

**Designing
AI Care Coordinator Insomnia Module
for
Smoking Cessation**

**Srilekha Kadiyala
Project Manager Intern**

Background

As a project manager collaborating with the clinical team on the AI care coordinator product for Nicotine addiction patients, my task is to design the initial version of the AI care coordinator insomnia module. The patients will have access to the care coordinator via texting and it will function like a chatbot that interacts with the patient, collects patient reported metrics and triages messages back to the admin and therapists.

Task 1

Flowchart Design: AI care coordinator module

Figma Link:

<https://www.figma.com/file/bNIGGwXy5GpHejwCcnwjpO/Untitled?type=whiteboard&node-id=0-1&t=J3GWfJ1CDIILj8nq-0>

** pdf attached seperately **

Task 2: Core Use Cases

Core Use Case 1: Comprehensive Insomnia Assessment and Initial Support Plan

- **Circumstances:** A patient experiencing insomnia during their smoking cessation journey reaches out to the AI Care Coordinator.
- **Objective:** To perform an initial assessment of the patient's insomnia, understand its impact on their smoking cessation efforts, and provide an initial set of personalized recommendations to manage insomnia.
- **Background Information:**
 - **System:** AI Care Coordinator for Smoking Cessation Insomnia Module
 - **Primary Actor:** Patients experiencing insomnia during their smoking cessation journey.
 - **Secondary Actors:** Clinical team members, therapists
 - **Goals:** To assess the severity of insomnia in patients attempting to quit smoking and to provide an initial support plan tailored to their specific needs
 - **Stakeholders:** Patients, clinical teams, therapists specializing in sleep disorders
 - **Preconditions:** The patient has initiated contact with the AI care coordinator and expressed sleep-related difficulties.
 - **Triggers:** The patient mentions sleep problems during their interactions with the AI.

- **Scenarios:**
 - **Basic Flow:** The patient interacts with the AI to report sleep difficulties. The AI conducts an initial assessment using a structured questionnaire, provides basic sleep hygiene advice, and suggests relaxation techniques tailored to the patient's responses.
 - **Alternate Flow 1:** If the patient reports severe insomnia symptoms, the AI recommends scheduling a consultation with a therapist while continuing to monitor the patient's sleep patterns and smoking cessation progress.

Core Use Case 2: Ongoing Sleep Management and Quit Support

- **Circumstances:** A patient is in the midst of their quit journey and is receiving ongoing support from the AI Care Coordinator to manage insomnia and maintain their cessation progress.
- **Objective:** To offer continuous, adaptive support for sleep management alongside encouragement and strategies for smoking cessation, tailoring advice, and interventions based on patient feedback and progress.
- **Background Information:**
 - **System:** AI Care Coordinator for Smoking Cessation Insomnia Module
 - **Primary Actor:** Patients engaged in the smoking cessation program and receiving ongoing support for insomnia.
 - **Secondary Actors:** Clinical team members, therapists
 - **Goals:** To provide ongoing support for sleep management and smoking cessation, adjusting strategies based on patient feedback and progress.
 - **Stakeholders:** Patients, clinical teams, therapists specializing in sleep disorders and addiction
 - **Preconditions:** The patient has received an initial assessment and support plan for managing insomnia.
 - **Triggers:** Ongoing interactions and progress reports from the patient regarding sleep quality and smoking cessation efforts.
- **Scenarios:**
 - **Basic Flow:** The AI periodically checks in with the patient to assess sleep quality and smoking cessation progress, offering personalized advice and adjusting the support plan based on the patient's feedback.
 - **Alternate Flow 1:** If the patient continues to struggle with insomnia or relapses in smoking, the AI escalates the case for further evaluation by clinical team members or therapists.

