

# Elyx Health WhatsApp Conversation Generator

AI-Powered Synthetic Healthcare Communication System  
Technical Documentation

AI Agent Documentation

August 16, 2025

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# 1 Executive Summary

The Elyx Health WhatsApp Conversation Generator is an AI-powered system designed to create realistic, multi-participant healthcare conversations spanning a 32-week premium concierge health program. This system generates synthetic WhatsApp conversations between healthcare members and a multidisciplinary medical team, incorporating realistic progression challenges, complaint scenarios, and authentic communication patterns.

## 1.1 Key Features

- **32-Week Program Structure:** Complete healthcare journey with 8 distinct phases
- **AI-Powered Generation:** Uses Google Gemini 2.5-Pro for contextual message creation
- **Realistic Constraints:** Member time commitments, exercise schedules, and adherence patterns
- **Multi-Agent Team:** 6 healthcare professionals with distinct roles
- **Complaint Integration:** 5 realistic complaint scenarios at specific program milestones
- **Authentic Formatting:** WhatsApp-style timestamps and message threading

# 2 System Architecture

## 2.1 Core Components

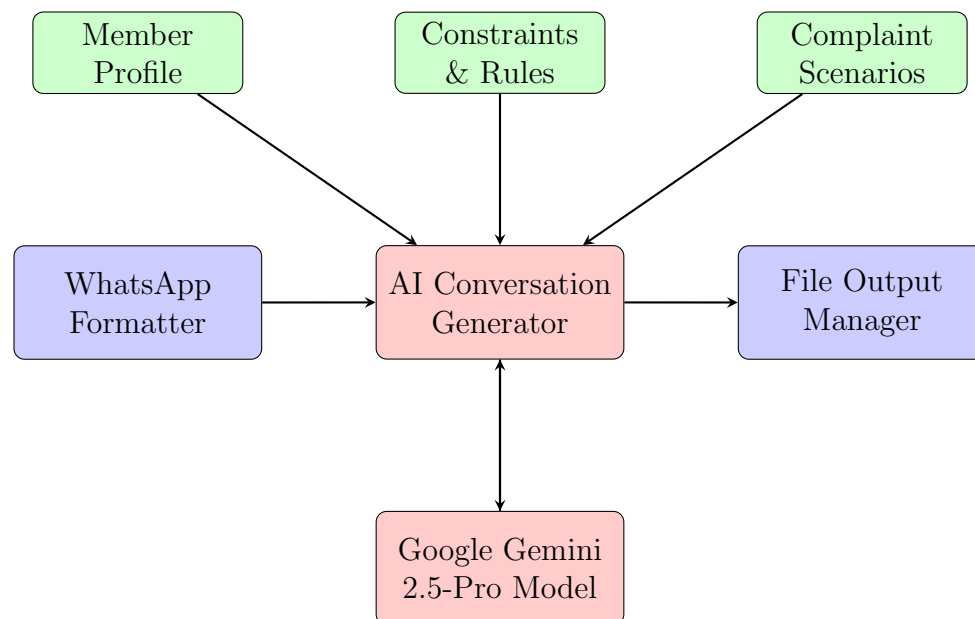


Figure 1: System Architecture Overview

## 2.2 Component Descriptions

### 2.2.1 MemberProfile Class

Stores comprehensive member information including:

- Personal demographics and health goals
- Behavioral patterns and motivation levels
- Technology preferences and communication styles
- Scheduling constraints and availability

### 2.2.2 WhatsAppFormatter Class

Handles message formatting and timing:

- Cross-platform timestamp formatting
- Realistic message spacing and delays
- Attachment handling and threading
- Time progression management

### 2.2.3 AIConversationGenerator Class

Core AI-powered conversation generation:

- Integration with Google Gemini 2.5-Pro
- Week-specific prompt generation
- Fallback template-based generation
- Conversation flow management

## 3 32-Week Program Structure

The system models a comprehensive healthcare program divided into 8 phases:

