Developing a Trustworthy AI Chatbot for Personalized HIV Care

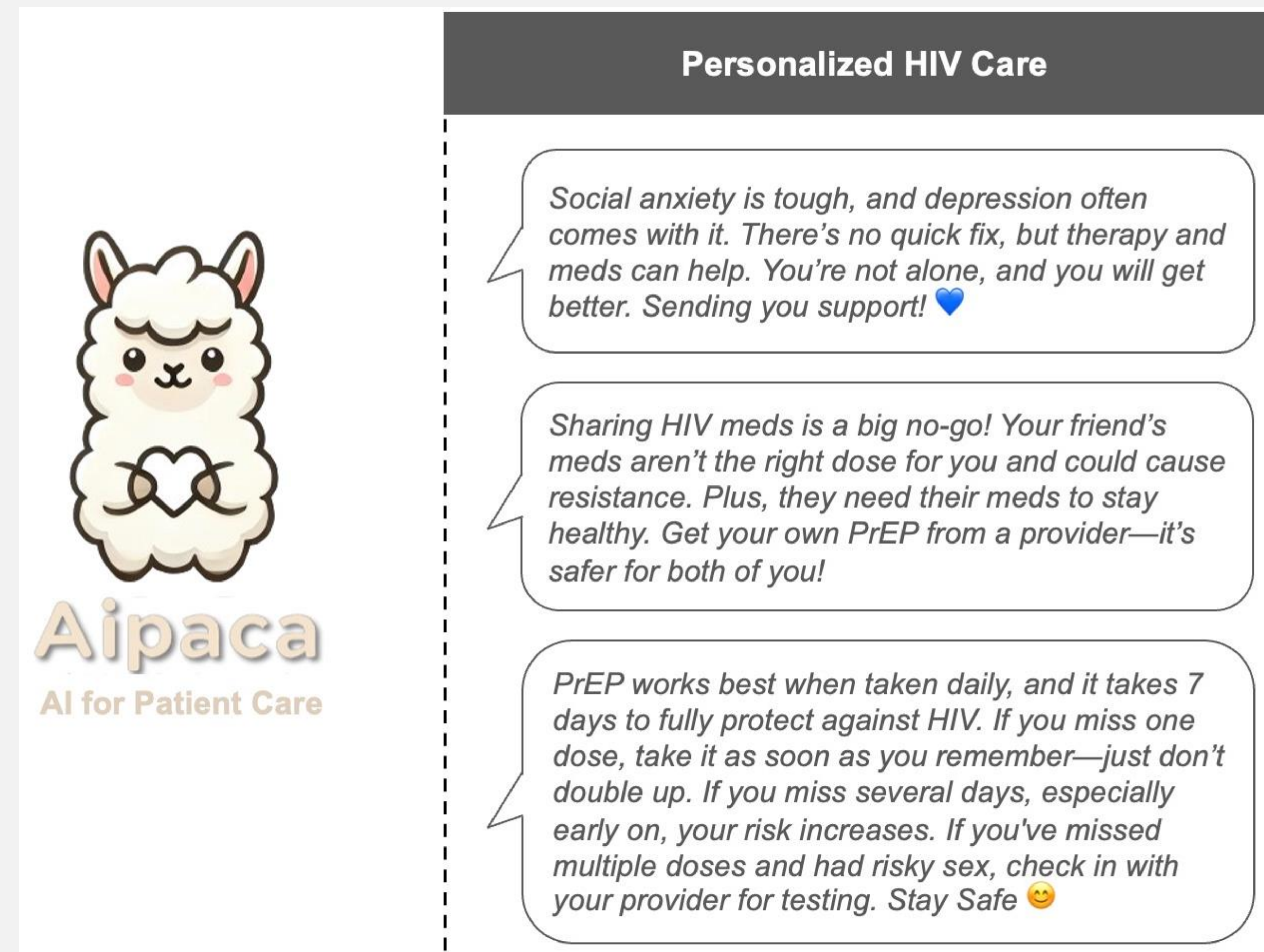Shiv Patel[1], Sreeja Patnala[1], Ruosi Shao[1] Ph.D.

I. Background

- **Current Problems in HIV Care:**
  - People with HIV (PWH) face high barriers to accessing quality healthcare.
- **Current in Traditional Care:**
  - Lack gaps of scalable, accessible, and on-demand support
- **Our Solution – Personalized HIV Care with AI Chatbot:**
  - AI chatbots offer scalable, real-time, personalized guidance for HIV care.
  - Integrates clinically validated recommendations to enhance accuracy and inclusivity

II. Methodology

- Curating HIV knowledge bank for LLM fine-tuning and benchmark

- **Synthesized 6 modules covering 36 chapters**, each structured as:
  - **Educational Materials:**
    - Compiled 1,080+ pages of medically validated, peer-reviewed information.
    - Transcribed all figures and tables into text descriptions using ChatGPT, verified by researchers.
  - **Quiz Bank:**
    - Structured with 450+ questions, each containing:
    - Question: Scenario-based or factual.
    - Answer: Evidence-based and peer-reviewed.
    - Explanation: Detailed reasoning with supporting charts and clinical context.

- **Modules focused on:**
  1. Screening & Diagnosis
  2. Basic HIV Primary Care
  3. Antiretroviral Therapy (ART)
  4. Co-Occurring Conditions
  5. HIV Prevention Strategies
  6. Key Populations & Social Determinants of Health

III. Results

Personalized HIV Care

Social anxiety is tough, and depression often comes with it. There's no quick fix, but therapy and meds can help. You're not alone, and you will get better. Sending you support! 💙

Sharing HIV meds is a big no-go! Your friend's meds aren't the right dose for you and could cause resistance. Plus, they need their meds to stay healthy. Get your own PrEP from a provider—it's safer for both of you!

PrEP works best when taken daily, and it takes 7 days to fully protect against HIV. If you miss one dose, take it as soon as you remember—just don't double up. If you miss several days, especially early on, your risk increases. If you've missed multiple doses and had risky sex, check in with your provider for testing. Stay Safe 😊

Aipaca AI for Patient Care

Figure 1: Illustrative Example of Chatbot Interaction
- *Demonstrates how the AI-driven chatbot (Aipaca) interacts with users through text-based conversations.*
- *Provides personalized HIV care with tailored advice on mental health support, medication safety, and PrEP usage.*

- **Curated an HIV Knowledge Bank** covering the **HIV care continuum**:

- **Knowledge Bank Includes:**
  - 1,080+ pages of peer-reviewed, evidence-based clinical information.
  - 450+ quiz questions designed to benchmark clinical understanding.
  - 1.2 million+ words/tokens synthesized for AI training datasets.

- **Benchmark multiple AI models:**
  - **Open-source:** Llama, Mistral.
  - **Closed-source:** GPT-4, Gemini.

- **Evaluating chatbot performance in:**
  - Accuracy of clinical reasoning and personalized recommendations.
  - Patient-centered communication and clinical applicability.

IV. Future Steps

- **LLM fine-tuning and benchmark** HIV knowledge bank

- **Pilot test and semi-structured** interview with HIV specialists to access clinical applicability

- **Optimize chatbot design** to address expert feedback

- **Conduct small-scale feasibility test** with PWH

- **Ongoing testing** to validate accuracy, safety, and scalability for clinical use.

V. References

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