



# Pahola: An AI for Health Care and Alcohol Education



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**PAHO**



Pan American  
Health  
Organization



World Health  
Organization  
REGIONAL OFFICE FOR THE  
Americas

**As required by the Alcohol Policy 19 Conference,  
I/we have signed a disclosure statement and note the  
following conflict(s) of interest:**

**None to Declare**



**Evidence to Action: Building a Framework for Change**  
**September 14-16, 2022 Arlington, VA**

# Background

- COVID-19 led to an increase in alcohol misinformation, online communications, sales and marketing, disruptions in health services, increase in stress/anxiety and consumption of alcohol to cope with
- The pandemic accelerated the need for a rapid improve in the access to safe and effective health services
- Need for a trusted, reliable source of accurate information
- Ways to improve health literacy using digital solutions were needed
- SBI had already some data on its effectiveness via computer-based interventions but large scale implementation of SBI has been a challenge, despite being recommended as one of the 'good buys' for NCD

# New Paradigm has also been proposed

- Efforts to integrate SBI into health care system could include macro-level population issues, with SBI being more directly linked to alcohol policy measures.
- As a result, it would not be restricted to discussing the “self-regulation of one’s own drinking” but would invite the individual to think about other environmental stimuli, such as persuasion by ubiquitous marketing, low alcohol prices, easy accessibility, wide availability etc.
- This integrative approach could include people’s access to health information and to a broader understanding of social norms, attitudes and environmental factors affecting their own behaviors, fostering their motivation and capabilities to change their health outcomes effectively and positively, which is the general idea behind the concept of health literacy.

# PAHO's first AI digital health worker

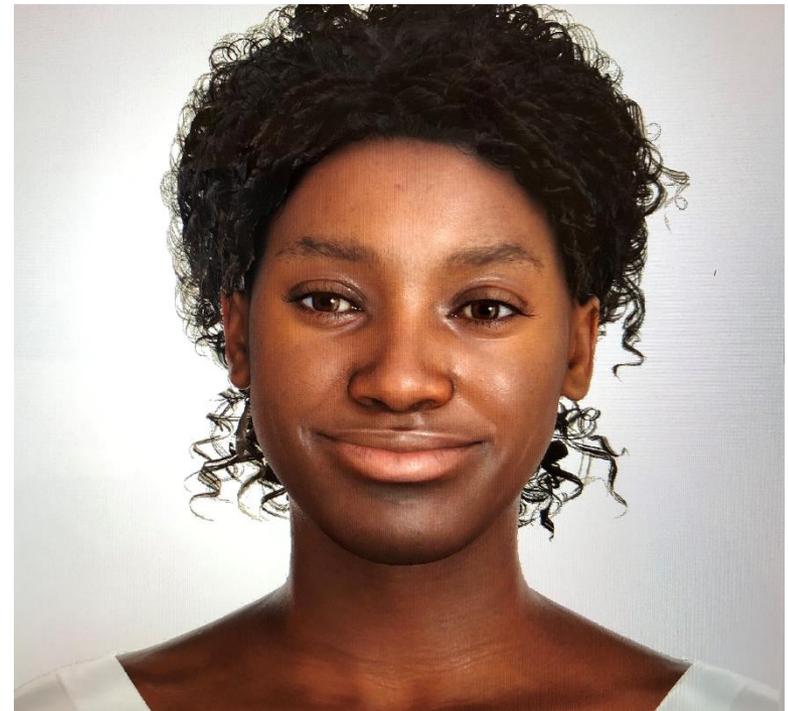
<https://www.paho.org/es/alcohol/pahola>

Pahola is an autonomously animated A.I. launched on PAHO's website on 19 November 2021

Available in 3 languages, to an unlimited number of users, 24 hours per day/7days a week

Created in partnership with the companies Soul Machines and Rooftop, using Google Digitalflow and iCloud services;

Pahola can help and give advice to alcohol users who wish to learn about alcohol harms, reduce or quit their drinking, and can combat alcohol misinformation



# Seven Technology Components

1. Facial sentiment analysis of end user video stream.
2. Autonomous animation of digital person with cognitive models.
3. 3D rendering cloud architecture
4. WebRTC video and audio streaming front-end SDK (software development kit).
5. Natural language processing (Google Digital Flow ES).
6. Speech to text conversion (STT).
7. Text to speech synthesis (TTS)

Each component performed a group of tasks to automatically process the audio or text inputs provided by the end-users. PAHO secured a non-exclusive worldwide license from a private company to use a software that enables interactions between a digital conversational agent and users via an application

The NLP integration with basic EML required the implementation of specific phrases that consistently trigger specific emotions by Pahola.