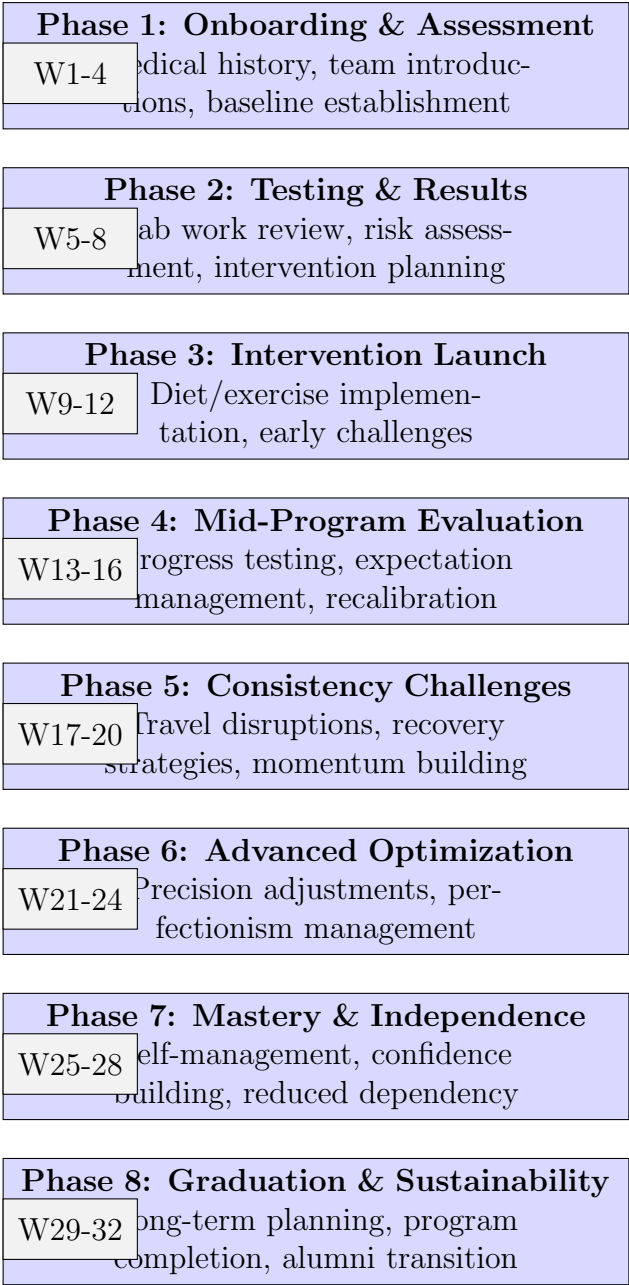
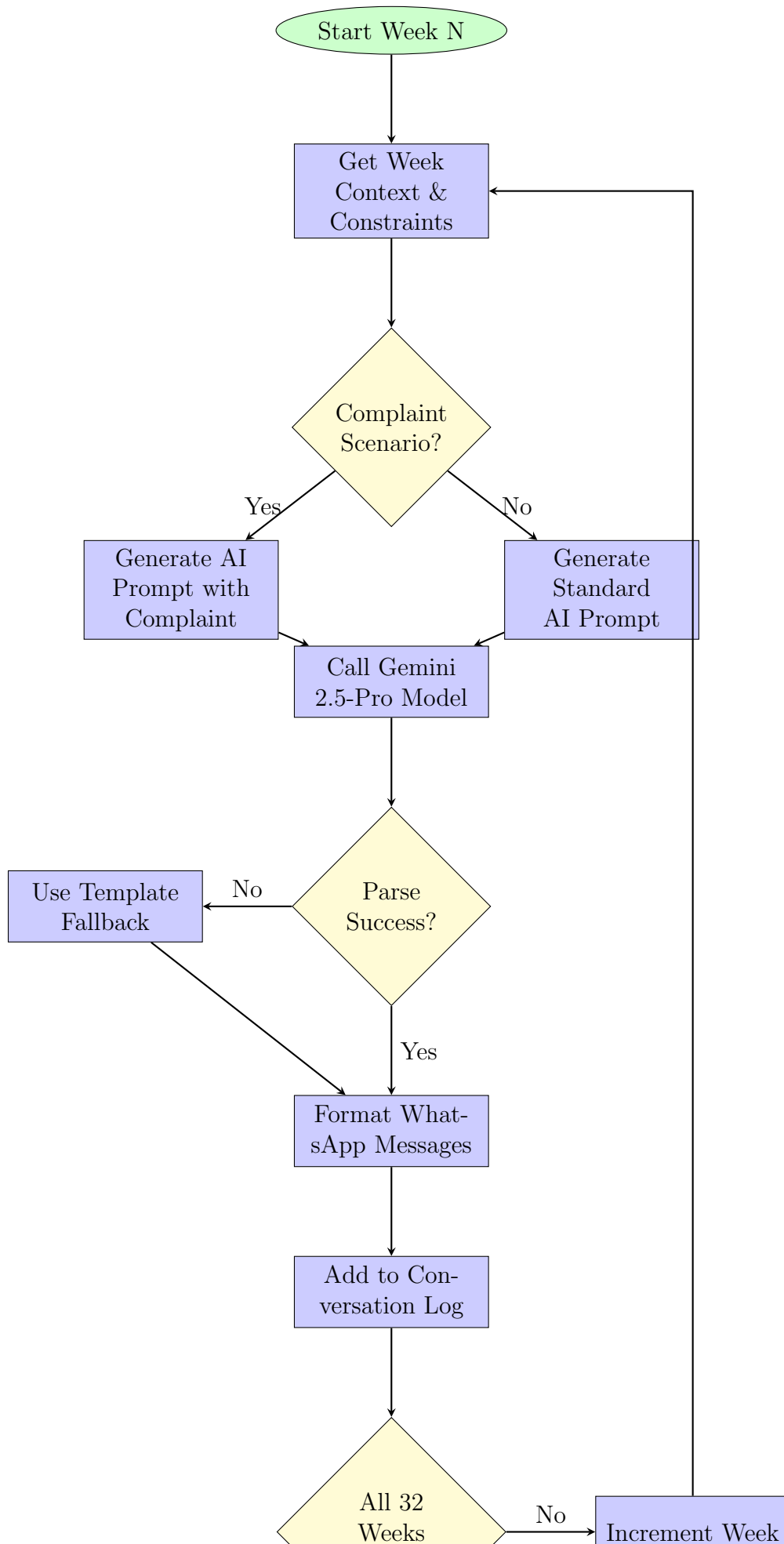