Core Use Case 3: Escalation and Referral for Specialized Care

- **Circumstances:** A patient's insomnia symptoms persist or worsen despite the initial assessment and ongoing support, indicating a need for more specialized care.
- **Objective:** To identify when a patient requires specialized care for insomnia beyond the capabilities of the AI's support, facilitating a referral to appropriate healthcare providers for further evaluation and treatment.
- **Background Information:**
 - **System:** AI Care Coordinator for Smoking Cessation Insomnia Module
 - **Primary Actor:** Patients with persistent insomnia despite ongoing support
 - **Secondary Actors:** Clinical team members, sleep disorder therapists
 - **Goals:** To identify patients who require more specialized care for their insomnia and facilitate referrals to appropriate healthcare providers.
 - **Stakeholders:** Patients, clinical teams, therapists specializing in sleep disorders
 - **Preconditions:** The patient has engaged with the AI for insomnia management and smoking cessation without significant improvement in sleep quality.
 - **Triggers:** The AI identifies patterns indicating a lack of progress or worsening insomnia symptoms.
- **Scenarios:**
 - **Basic Flow:** Based on the AI's assessment, the patient is referred to a sleep disorder specialist for further evaluation and treatment. The AI provides a summary of the patient's case and the healthcare provider's interventions.
 - **Alternate Flow 1:** If the patient hesitates to seek specialized care, the AI provides additional information on the benefits of specialized treatment and attempts to address any concerns.

Task 3: Interaction Examples

Interaction Example for Core Use Case 1: Comprehensive Insomnia Assessment and Initial Support Plan

Patient: Texts the AI Care Coordinator, "I have been having trouble sleeping since I started trying to quit smoking."

AI Care Coordinator: "I am here to help you with that. Can you tell me more about your sleep issues? How often do you find yourself unable to sleep?"

Patient: "Almost every night for the past week. I keep thinking about smoking."

AI Care Coordinator: "It is common to experience sleep disturbances when quitting smoking. Let's try some strategies to improve your sleep. Have you practiced relaxation techniques before bed, like deep breathing or meditation?"

Patient: "Not really, no."

AI Care Coordinator: "Let's start with some basic sleep hygiene tips and relaxation techniques tonight. First, try to go to bed and wake up at the same time every day. Avoid caffeine and heavy meals in the evening. As for relaxation, try the 4-7-8 breathing technique. Inhale for 4 seconds, hold your breath for 7 seconds and exhale slowly for 8 seconds. Repeat this cycle four times before bed. Can you try this and let me know how it goes tomorrow?"

Patient: "Okay, I'll give it a try. Thank you."
The next day...

Patient: "I tried the breathing technique. It took a while, but I think I fell asleep faster."

AI Care Coordinator: "Great to hear it helped a bit! Consistency is key, so let's keep this up. Also, let's start tracking your sleep patterns. Could you log when you go to bed and when you wake up? This information can help us understand and further improve your sleep."

Interaction Example for Core Use Case 2: Ongoing Sleep Management and Quit Support

Patient: "I've been following the sleep hygiene tips you suggested, but I still have nights where I can't seem to switch off. It's frustrating."

AI Care Coordinator: "I understand how challenging that can be. It's important to keep trying and adjust strategies as needed. Let's review your sleep diary. Have you noticed any patterns or triggers on the nights you find it hard to sleep?"

Patient: "Yes, sleep is worse on days I feel more stressed. Also, when I have coffee late in the afternoon."

AI Care Coordinator: "Stress and caffeine can impact your sleep. Let's try a new approach for stress management. Have you ever tried guided imagery or progressive muscle relaxation in the evening?"

Patient: "No, I haven't tried those before."

AI Care Coordinator: "Let's start with progressive muscle relaxation tonight. It involves tensing each muscle group in your body tightly, but not to the point of strain, and then slowly relaxing them. This can help reduce physical tension and mental stress. I'll send you a guide. As for coffee, try limiting it to mornings only. Let's check in a week to see how these adjustments work for you."

Interaction Example for Core Use Case 3: Escalation and Referral for Specialized Care

Patient: "I've tried all the techniques we discussed, but my sleep hasn't improved much. I'm starting to worry this is affecting my health."

