records. If there are any duplicate records, it’ll be removed from the section and stored as a separate file to the medical recording storage
      * 3.2.2.1 - Save duplicate records in a separate file
  + 3.3 - Create the index of sorted EMR records: After EMR records are sorted, give index to the file by giving them page numbers. Page numbering starts from “Page 1” and continuously increases throughout the entire medical file.
  + 3.4 Update patient EMR records: update patient’s sorted and indexed medical records to the medical recording storage. It’ll be ready for future request from doctors.
* **Data Storages:**
  + Medical Recording Storage: contains the data of the medical records from past EMR activity. And, provides the access to the doctors of these medical records through the user interface.

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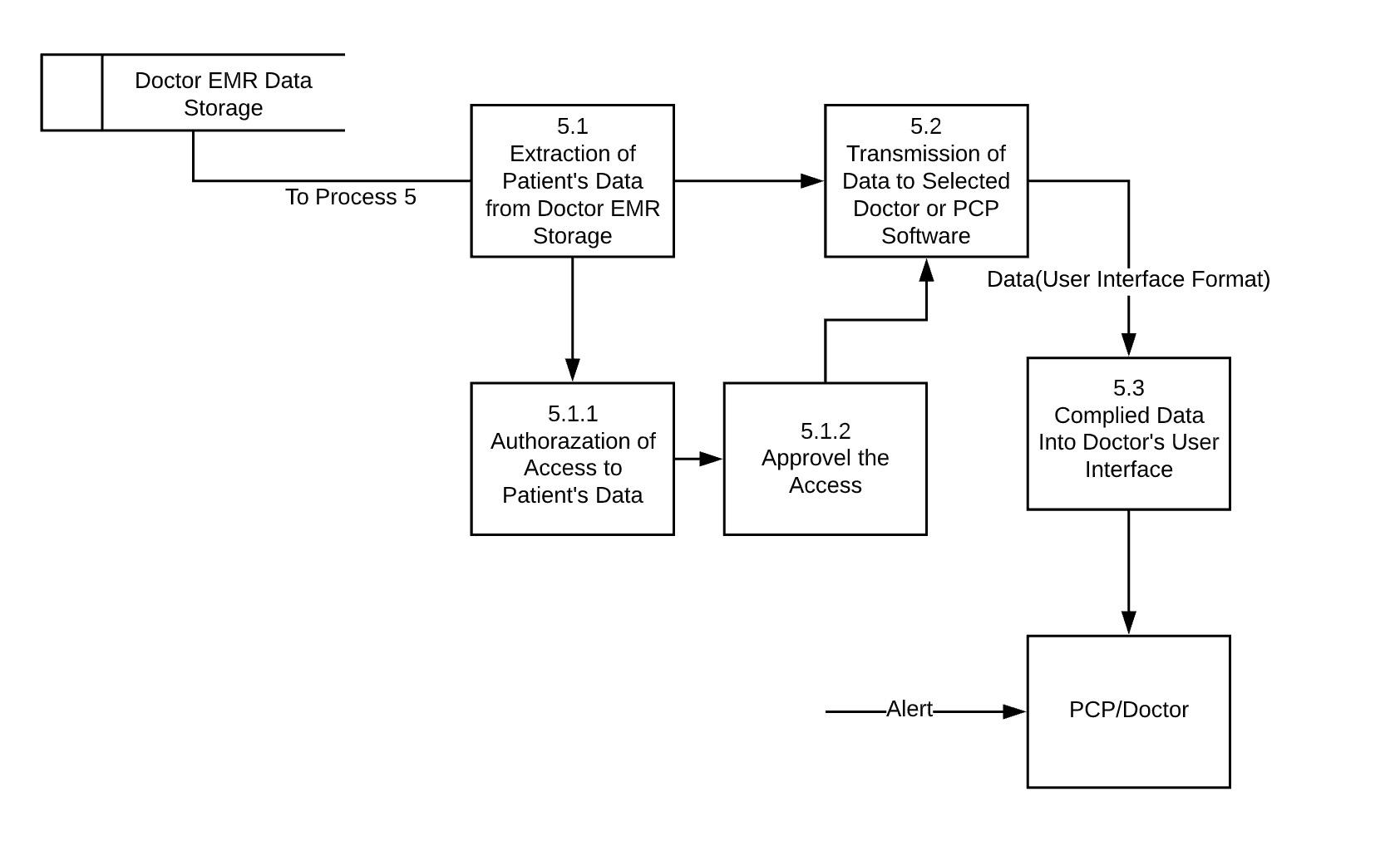
**Process - 4**

