**Use Case 1: Daily Air Quality Management**

Actors: Asthma Patient (Primary Actor), Smart Indoor Air Quality Hub, Aerosense App

Stakeholders: Asthma Patients, Family Members, Healthcare Providers

Preconditions:

* The Aerosense Hub is powered on and connected to Wi-Fi.
* The Aerosense App is installed and linked to the Hub.

Triggers:

* The patient is at home and wants to ensure their living space has clean air.

Main Success Scenarios (Basic Flow):

* The patient activates the Aerosense Hub using the app.
* The Hub gathers data on indoor air quality using its sensors.
* Real-time air quality data is displayed on the Hub and sent to the app.
* The app notifies the patient if air quality dips below the safe threshold.
* The patient views the app to understand the air quality data better.
* Based on the data, the patient takes appropriate action, like activating an air purifier.

Alternative Paths (Alternative Flow):

* If the Hub detects a high concentration of a specific pollutant, it advises the patient to ventilate the room or adjust the HVAC settings.
* If the patient does not interact with the Hub or app for a prolonged period, the Hub sends a reminder to check the air quality.

Postconditions:

* The patient is informed about the current air quality of their home.
* The patient has taken steps to maintain or improve indoor air quality.

**Use Case 2: Emergency Response to Air Quality Drop**

Actors: Asthma Patient (Primary Actor), Smart Indoor Air Quality Hub, Aerosense App

Stakeholders: Asthma Patients, Emergency Contacts

Preconditions:

* The Aerosense Hub is set up in a commonly used living area.
* The patient has input emergency contact information in the app.

Main Success Scenarios (Basic Flow):

* The Hub detects an immediate and dangerous drop in air quality.
* It emits an urgent audible and visible alert.
* The app sends a high-priority notification to the patient's mobile device.
* The patient receives the alert and checks the app for detailed information.
* The app provides a recommended course of action, like leaving the area or using medication.
* The patient follows the advice and notifies their emergency contact if needed.

Alternative Paths (Alternative Flow):

* If the patient cannot interact with the Hub or app, it sends an automated message to the emergency contact with the patient's location and air quality alert.

Postconditions:

* The patient is safe and aware of the air quality issue.
* Emergency contacts are informed and can take necessary action if the patient is unresponsive.

**Use Case 3: Weekly Air Quality Review for Asthma Management**

Actors: Asthma Patient (Primary Actor), Smart Indoor Air Quality Hub, Aerosense App

Stakeholders: Asthma Patients, Healthcare Providers

Preconditions:

* The Aerosense Hub has been operational for at least a week.
* The patient has scheduled a weekly review in the app.

Main Success Scenarios (Basic Flow):

* The patient receives a reminder from the app for their weekly air quality review.
* The patient opens the app, which presents a summary of the past week’s air quality.
* The app highlights any concerning patterns or incidents.
* The patient reviews the information and notes any correlations with their asthma symptoms.
* The patient uses the app to send a report to their healthcare provider.
* The patient and healthcare provider discuss any necessary adjustments to their asthma management plan.

Alternative Paths (Alternative Flow):

* If the app identifies a consistent trigger, it suggests changes to the patient’s indoor environment or schedule to avoid future issues.
* The patient can set reminders for more frequent reviews if their situation requires close monitoring.

Postconditions:

* The patient has a clear understanding of their indoor air quality over time.
* The patient has shared important data with their healthcare provider to better manage their asthma.