

Use Case 1: Instructional Guide for Operating an AED Plus

Primary Actor: User

Scope: Effective use of an AED Plus device

Level: User goal

Stakeholders and Interests:

User - Wants to effectively use the AED to respond to a sudden cardiac arrest

Patient - Depends on the correct use of the AED to potentially live

Precondition: AED Plus is powered on and functional

Postcondition: AED Plus guides the user, ensuring correct actions are taken

Success Guarantee: User follows AED Plus instructions correctly and potentially saves a life

Main Success Scenario:

1. User presses the "ON" button for more than 5 seconds on the AED Plus.
2. The AED Plus initiates a self-test to check that it's ready for use
3. The AED Plus provides a visual and audio indication to user so they can proceed
4. User places the adhesive electrode pads on the patient's bare chest
5. AED Plus analyzes the patient's heart rhythm through the electrodes to determine if a shockable rhythm (ventricular fibrillation or ventricular tachycardia) is present
6. AED Plus provides user with voice and visual prompts
7. If a shockable rhythm is detected, the AED Plus automatically charges itself and prompts the user to press the button to deliver a shock
8. User ensures no one is in contact with the patient and administers the shock
9. AED Plus instructs the user to perform CPR for a specified duration

Extensions:

- 1a. Battery is dead
 - 1a1. If battery is dead then the device will not turn on
- 1b. Battery dies with use
 - 1b1. The device's battery life gradually decreases over time and once the battery is fully drained then the device will turn off
- 1c. Electrodes already plugged in
 - 1c1. AED jumps to analyzing patient (step 5)
- 2a. Device not ready for use
 - 2a1. If device fails self check then it will signal the user that its not ready for use
- 4a. Choosing the right electrode pad
 - 4a1. Depending on patient's age, the user can select to use the pad labeled "Adult Pads", include Attaching Pads of AED Plus, or "Child Pads", include Attaching Pads of AED Plus on a child
- 4b. Connecting the pads
 - 4b1. AED Plus asks user to plug in the pads' connector to the AED if necessary
- 5a. Safety features

- 5a1. AED Plus will advise against shocking if the rhythm is not shockable
- 6a. Different prompts given to user
 - 6a1. "Stand clear" - to ensure no one is touching the patient.
 - 6a2. "Analyzing" - as the AED evaluates the heart rhythm.
 - 6a3. "Shock advised" - if a shockable rhythm is detected.
- 7a. Victim is touched or disturbed
 - 7a1. If the victim is touched or disturbed while user administers the shock then the ECG may not be accurate
- 9a. Continued evaluation
 - 9a1. The AED may continue to monitor the patient's heart rhythm
 - 9a2. The AED will provide further shocks or CPR instructions if needed

Use Case 2: Following voice prompts of AED Plus

Primary Actor: User

Scope: Following AED Plus instructions to save a life

Level: User goal

Stakeholders and Interests:

User - Wants to effectively use the AED to respond to a sudden cardiac arrest

Patient - Depends on the correct use of the AED to potentially live

Precondition: AED Plus is powered on and functional

Postcondition: AED Plus guides the user, ensuring correct actions are taken

Success Guarantee: User follows AED Plus instructions correctly and potentially saves a life

Main Success Scenario:

1. Take of AED lid and press the “ON” button
2. Follow AED device prompt to “stay calm” and “check responsiveness”
3. Follow AED device prompt to “call for help”
4. Follow AED device prompt to “open airway” by opening the patient mouth
5. Follow AED device prompt to “check breathing”
6. Follow AED device prompt to “attach defib pads to patients bare chest”
7. AED device will prompt to “analyzing” and “don’t touch patient”
8. AED will analyze if there is a shockable rhythm
9. Follow device prompt to “start CPR” once instructed to
10. Follow AED device prompt to “Stop CPR” so it can analyze patient again
11. Follow additional AED device instruction based on patient's state to continue CPR or delivering another shock

Extensions:

- 1a. Self test
 - 1a1. Device prompts “unit OK” if self test passed
 - 1a2. Device prompts “unit failed” if self test failed
- 1b. Batteries
 - 1b1. Change all 10 of the devices batteries if prompted “change batteries”
- 2a. Patient is responsive
 - 2a1. If person is responsive the AED Plus should not be used as it is only meant for non responsive patients
- 5a. Checking patients breathing
 - 5a1. Look for any chest movements in patients that indicate breathing
 - 5a2. Listen for breathing coming from patients nose or mouth
- 5b. Make use of lid
 - 5b1. AED lid can be placed behind patients shoulders to support and maintain an open airway
 - 5b2. Do not use lid if patient is suspected to have a spinal injury