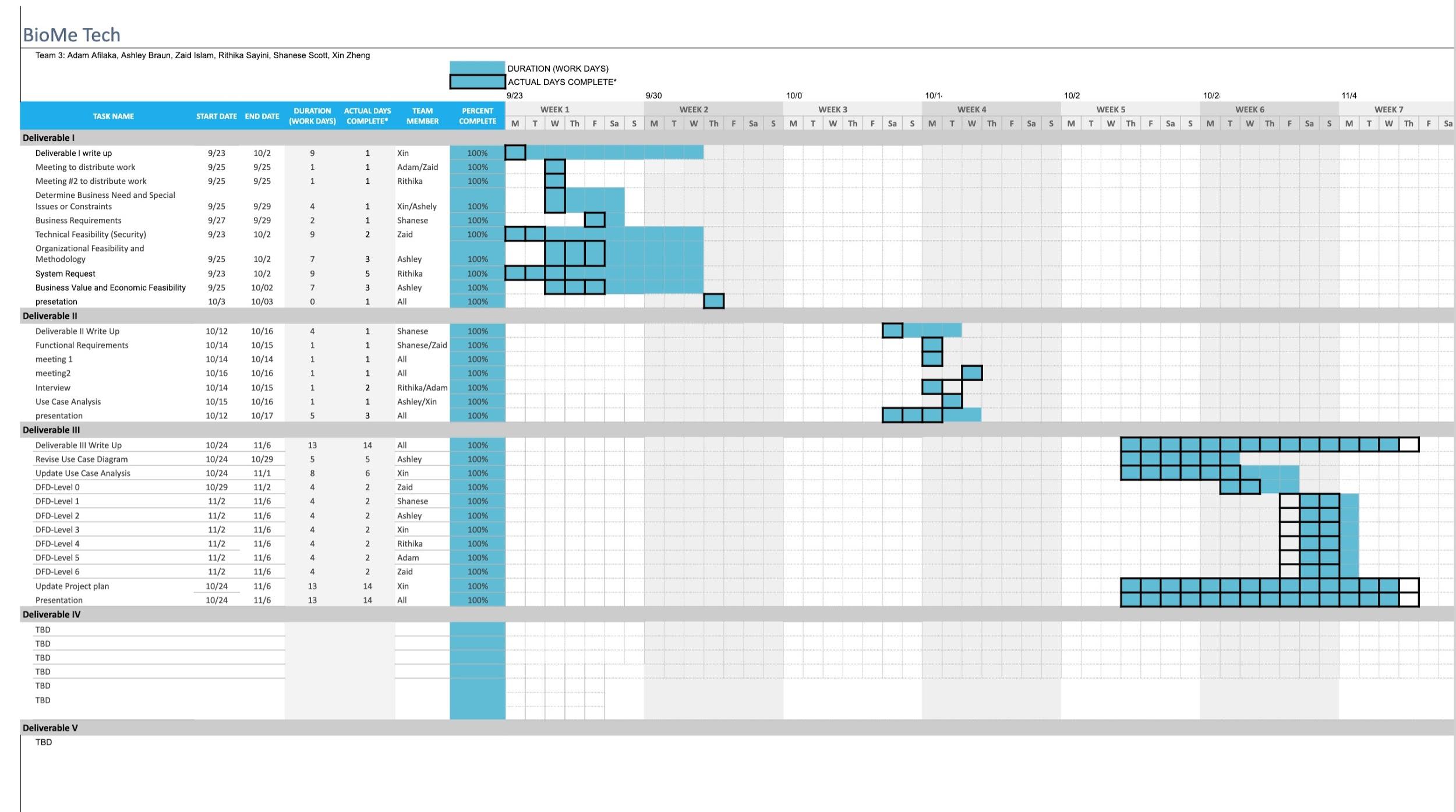
* **External Entities:**
  + EMR Wearable Device: Device detects and records changes in vital signs and homeostasis to determine severity of situation in order to alert medical personnel.
  + PCP/Doctor - the primary care physician or doctor of the patient
  + Patient - user of the EMR Wearable Device
* **Levels and Processes:**
  + 4.1 - Identify potential adverse event: The wearable device detects changes in heart rate, blood pressure, breathing rate, hormone levels, and other vitals. If the vital signs are drastically different from patient’s normal homeostasis, the application will assess whether the user needs emergency medical attention.
  + 4.2 - Prioritize the Severity of the Event - In special cases, the patient must be responsive to the device in order for medical personnel to arrive at the scene of the adverse event. In this case, the device will allow ten seconds for the patient to indicate whether they are responsive or not.
    - 4.2.1 - Record Alert History and Data
  + 4.3 - Send Alert to External Entities - If the potential adverse event is deemed severe, or even life threatening, or if the patient is not responsive after 10 seconds, the application will alert emergency medical personnel.
    - 4.3.1 - Conversion of Alert to Sound Alarm
      * 4.3.1.1 - Device waits for patient responsiveness
    - 4.3.2 - Send Alert to PCP/Doctor - The patient’s PCP is also alerted of the current emergency event so that they are prepared to provide proper diagnosis.
* **Storage** 
  + Doctor EMR Data Storage: Storage of past, and present EMR activity as well as patient medical records that only the PCP/Doctor of the patient is allowed to access. Patient cannot access these records due to safety reasons.

