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Use Cases for Insulin Pump Simulation

Use Case 1: Create a New Profile

Primary Actor: User

Stakeholders and Interests:

- User: Needs the ability to create and manage different profiles for different insulin settings.
- System: Must ensure proper profile creation and prevent duplicate entries.

Preconditions:

- Simulation is running.

Success Guarantee:

- A new profile is successfully created and stored in the system.

Main Success Scenario:

1. User selects "Create Profile."
2. System prompts for profile name.
3. User enters profile name.
4. System creates a new insulin pump profile with default settings.
5. System adds the profile to the list of available profiles.
6. System confirms profile creation.

Extensions:

1a. User enters a duplicate profile name: System notifies the user and requests a new name.
2a. User cancels profile creation: No new profile is created.

Use Case 2: Delete a Profile

Primary Actor: User

Stakeholders and Interests:

- User: Needs the ability to remove outdated or unnecessary profiles.
- System: Ensures profiles are deleted correctly and prevents accidental deletions.

Preconditions:

- At least one profile exists.

Success Guarantee:

- The selected profile is removed from the system.

Main Success Scenario:

1. User selects "Delete Profile."
2. System displays a list of profiles.
3. User selects a profile to delete.
4. System removes the profile from storage.
5. System confirms deletion.

Extensions:

1a. User cancels deletion: No profiles are deleted.

2a. System error occurs during deletion: System notifies user and logs the error.

Use Case 3: Deliver a Manual Bolus

Primary Actor: User

Stakeholders and Interests:

- User: Needs to administer bolus insulin for blood glucose management.
- System: Ensures the system correctly calculates and delivers bolus insulin.

Preconditions:

- Profile exists.
- Pump has sufficient insulin available.

Success Guarantee:

- Bolus insulin is accurately calculated and delivered.

Main Success Scenario:

1. User selects "Deliver Bolus."
2. System prompts for glucose level and carbohydrate intake.
3. User enters values.

4. System calculates the required bolus amount.
5. System administers insulin if sufficient supply is available.
6. System logs bolus delivery.
7. System confirms delivery.

Extensions: 1a. User enters incorrect values: System allows corrections before processing. 2a. Insulin supply is insufficient: System notifies users and suggests alternatives.

Use Case 4: Automatically Deliver Basal Insulin

Primary Actor: System

Stakeholders and Interests:

- User: Needs continuous background insulin delivery.
- System: Ensures basal insulin is delivered at the right intervals and in the correct amount.

Preconditions:

- Profile exists.
- Pump has sufficient insulin available.

Success Guarantee:

- Basal insulin is administered at regular intervals without user intervention.

Main Success Scenario:

1. System checks configured basal rate.
2. System administers the required insulin dose at regular intervals.
3. System logs insulin delivery.

Extensions:

1a. Pump is out of insulin: System notifies user and stops delivery.

2a. Battery is too low: System suspends delivery and alerts user.

Use Case 5: View Insulin Pump History

Primary Actor: User

Stakeholders and Interests:

- User: Needs to review past insulin doses and system activity.
- Healthcare Provider: May use log data for medical analysis.

Preconditions:

- Profile exists.
- History logs exist.

Success Guarantee:

- User successfully accesses and reviews insulin pump history.

Main Success Scenario:

1. User selects "View History."
2. System retrieves and displays stored records.

Extensions:

1a. No history exists: System notifies user and returns to the main menu.

Use Case 6: Suspend/Resume Insulin Delivery

Primary Actor: User

Stakeholders and Interests:

- User: Needs the ability to pause insulin delivery in specific situations.
- Safety Inspector: Ensures the system logs suspensions and resumes insulin correctly.

Preconditions:

- Profile exists.

Success Guarantee:

- Insulin delivery is successfully suspended and resumed when required.

Main Success Scenario:

1. User selects "Suspend Insulin Delivery."
2. System stops all insulin administration.
3. System logs suspension.

4. User selects "Resume Insulin Delivery."
5. System resumes insulin administration.
6. System logs resumption.

Extensions:

1a. User tries to resume while battery is low: System alerts user before resuming.

2a. User forgets to resume insulin delivery: System provides a periodic reminder.

Use Case 7: Battery Status Check

Primary Actor: System

Stakeholders and Interests:

- User: Needs to be informed about battery levels to ensure uninterrupted pump operation.
- Safety Inspector: Ensures low battery alerts are functional and timely.

Preconditions:

- Device is powered on.

Success Guarantee:

- User is notified if the battery level is low.

Main Success Scenario:

1. System monitors battery level.
2. If the battery is low, the system alerts the user.

Extensions:

1a. Battery drains completely: System logs shutdown and notifies user upon restart.

2a. User ignores battery alert: System escalates warning with additional notifications.