

Use Case Model Documentation – DiabRisk

Project: DiabRisk – Diabetes Risk Screener Platform

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Version: 1.0

Phase: Stage 2 – Use Case Modeling

1. Actor Identification

1.1 Actor Candidates from Project Dictionary

Based on the analysis of the Project Dictionary (Section 2.4 – Persons), the following actor candidates were identified:

Actor Candidate	Source Term	Selection Decision
End User	"End User" (PD 2.4)	✔ Selected – Primary system actor
Clinician Reviewer	"Clinician Reviewer" (PD 2.4)	✔ Selected – Secondary actor for exported data
Product Owner	"Product Owner" (PD 2.4)	✘ Excluded – Project management role, not system user
Go Developer	"Go Developer" (PD 2.4)	✘ Excluded – Development role, not end user
ML Engineer	"ML Engineer" (PD 2.4)	✘ Excluded – Development role, not end user
Frontend Developer	"Frontend Developer" (PD 2.4)	✘ Excluded – Development role, not end user
QA Engineer	"QA Engineer" (PD 2.4)	✘ Excluded – Testing role, not end user
DevOps Engineer	"DevOps Engineer" (PD 2.4)	✔ Selected as "System Administrator"
Course Instructor	"Course Instructor" (PD 2.4)	✘ Excluded – Academic supervisor, not system user

1.2 Actor Refinement and Specialization

Primary Actors:

- **Anonymous User:** Unauthenticated visitor who can submit one-off assessments
- **Registered User:** Authenticated user with account who can save and track assessments
 - *Generalization:* Registered User inherits all capabilities of Anonymous User

Secondary Actors:

- **Clinician Reviewer:** Healthcare professional who reviews exported patient assessment data
- **System Administrator:** Technical role managing system health and performance













1.3 Final Actor List

Actor ID	Actor Name	Description	Primary/Secondary
A1	Anonymous User	Performs one-time risk assessments without registration	Primary
A2	Registered User	Authenticated user with persistent account and history	Primary
A3	Clinician Reviewer	Reviews exported assessment data as supplementary information	Secondary
A4	System Administrator	Monitors system health and manages technical operations	Secondary






2. Use Case Identification

2.1 Use Case Candidates from Project Dictionary

From Functions (Section 2.2):

- Register / Sign In 
- Submit Assessment 
- Predict Risk  (internal, included in Submit Assessment)
- Explain Prediction 
- Generate Report 
- Save Assessment 
- List Assessments 
- Export Assessments 
- Delete Assessment 
- Delete Account & Data 
- List Model Versions 
- Health Check 

From Activities (Section 2.3):

- Onboarding  (merged with Register/Sign In)
- Data Entry  (part of Submit Assessment)
- Risk Evaluation  (internal process)
- Report Generation 
- Monitoring & Logging  (admin function)

From Prioritized Use Cases (Part IV):

- All 15 use cases (UC-1 through UC-15) identified and included

2.2 Use Case Categorization

Core Assessment (Anonymous + Registered):

- UC-1: Submit Anonymous Assessment
- UC-2: View Risk Result with Visualization
- UC-15: Acknowledge Legal Disclaimer

Authentication:

- UC-4: Register / Sign In via OAuth

Account Management (Registered only):

- UC-5: Save Assessment to Account
- UC-6: List Past Assessments
- UC-7: Delete Individual Assessment
- UC-12: Delete Account & All Data (GDPR)

Reports & Export:

- UC-3: Download PDF Report
- UC-8: Export All Assessments (CSV/JSON)

Advanced Analysis:

- UC-9: View Model Version and Metrics
- UC-10: Generate SHAP Explanations
- UC-11: View Calibration Plot

Administrative:

- UC-13: Admin Health Check Endpoint
 - UC-14: Rate Limit Handling
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3. Relationship Identification

3.1 Actor Generalizations

Registered User --|> Anonymous User

Rationale: A registered user can perform all actions available to anonymous users, plus additional authenticated features. This is a classic "is-a" relationship.

3.2 <> Relationships (Mandatory)

Base Use Case	Included Use Case	Justification
UC-1: Submit Anonymous Assessment	UC-15: Acknowledge Legal Disclaimer	Every assessment submission requires disclaimer acknowledgment
UC-1: Submit Anonymous Assessment	Validate Input Data	All submissions must validate 21 health parameters
UC-1: Submit Anonymous Assessment	Execute ML Inference	Core functionality - assessment requires prediction
UC-2: View Risk Result	Execute ML Inference	Displaying results requires inference completion
UC-3: Download PDF Report	Generate Report Content	PDF creation requires content generation
UC-5: Save Assessment to Account	UC-1: Submit Assessment	Saving requires an assessment to exist

3.3 <> Relationships (Optional)

Base Use Case	Extending Use Case	Extension Point	Condition
UC-2: View Risk Result	UC-10: Generate SHAP Explanations	After displaying result	User requests detailed explanation
UC-2: View Risk Result	UC-11: View Calibration Plot	After displaying result	User requests model reliability info
UC-3: Download PDF Report	UC-10: Generate SHAP Explanations	During report generation	User opted for detailed report

Rationale: SHAP explanations and calibration plots are optional enhancements that provide additional insight but are not required for core functionality.