Figure 2: 32-Week Program Phase Structure



## 4 AI Generation Workflow



## 5 Key Features & Constraints

### 5.1 Member Behavior Modeling

The system models realistic member behavior patterns:

| Constraint              | Value          | Implementation                                     |
|-------------------------|----------------|--|
| Weekly Time Commitment  | 5 hours        | Referenced in member messages about plan adherence |
| Conversation Initiation | 2-3 per week   | Member asks research-based questions               |
| Exercise Updates        | Every 2 weeks  | Physiotherapist provides plan modifications        |
| Test Panel Frequency    | Every 12 weeks | Quarterly comprehensive testing                    |
| Plan Adherence Rate     | 50%            | Plans require adjustment half the time             |
| Travel Pattern          | 1 week/4 weeks | Disruption scenarios included                      |

Table 1: Member Behavior Constraints

### 5.2 Complaint Scenario Integration

Five realistic complaint scenarios are integrated at specific weeks:

1. **Week 11 - Meal Complexity:** Time-consuming meal preparation complaints
2. **Week 15 - Slow Results:** Expectation vs. reality frustrations
3. **Week 17 - Travel Disruption:** Business trip adherence challenges
4. **Week 22 - Perfectionism Stress:** Anxiety about plan adherence
5. **Week 26 - Program Ending:** Fear of losing support structure



