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SOFTWARE SECURITY

**BOUNDARY DIAGRAM**

Diagram

Description automatically generated

**The above image is a Boundary Diagram for a Patient-controlled analgesia (PCA) pump.**

The boundary diagram illustrates the interaction between the elements and data flow for a Patient-controlled analgesia (PCA) pump.

As seen in the diagram, I created three (3) system boundaries: the Patient room / **PCA Boundary**, the Database portal / **Database Boundary,** and the Doctor’s office / **Doctor Boundary.** These boundaries are a visual representation of what a hospital would look like. Inside these boundaries, I created **elements** for the **patient**, the **medical device**, which is the PCA pump, the **SQL database**, the **web server**, the **doctor**, and the **doctor’s computer**. Each of these elements have interfaces that are used to interact with each other.

* **The PCA boundary / Patient room:** This boundary was created to accommodate where the patient will be, which is the patient’s room and where the PCA pump will be located which needs to be right next to the patient.
* **The Database Boundary / Database Portal**: This boundary was created to accommodate the SQL database where the patient information will be stored and the web server where the medical portal or website will be accessed. These elements manage the patient’s data and the patient’s dosage which informs the PCA pump the amount of dosage that the patient needs.
* **The Doctor boundary / Doctor’s office:** This boundary accommodates two elements; the doctor’s office where the doctor will be situated and the doctor’s computer that is used to manage all the patient’s information.

For the interfaces and interactions, it is more like a 2-way interaction. Please see below.

* **The doctor’s room**: when a patient is admitted to the hospital, the doctor collects all information from the patient and records it into his computer.
* **Database Portal:** The doctor then stores the patient information into the database. This information might comprise of the patient’s name and phone number, the patient’s room, the patient’s medical condition, the patient’s dose requirements, and any other important information.
* **The Patient room**: The patient room is more like the most important boundary. Here, when the patient is brought and given a room, a PCA pump which is the medical device is left with the patient for medical assistance. This pump manages the dosages of the patient when it is requested.

1. The patient will first click the button of the PCA pump to request for medication.
2. Then the PCA pump will verify the patient before administering the dose.
3. The information is then sent to the web server. The webserver now pulls out the patient data from the database. The database the provides the dosage of the patient that was provided by the doctor.
4. The web server then sends the right information and updates the PCA pump.
5. The PCA then gives the patient the amount of quantity of doses that the patient needs.
6. This is then recorded in the database. That a particular number of doses has been given to this patient.
7. When the PCA pump sends the dosage that has been given to that patient to the webserver, the doctor is then able to monitor and view the logs of each patient.

With this, the above description illustrates the components of the PCA pump and it’s interactions between the elements.