3.4 Use Case Dependencies

Prerequisite Relationships:

- UC-5, UC-6, UC-7, UC-12 require UC-4 (user must be authenticated)
- UC-3 requires UC-2 (must have a result to generate report)
- UC-7 requires UC-6 (must list assessments before deleting one)

4. Use Case Diagram

The use case diagram is provided in PlantUML format in `use_case_diagram.puml`.

Key Features:

- Actor hierarchy showing generalization (Registered User inherits from Anonymous User)
- System boundary clearly delineated
- 15 prioritized use cases organized by functional area
- <> relationships showing mandatory dependencies
- <> relationships showing optional enhancements
- Association lines connecting actors to their use cases

To generate the diagram:

```
# Using PlantUML CLI
plantuml use_case_diagram.puml

# Using VS Code PlantUML extension
# Open file and use preview command
```

5. Use Case Prioritization Matrix

Use Case	Priority	Actor	Complexity	Phase	Dependencies
UC-1	Critical	Anonymous User	Medium	1	UC-15
UC-2	Critical	Anonymous User	Low	1	UC-1
UC-15	Critical	Anonymous User	Low	1	None
UC-4	High	Registered User	High	1	None
UC-5	High	Registered User	Medium	1	UC-1, UC-4

Use Case	Priority	Actor	Complexity	Phase	Dependencies
UC-6	High	Registered User	Low	1	UC-4
UC-3	High	Registered User	High	1	UC-2, UC-4
UC-12	High	Registered User	Medium	1	UC-4
UC-7	Medium	Registered User	Low	1	UC-4, UC-6
UC-9	Medium	Anonymous User	Low	1	None
UC-14	Medium	System	Medium	1	None
UC-8	Medium	Registered User	Medium	2	UC-4, UC-6
UC-10	Medium	Registered User	High	2	UC-2
UC-11	Medium	Registered User	High	2	UC-2
UC-13	Low	Admin	Low	1	None

6. Actor-Use Case Matrix

Use Case	Anonymous User	Registered User	Clinician	Admin
UC-1: Submit Assessment	✓	✓ (inherited)		
UC-2: View Result	✓	✓ (inherited)		
UC-3: Download Report		✓		
UC-4: Sign In		✓		
UC-5: Save Assessment		✓		
UC-6: List Assessments		✓		
UC-7: Delete Assessment		✓		
UC-8: Export Data		✓	✓	
UC-9: View Model Info	✓	✓ (inherited)		
UC-10: SHAP Explanations		✓		
UC-11: Calibration Plot		✓		
UC-12: Delete Account		✓		
UC-13: Health Check				✓

Use Case	Anonymous User	Registered User	Clinician	Admin
UC-14: Rate Limiting	System	System	System	✓
UC-15: Disclaimer	✓	✓ (inherited)		

7. Modeling Decisions and Rationale

7.1 Why Anonymous User and Registered User are Separate Actors

Despite the generalization relationship, we model them separately because:

1. **Different authentication states** lead to different system behaviors
2. **Distinct use case sets** - many features require authentication
3. **Clear business rules** - anonymous assessments are ephemeral, registered ones persist
4. **Security boundaries** - different authorization levels

7.2 Why Clinician Reviewer is Included

Although secondary, the clinician actor is included because:

- Explicitly mentioned in System Vision (Section 1.1)
- Has a specific use case (UC-8: reviewing exported data)
- Represents a different usage pattern than end users
- Important for complete system understanding

7.3 Internal Use Cases (Not Shown)

Some technical processes are **not** modeled as use cases:

- **Validate Input Data:** Technical subprocess, shown as included
- **Execute ML Inference:** Internal system operation, not user-initiated
- **Generate Report Content:** Technical subprocess of UC-3

Rationale: Use case diagrams show user-visible functionality. Internal technical steps are documented in sequence diagrams and activity diagrams (future stages).

7.4 Rate Limit Handling (UC-14)

Modeled as a system-level use case because:

- Transparent to normal users (automatic)

- Only visible when limits exceeded
- Managed by administrators
- Cross-cutting concern affecting all use cases

8. Traceability to System Dictionary

Use Case	Dictionary Functions	Dictionary Activities
UC-1	Submit Assessment	Data Entry, Risk Evaluation
UC-2	Predict Risk	Risk Evaluation
UC-3	Generate Report	Report Generation
UC-4	Register / Sign In	Onboarding
UC-5	Save Assessment	-
UC-6	List Assessments	-
UC-7	Delete Assessment	-
UC-8	Export Assessments	-
UC-9	List Model Versions	-
UC-10	Explain Prediction	Risk Evaluation
UC-11	(Calibration Curve entity)	-
UC-12	Delete Account & Data	-
UC-13	Health Check	Monitoring & Logging
UC-14	(Rate limiting)	Monitoring & Logging
UC-15	(Legal disclaimer)	Onboarding

9. Summary Statistics

- **Total Actors:** 4 (2 primary, 2 secondary)
- **Total Use Cases:** 15
- **Actor Generalizations:** 1
- **<> Relationships:** 6
- **<> Relationships:** 3
- **Phase 1 Use Cases:** 11
- **Phase 2 Use Cases:** 4

Document Prepared By: Development Team

Review Status: Ready for Stage 2 Submission

Next Steps: Detailed use case specifications, sequence diagrams, activity diagrams

End of Use Case Model Documentation