## 6 Healthcare Team Structure

### 6.1 Team Composition

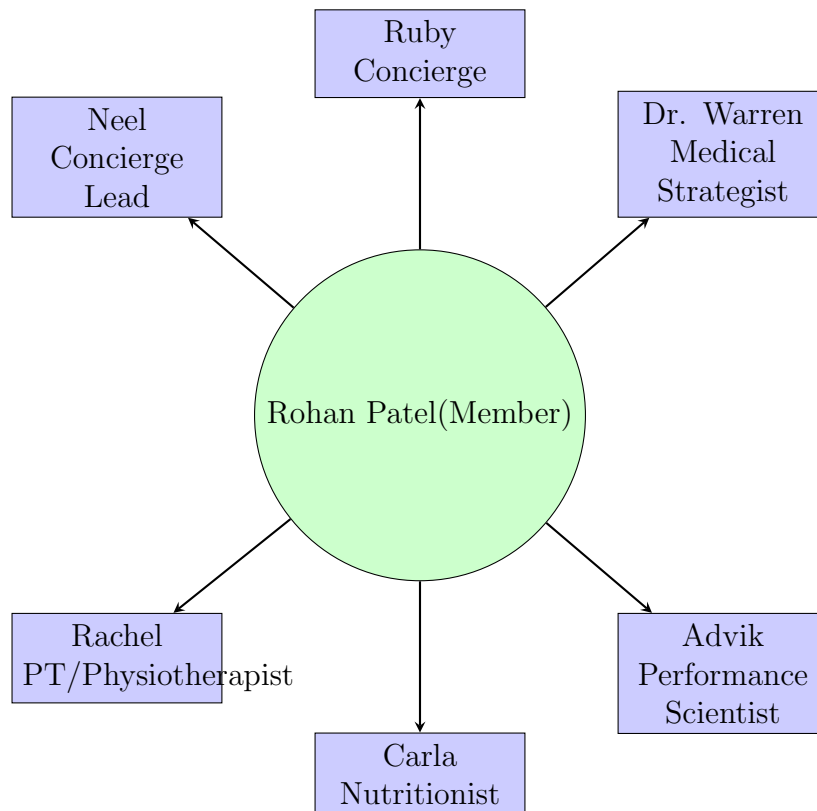


Figure 4: Healthcare Team Structure

### 6.2 Role Responsibilities

- **Ruby (Concierge):** Primary contact, scheduling, coordination
- **Dr. Warren (Medical Strategist):** Medical decisions, test interpretation
- **Advik (Performance Scientist):** Data analysis, wearables, optimization
- **Carla (Nutritionist):** Diet planning, meal guidance, nutrition education
- **Rachel (PT/Physiotherapist):** Exercise programs, physical therapy, movement
- **Neel (Concierge Lead):** Senior oversight, complex coordination, escalations

## 7 Technical Implementation

### 7.1 AI Prompt Engineering

The system generates contextual prompts for each week containing:

```
CONTEXT:
[Member Profile Summary]
[32-Week Program Overview]

CURRENT WEEK: Week N
FOCUS: [Week-specific description]
WEEK INTENSITY: [Phase characteristics]

CONSTRAINTS:
- Target: 18-22 messages
- Member initiates: 2-3 conversations
- Exercise updates: [If week % 2 == 0]
- Complaint scenario: [If applicable]

INSTRUCTIONS:
Generate realistic WhatsApp messages that:
1. Follow program structure
2. Show member curiosity/research
3. Include time commitment references
4. Maintain professional tone
5. Show appropriate progression
```

Listing 1: AI Prompt Structure Example

## 7.2 Message Parsing & Formatting

The system parses AI responses using regex patterns:

- Pattern 1: Message X: [SENDER] - [MESSAGE]
- Pattern 2: [SENDER] - [MESSAGE]
- Timestamp formatting: [M/D/YY, H:MM AM/PM]
- Attachment handling: attached: filename.ext

## 7.3 Fallback System

When AI generation fails, the system uses template-based generation with:

- Week-specific base messages
- Constraint-compliant filler content
- Realistic member question templates
- Exercise update templates (bi-weekly)