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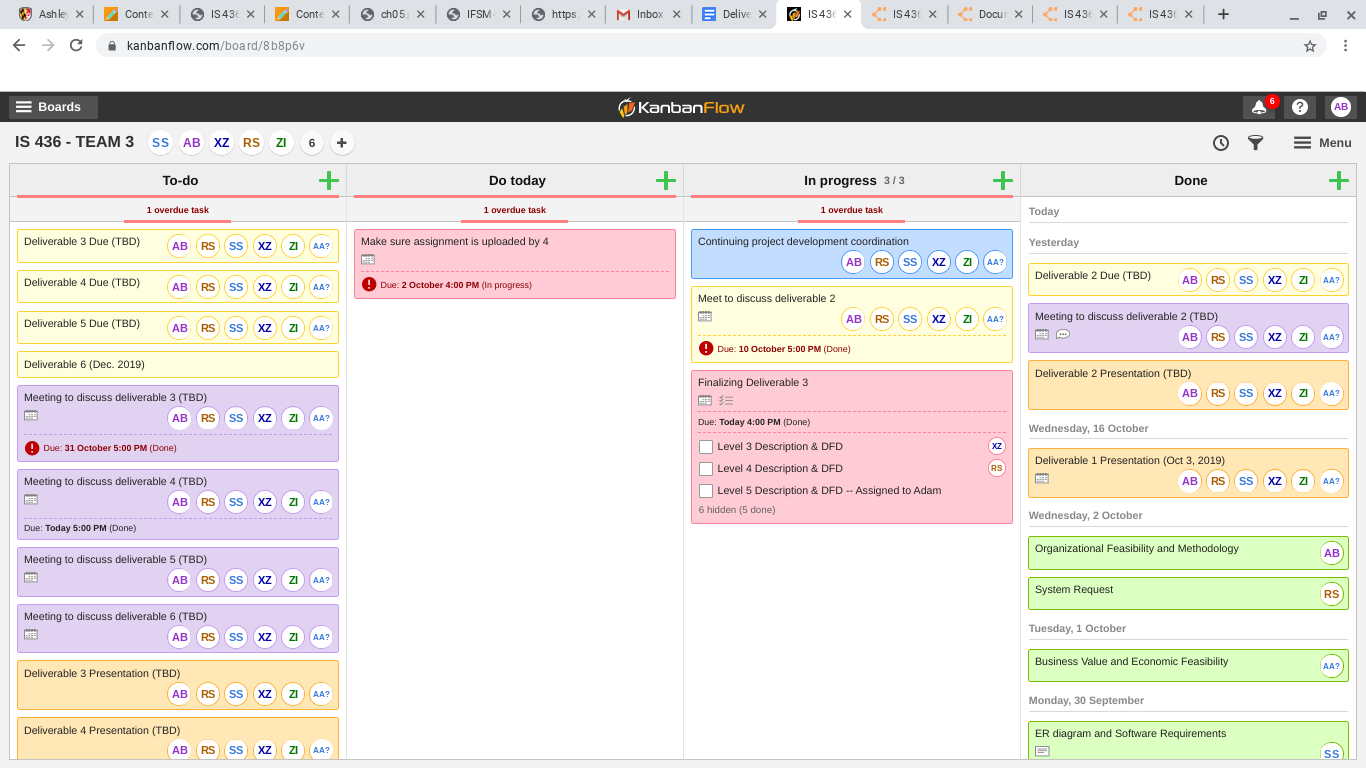
**Process-5**

* **External Entities**
  + Doctor or PCP
* **Levels and Processes**
  + 5.1-Extraction of Paitent's Data from EMR Data Storage: Collecting and sorting the data from the EMR database to be specified protocol for a patient.
    - 5.1.1-Authorization of Access to Patient's Data: Security protocol to ensure access is given only to selected end-user
    - 5.1.2-Approvel the Access
  + 5.2-Transmission of Data to Selected Doctor or PCP Software: Data turned into information based on UI design to eligibility and user friendly for immediate analysis.
  + 5.3-Compiled Data into Doctor's User Interface: Information is displayed in Doctor’s UI
* **Storages**
  + Doctor EMR Data Storage: Data processed that alerted the system of possible health risk or activity that required quick doctor attention for quicker diagnosis.

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**Project Plan:**

**Kanban Board:**

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