

## **Adherium - Senior Backend Engineer Take-Home Project**

### **Patient Adherence Data Sync Service**

#### **Context**

You're joining a healthcare technology company that builds remote patient monitoring solutions. Our platform collects inhaler usage data from Bluetooth-connected sensors and calculates adherence metrics for clinical dashboards. A common challenge we face is ensuring data consistency between mobile clients and our backend when patients have intermittent connectivity.

#### **The Problem**

A patient's mobile app collects inhaler usage events while offline. When connectivity is restored, the app sends a batch of events to your API.

Build a small .NET service that:

1. Accepts a batch of usage events via a REST endpoint (each event has: timestamp, device ID, patient ID, event type)
2. Handles idempotency (the same events may be sent multiple times due to network issues)
3. Calculates a simple "adherence score" for the patient (care plan suggests 2 puffs, 2x per day)
4. Returns the updated adherence score and confirmation of which events were processed

#### **Requirements**

- .NET 8+ and C#
- Include basic unit tests for your adherence calculation logic
- Provide a README explaining your design decisions, especially around idempotency and data consistency
- In-memory storage is fine (no database required)

#### **Evaluation Criteria**

- Clean, readable code structure

- Thoughtful handling of edge cases (duplicate events, out-of-order timestamps, missing data)
- Clear explanation of tradeoffs in your README
- Test coverage of critical business logic
- Communication with the Adherium Product team

**Time Expectation:** 2-3 hours

Communication with team is encouraged. Please liase with Johnny Soares [johnnyl@adherium.com](mailto:johnnyl@adherium.com) for engineering questions and Luke Allera for subject matter questions.

**Deadline:** Please submit within 5 days of receipt. Send a link to a GitHub repo or a zip file to [davidh@adherium.com](mailto:davidh@adherium.com)

Should you need more time please reach out.

Upon review of your submission you may be invited to present your work to the rest of the engineering and product team.