# 8 Output Generation

## 8.1 Conversation Statistics

The system generates comprehensive statistics:

| Metric                    | Target Value              |
|---------------------------|---------------------------|
| Total Messages            | 640+ (20/week × 32 weeks) |
| Message Range per Week    | 18-22 messages            |
| Member-Initiated Messages | 64+ (2/week × 32 weeks)   |
| Exercise Update Weeks     | 16 weeks (every 2nd week) |
| Complaint Scenarios       | 5 specific weeks          |
| Conversation Span         | Jan 15 - Aug 20, 2025     |

Table 2: Expected Output Statistics

## 8.2 File Output Format

The generated conversation is saved as:

```
ELYX HEALTH - 32-WEEK WHATSAPP CONVERSATION LOG
=====
Member: Rohan Patel
Period: January 15 - August 20, 2025 (32 weeks)
Total Messages: [count]

PROGRAM STRUCTURE:
[32-week plan details]

CONVERSATION:
[1/15/25, 9:15 AM] Ruby (Elyx Concierge): ...
[1/15/25, 9:30 AM] Rohan Patel: ...
...
```

Listing 2: Output File Structure

## 9 Usage Instructions

### 9.1 System Requirements

- Python 3.8+
- Google Generative AI library
- Valid Google Gemini API key
- Required Python packages: datetime, random, os, time, re

### 9.2 Configuration

```
# Configure API key
genai.configure(api_key="YOUR_API_KEY_HERE")

# Initialize system
formatter = WhatsAppFormatter()
member_name = "Member_Name"
generator = AIConversationGenerator(
    formatter,
    member_name,
```

```
    use_ai=True    # Set to False for template-only mode
)
```

Listing 3: Configuration Setup

## 9.3 Execution

```
# Generate conversation
conversation_log = generator.generate_thirty_two_week_conversation()

# Save to file
filename = save_conversation_to_file(conversation_log)
print(f"Conversation saved to: {filename}")
```

Listing 4: System Execution

# 10 Customization Options

## 10.1 Member Profile Customization

Users can customize member profiles by modifying:

- Personal demographics and health goals
- Behavioral patterns and motivation levels
- Technology preferences
- Communication styles and scheduling

## 10.2 Program Structure Modification

The 32-week program structure can be modified by:

- Adjusting phase descriptions in `week_phases` dictionary
- Modifying complaint scenarios and timing
- Changing intensity patterns per phase
- Customizing team member roles and responsibilities

## 10.3 AI Model Configuration

The system supports different AI models:

- Current: Google Gemini 2.5-Pro
- Configurable via `MODEL_NAME` variable
- Fallback to template-based generation if AI fails
- Adjustable AI prompt complexity and constraints

## 11 Quality Assurance

### 11.1 Validation Mechanisms

The system includes several quality assurance features:

- Message count validation (18-22 per week)
- Sender name validation against team roster
- Timestamp sequence validation
- Constraint adherence checking
- Fallback activation for failed AI generation

### 11.2 Realistic Conversation Elements

Key elements ensuring conversation realism:

- Natural message timing with random delays
- Authentic complaint scenarios at realistic intervals
- Progressive difficulty and complexity over 32 weeks
- Member-initiated research questions and curiosity
- Professional but friendly healthcare team tone

## 12 Future Enhancements

### 12.1 Planned Improvements

- Multi-language support for international members
- Additional AI model integrations (GPT-4, Claude)
- Real-time conversation generation APIs
- Member personality variation templates
- Advanced analytics and conversation insights

### 12.2 Scalability Considerations

- Database integration for member profile storage
- Batch processing for multiple member conversations
- Cloud deployment with API endpoints
- Real-time streaming conversation generation
- Integration with actual healthcare management systems

## 13 Conclusion

The Elyx Health WhatsApp Conversation Generator represents a sophisticated AI-powered system for creating realistic healthcare conversations. By combining detailed member profiling, constraint-based generation, authentic complaint scenarios, and professional healthcare team interactions, the system produces highly realistic 32-week conversation logs suitable for training, analysis, and demonstration purposes.

The system's modular architecture, comprehensive constraint handling, and robust fallback mechanisms ensure reliable operation while maintaining conversation authenticity and educational value.