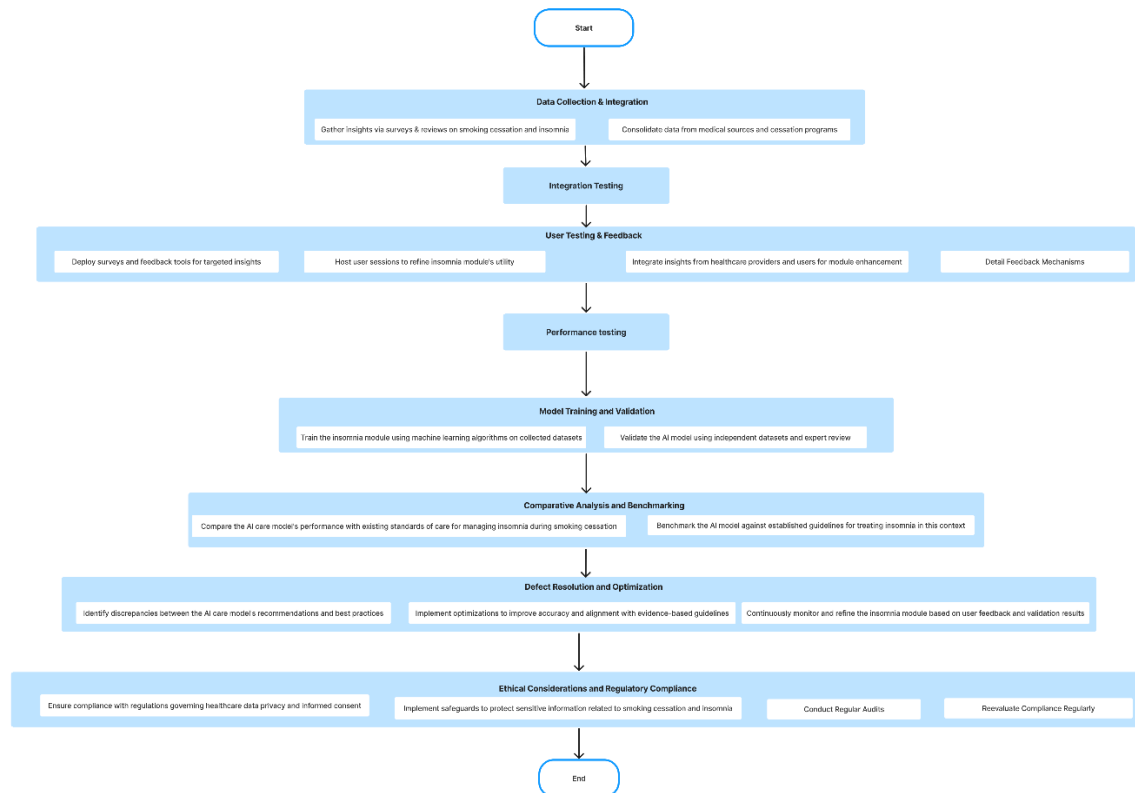
AI Care Coordinator: "I appreciate your effort and understand your concern. It might be time to consult a sleep specialist who can offer more in-depth support. Would you like me to help set up an appointment?"

Patient: "Yes, I think I need that. How does it work?"

AI Care Coordinator: "I'll provide your information and a summary of what we've tried to our clinical team, who will then reach out to you with details on how to proceed. They'll work with you to find a specialist and schedule a consultation. In the meantime, continue with the practices that bring even slight relief, and let's keep track of your sleep. We're here to support you through this journey."

These interaction examples for Core Use Case 2 and Core Use Case 3 demonstrate how the AI Care Coordinator offers ongoing support, adapts strategies based on patient feedback, and, when necessary, escalates the case to human healthcare providers for specialized care. This approach ensures that patients receive comprehensive support tailored to their specific needs and circumstances.

Task 4: Testing and Optimization plan



**** pdf attached seperately ****

Link:

<https://www.figma.com/file/TxVzWs8ckYnRHkC20nyRD8/Testing-and-Optimization-Plan-for-AI-care-coordinator-module?type=whiteboard&node-id=0-1&t=zuVR2g64mYvHAZeo-0>

Plan Description:

1. Start: The initiation of the testing and optimization plan for the AI care coordinator.

2.Data Collection & Integration:

- **Gather Insights:** Conduct surveys and review data on smoking cessation and insomnia to understand user needs and experiences.
- **Consolidate Data:** Aggregate data from medical sources and cessation programs to build a comprehensive dataset for training the AI.