# PAHO's technical input

PAHO decided on:

Gender, Race, personality, tone of voice, apparent age, hair style, clothing colors and style. The decisions were based on ad hoc informal consultations with about 30 staff from PAHO, as well as alcohol experts in several countries.

The name Pahola was chosen to intentionally relate to PAHO's acronym, as to minimize the likelihood of a duplicate proper name from another digital person already patented.

Pahola was developed in three languages for the first launching and deployment (English, Portuguese and Spanish).

# Summary of Pahola Dialogue Tree



The dialog tree was structured into 89 core topics: 49 from the alcohol effects branch, 18 from the quit branch, and 22 from the quiz branch.

Approximately 1,500 phrases were used to “train” the NLP.

“Small talk” phrases were also added in the script to enhance Pahola’s empathy and improve user engagement.

# Health Effects Branch

- Around 100 different alcohol-related health themes were included: what a standard drink is; if drinking is healthy; if alcohol can cause cancer, heart disease, mental health problems; how alcohol affects physical performance; how it affects immunity; alcohol and COVID-19; alcohol and liver problems; alcohol and sleep; alcohol dependence; alcohol use and gender differences; alcohol and pregnancy; alcohol use among youth; alcohol and violence; alcohol and driving; and so on.
- Themes were selected non-systematically based on common misunderstandings about alcohol effects/harms reported in social media channels and on the internet, as well as on ad hoc consultations with non-specialists, women in recovery from alcohol problems, alcohol researchers, PAHO staff and their family members, and young people in various countries.

# Additional Inputs from PAHO

- Page with Terms and Conditions (consent)
- Page with treatment resources, hotlines and AA groups by country
- 13 Fact Sheets in 3 languages
- Alcohol awareness campaign
- Social media marketing in Twitter, Instagram and Facebook about Pahola (including DV360 to drive traffic to Pahola's landing page)



# The First Digital Health Worker dedicated to Alcohol Health Literacy and Reduction in Alcohol Consumption

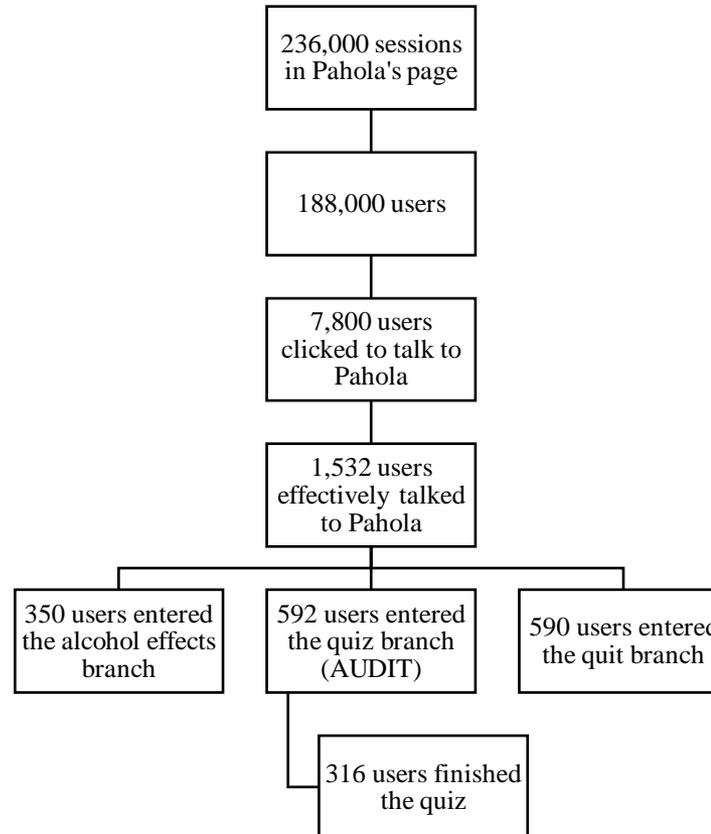
- Launched on 19 November 2021, webinar attended by >1,000 participants, message from Dr Tedros
- Media briefing sent ahead of the launch to journalists
- Followed by several webinars in 3 languages
- Support to NGOs from the region to amplify messages in social media
- Available in English, Spanish and Portuguese
- Pahola reached over **1.6M** people with her content
  - **236,000** people landed on Pahola's page
  - **7,800** clicked to talk to Pahola
  - **2,000** people talked to Pahola, for ~5 min