6a. Plug in cable

6a1. Check if electrode cable is properly attached to AED when prompted “plug in cable”

6b. Improper electrode pad attachment

6b1. If device prompts “check electrode pads” then the pads have not been properly attached to patient or are defective

8a. Shockable rhythm detected

8a1. If device detects a shockable rhythm it will prompt a countdown and beep at the shock

8b. Shockable Rhythm not detected

8b1. If device does NOT detects a shockable rhythm it will prompt “no shock advised”

9a. Compression prompts

9a1. Device will prompt “push harder” if cpr compressions are less than 2 inches deep

9a2. Device will prompt “Good Compressions” if CPR is done correctly

Use Case 3: Attaching pads of AED Plus

Primary Actor: User

Scope: Attaching the AED pads on the patient

Level: User goal

Stakeholders and Interests:

User - Wants to attach pads on patient

Patient - Needs effective placement of pads

Precondition: AED Plus is powered on and functional

Postcondition: AED Plus guides the user, ensuring correct actions are taken

Success Guarantee: User attaches the AED Plus pads correctly

Main Success Scenario:

1. Prepare patient for pad placement by exposing their chest
2. Open the packet with the electrode pads and unfold the electrode pads
3. Align the pads with the patients breast bone as shown on the electrode pads picture
4. Pull the adhesive tabs off the pads and place the pads on the patient

Extensions:

- 1a. Using the scissors provided
 - 1a1. If patients chest is covered by clothes, you the provided scissors in the electrode package to cut away the cloth to expose patients chest area
- 1b. Hairy chest
 - 1b1. If patients chest is hairy then you the provided in the electrode package razor to remove hair at the electrode pad application site
- 1c. Chest not dry
 - 1c1. If patients chest is wet use the provided towel in the electrode package
- 4a. Pulling the #2 pad
 - 4a1. Press the CPR landmark with you right hand and pull the #2 tab
 - 4a2. Stick the adhesive on the patient from center of the pad to the outer regions
- 4b. Pulling the #3 pad
 - 4b1. Repeat the steps for the #2 pad for the #3 pad
 - 4b2. If patient is large, the #3 pad can be extended at the perforated line to be placed at the proper desired location

Use Case 4: Attaching pads of AED Plus on a child

Primary Actor: User

Scope: Attaching the AED pads on the child patient

Level: User goal

Stakeholders and Interests:

User - Wants to attach pads on patient

Patient - Needs effective placement of pads

Precondition: Patient if between ages 0-8 years

Postcondition: AED Plus guides the user, ensuring correct actions are taken

Success Guarantee: User attaches the AED Plus pads correctly

Main Success Scenario:

1. Prepare patient for pad placement by exposing their chest
2. Open the packet with the electrode pads and unfold the electrode pads
3. Remove adhesive and place the round pad on patients chest
4. Roll patient so their back faces up and place the second pad on their back
5. Roll patient back up right, ready to follow the next instructions

Extensions:

- 1a. Using the scissors provided
 - 1a1. If patients chest is covered by clothes, you the provided scissors in the electrode package to cut away the cloth to expose patients chest area
- 1b. Chest not dry
 - 1b1. If patients chest is wet use the provided towel in the electrode package

Use Case 5: Troubleshooting the AED Plus

Primary Actor: User

Scope: User runs into battery or self-test problems

Level: User goal

Stakeholders and Interests:

User - Needs to fix issue if possible

Precondition: The AED failed the self test

Postcondition: AED Plus is in good condition for use

Success Guarantee: Issues with the AED Plus are resolved

Main Success Scenario:

1. Press the “ON” button
2. Self-test failed and shows user “X”
3. Change the batteries (needs to be replaced every 5 years)

Extensions:

2a. Inspect AED

2a1. Inspect the cable to see if its properly attached to the AED

2a2. Replace the batteries if the cable is not the issue

2a3. Remove unit from service if the previous steps did not resolve the issue

3. Replacing Batteries

3a1. Remove and discard all 10 batteries from the AED Plus battery compartment

3b2. Insert 10 type 123A lithium manganese dioxide batteries

3b3. Press battery reset button and close battery compartment