3. Integration Testing: Test the integration of the collected data within the AI system to ensure seamless operation between subsystems and the reliability of data sources.

4. User Testing & Feedback:

- **Deploy Surveys and Feedback Tools:** Use targeted surveys and feedback mechanisms to gather insights from users, specifically targeting those experiencing insomnia during smoking cessation.
- **Host User Sessions:** Conduct sessions with users to observe how they interact with the insomnia module and identify areas for improvement.
- **Integrate Insights:** Combine feedback from healthcare providers and users to enhance the module's utility and user experience.
- **Detail Feedback Mechanisms:** Provide a clear framework for how feedback is collected and integrated, emphasizing a continuous improvement loop.

5. Performance Testing: Evaluate the AI model's performance under various conditions to ensure it can reliably support users in managing insomnia during smoking cessation.

6. Model Training and Validation:

- **Train the Insomnia Module:** Apply machine learning algorithms to train the module using the collected datasets.
- **Validate the AI Model:** Use independent datasets and expert review to validate the model's recommendations and ensure its accuracy.

7. Comparative Analysis and Benchmarking:

- **Compare Performance:** Assess the AI care model's effectiveness against existing standards of care for managing insomnia in smokers attempting cessation.
- **Benchmark Against Guidelines:** Measure the model's recommendations and performance against established guidelines and best practices.

8. Defect Resolution and Optimization:

- **Identify Discrepancies:** Find and address any deviations between the AI's advice and evidence-based guidelines.
- **Implement Optimizations:** Make necessary adjustments to improve the model's accuracy and alignment with best practices.
- **Continuous Monitoring and Refinement:** Regularly update the insomnia module based on ongoing user feedback and validation efforts, ensuring it remains effective and relevant.

9. Ethical Considerations and Regulatory Compliance:

- **Ensure Compliance:** Verify that the system adheres to healthcare regulations, including data privacy and informed consent.
- **Implement Safeguards:** Protect sensitive information, ensuring the privacy and security of user data related to smoking cessation and insomnia.
- **Conduct Regular Audits:** Systematically review the AI system to guarantee ongoing compliance with ethical standards and regulations.
- **Reevaluate Compliance:** Continuously assess and adjust the system to meet evolving regulatory requirements and ethical considerations.
-

10.End: The completion of the testing and optimization cycle, leading to a refined, compliant, and effective AI care coordinator for managing insomnia in the context of smoking cessation.

This plan ensures that the AI care coordinator continually improves based on real-world feedback and evolving healthcare practices.

Conclusion:

Overall, this document is structured as a plan detailing the integration of an AI Care Coordinator Insomnia Module into a smoking cessation program. The aim is to design an interactive, chatbot-like interface that engages patients through text messaging, collects their responses, and coordinates with clinicians for further action. The project outlines various scenarios, illustrating how the AI can offer tailored support based on the patient's specific needs during their quit journey, including initial assessments, ongoing sleep management, and, when needed, referrals for specialized care. Additionally, a detailed plan for testing and optimizing the AI system ensures its effectiveness and compliance with healthcare standards. This plan is pivotal for offering personalized patient support and represents a significant step towards integrating AI into patient care for those struggling with insomnia during smoking cessation.

References:

<https://www.mentalhealth.va.gov/quit-tobacco/docs/My-Smoking-Workbook-508.pdf>

Fucito, L. M., Redeker, N. S., Ball, S. A., Toll, B. A., Ikomi, J., & Carroll, K. M. (2013).

Integrating a Behavioural Sleep Intervention into Smoking Cessation Treatment for Smokers with Insomnia: A Randomised Pilot Study. *The Journal of Smoking Cessation*, 9(1), 31–38. <https://doi.org/10.1017/jsc.2013.19>