COMP-3004 A

Team Project

Team-44

Use Case - 1: Using AED (Central Use Case)

Primary Actors: Personnel trained to use AED (like First Aid Provider), AED

Pre-Conditions:

Patient (A suspected Cardiac Arrest Victim) is:

- Unconscious, and
- Not breathing normally, and
- Doesn't have a detectable pulse or other signs of circulation.

Main Success Scenarios:

1. User turns on the AED and the AED performs a self test [Refer: Use Case 2].
2. AED indicates user to 'Stay Calm'.
3. AED indicates user to 'Check Responsiveness'.
4. AED indicates user to 'Call for Help'.
5. AED indicates user to 'Apply Electrode Pads'.
6. User applies the electrode pads based on patient type [Refer: Use Case 3].
7. AED senses the kind of pads being used and sets the shock accordingly.
8. AED displays the number of shocks available.
9. AED indicates the user to not touch the patient.
10. The patient is administered CPR [Refer: Use Case 4].

Post-Conditions:

The Patient is successfully administered CPR.

Extensions:

1a. In case of a failed self test, AED can not be used.

1b. If the pads are already applied to the patient before turning on the AED, skip to Step 7 after passing the self test.

Use Case - 2: Power On and Self Test

Primary Actors: Personnel trained to use AED (like First Aid Provider), AED

Pre-Conditions:

Patient (A suspected Cardiac Arrest Victim) is:

- Unconscious, and
- Not breathing normally, and
- Doesn't have a detectable pulse or other signs of circulation.

Main Success Scenarios:

1. User presses the Power On/Off Button to turn the AED on.
2. AED performs a self test involving the following tests:
    a. Battery: Verifies that the battery usage indicator shows adequate battery capacity remaining.
    b. Defibrillation Electrodes Connection: Verifies that the defibrillation electrodes are properly pre-connected to the device.
    c. ECG Circuitry: Verifies that the ECG signal acquisition and processing electronics are functional.
    d. Defibrillator Charge and Discharge Circuitry: Verifies that the device's defibrillator electronics are functional and can charge and discharge at 2 joules.
    e. Microprocessor Hardware/Software: Verifies proper function of the Fully Automatic AED Plus microprocessor electronics and the integrity of its software.
    f. CPR Circuitry and Sensor: Verifies that CPR monitoring and compression depth detection are functional.
    g. Audio Circuitry: Verifies that voice prompts are functional.
3. AED indicates that it has passed the self test.

Post-Conditions:

AED is powered on.

AED passes the Self test and is ready to use.

Extensions:

3a. If any of the tests in the AED Self test fail, the unit indicates that it has failed the self test.

Use Case - 3: Applying Electrode Pads

Primary Actors: Personnel trained to use AED (like First Aid Provider), AED

Pre-Conditions:

AED is powered on and has passed the self test.

Main Success Scenarios:

1. User removes all the clothes covering the patient's chest.
2. User ensures the patient's chest is dry.
3. If the patient has excessive chest hair, User clips or shaves the hair to help ensure proper adhesion of the electrodes.
4. If the patient is an adult, user tears open the 'CPR-D Padz' electrode package (Adult Pads), unfolds the electrodes, and places the electrodes on the patient.
5. User holds the CPR sensor and places it between the nipples and on the middle of the patient's breastbone and places the pads accordingly.
6. User pulls the tab to peel the protective backing from the first electrode and adheres it properly to the patient's skin.
7. User pulls the tab to peel the protective backing from the first electrode and adheres it properly to the patient's skin.

Post-Conditions:

User has applied CPR pads to the patient.

AED is ready to shock the patient.

Extensions:

4a. If the patient is under 8 years and 25kg, user uses the ‘Pedri-Padz II’ electrode package (Infant/Child Electrodes) instead.

5a. If the patient is under 8 years and 25kg, user places one of the pads on the patient’s chest and the other one on their chest aligned with the first pad.

5b. If the patient is large, user tears away the lower pad at perforated line and extends the pad.

5c. If the patient has an implanted pacemaker or defibrillator in the upper right chest, user angles the electrodes slightly to avoid placing the electrodes over either device.

Use Case - 4: Administer CPR

Primary Actors: Personnel trained to use AED (like First Aid Provider), AED

Pre-Conditions:

User has applied appropriate CPR pads to the patient.

Main Success Scenarios:

1. AED analyses the patient's heartbeat.
2. In case of a shockable rhythm, AED provides one shock to the patient.
3. AED updates the number of shocks left on the display.
4. AED indicates the user to start CPR.
5. User administers 2 minutes of CPR as cycles of 30 Compressions and 2 breaths.
6. Steps 1 to 5 are repeated until:
    a. The patient is recovered, OR
    b. The patient is deceased, OR
    c. AED runs out of battery, OR
    d. AED is turned off.

Post-Conditions:

CPR has been administered.

Extensions:

2a. In case of unshockable rhythm, AED indicates to the user that No shock is advised, and to start CPR instead [Skip to step 5].