**PAHO**

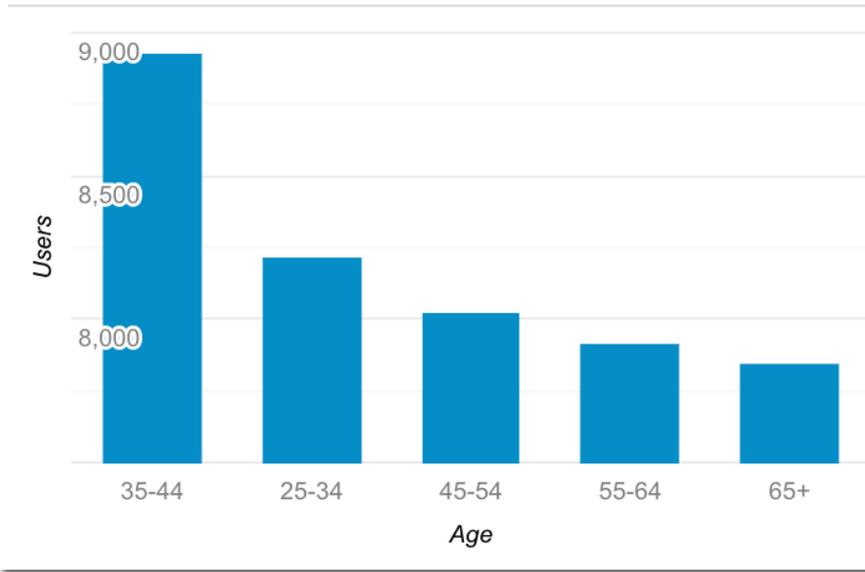


# How users accessed Pahola – from 19 November 2021 to 16 January 2022

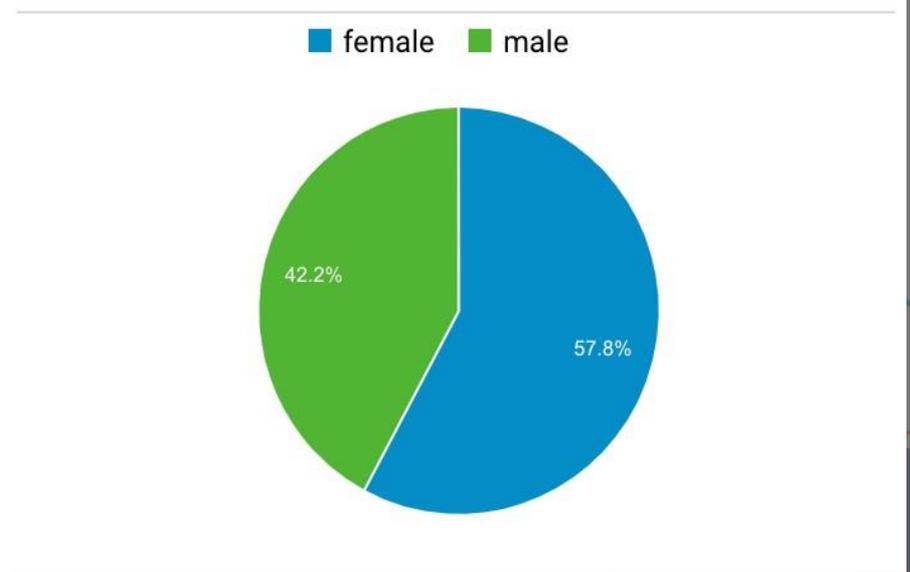


# Who visited PAHOLA's page

PAHOLA - Audience demographic



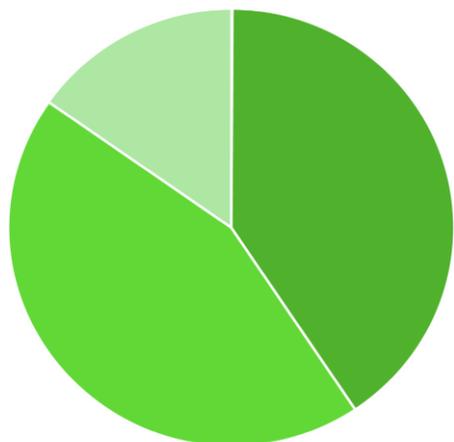
PAHOLA - Audience demographic



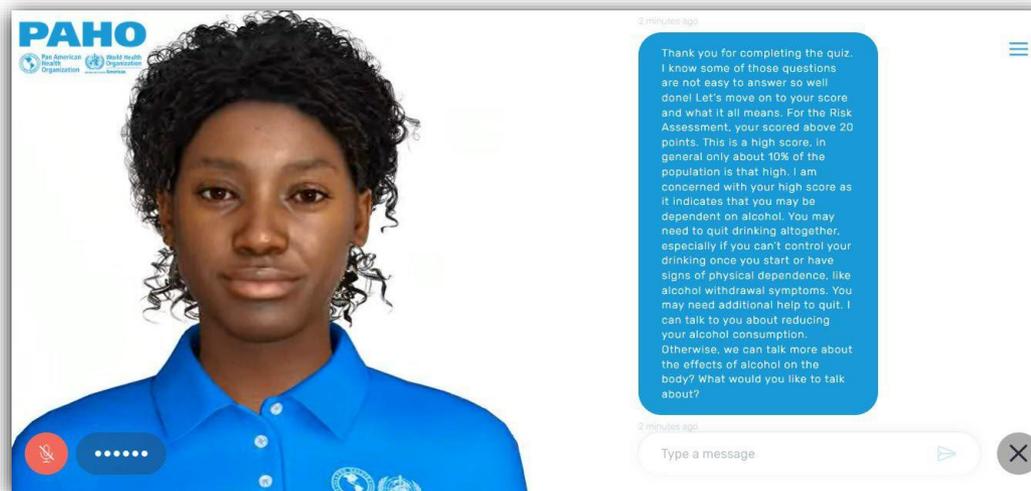
# Audit Branch – Quiz Results

19 November 2021 – 22 January 2022

The ratio of results based on English users that completed the quiz.



■ Low Risk ■ At Risk ■ Possible Dependency on Alcohol



# Effects of Alcohol Branch: Most and least commonly accessed nodes (n=49)

## Commonly accessed nodes

What is the nutritional value of alcohol?
How healthy is it to drink?
Alcohol, the brain and behavior
Alcohol, sex and pregnancy
Social drinking

## Least accessed nodes

What is fetal alcohol syndrome?
Are women more vulnerable to alcohol effects compared to men
Can I drink while breastfeeding?
Can alcohol dependence be cured?

# Commonly unmatched questions

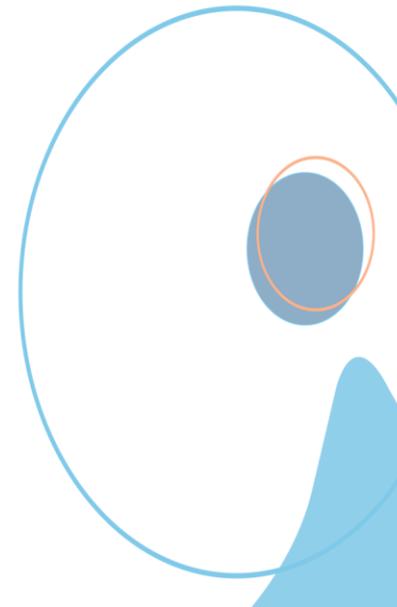
How does alcohol affect my heart?
Is alcohol good for you?
Are there any benefits in drinking alcohol?
Can alcohol help me fight Covid?
What is the relationship between alcohol and breast cancer?
What are the consequences of alcohol?
Causes of alcoholism?
Alcohol gives me cancer?
How to help an alcoholic?
What are the cardiovascular effects of alcohol?
How it affects my liver?
Is alcoholism genetic ?

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# Next Steps

- Revision of Pahola corpus and engagement
  - Modify presentation of Terms and Conditions
  - Tailored conversations based on the user conversations
  - Enable recall of conversation within a session to make it more engaging
  - Add more features of empathy
  - Add branch for 'Returners'
  - Add branch for those who want to assist others
  - Add Pahola in French
- New communication strategy and campaign to launch the new version



# How to scale PAHOLA further and save lives

1. Evolve her reach and impact with seamless channel integration – including a mobile app
2. Connect Pahola and ‘Florence’
3. Integrate Pahola into countries health systems: 4 pilot countries
4. Promote research studies on cost-effectiveness and other topics





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Thank you!  
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