



FemmeHacks 2023

Aurchie

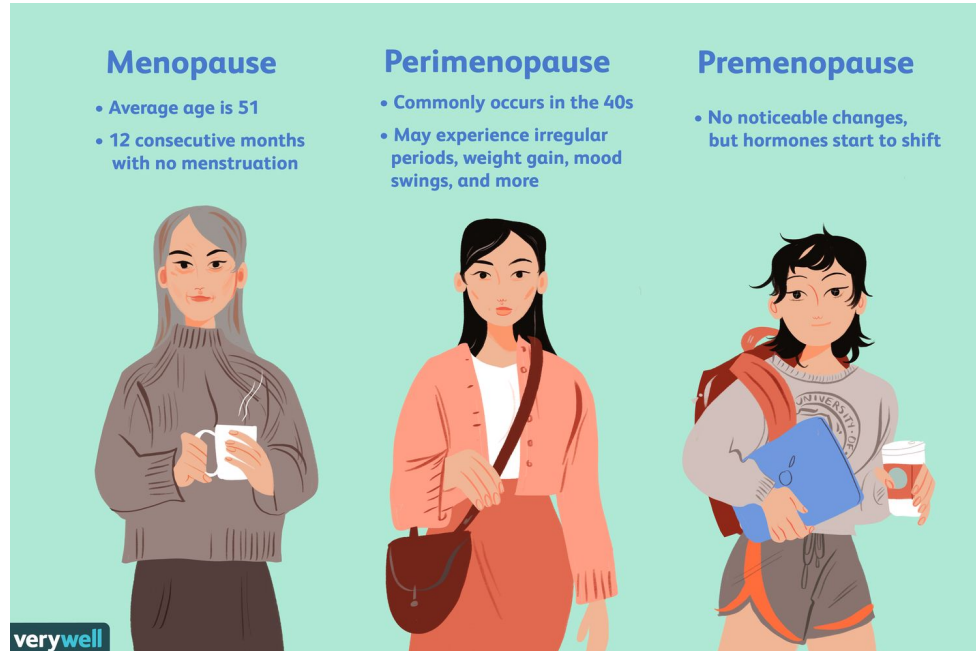
Onsang

Suhani

Lina

What is Menopause?

Menopause is the time that marks the end of a woman's menstrual cycles.



Causes

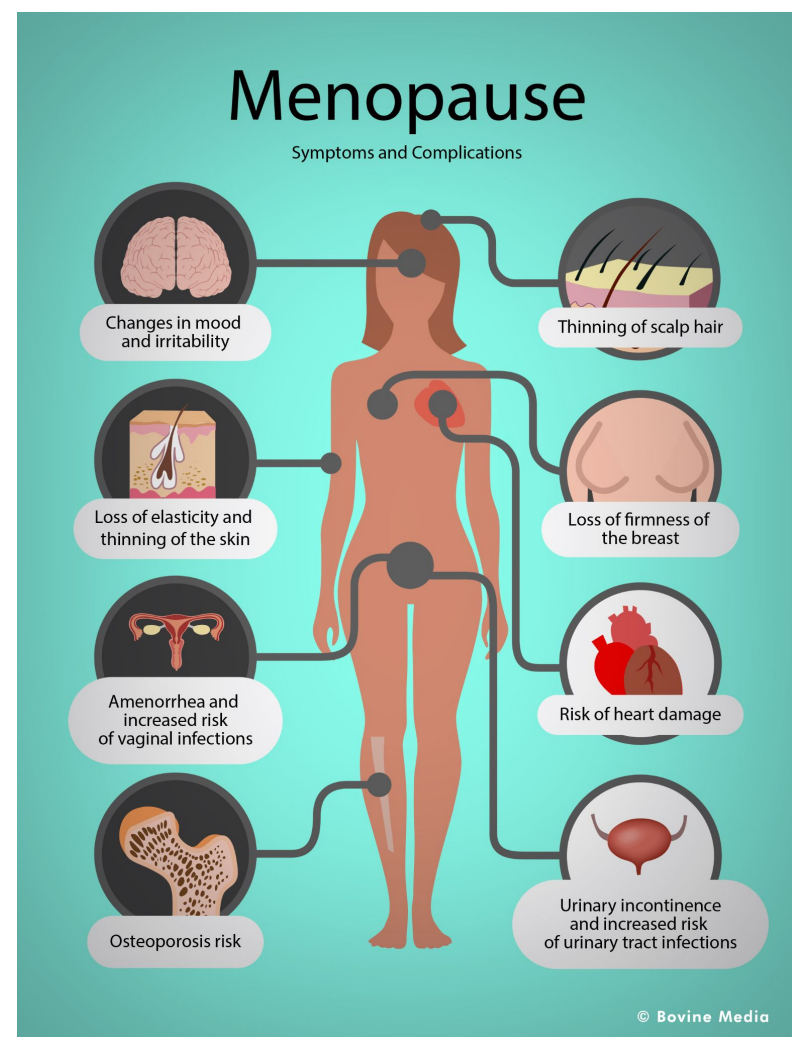
Menopause can result from:

- **Naturally declining reproductive hormones.**
- **Surgery that removes the ovaries (oophorectomy).**
- **Chemotherapy and radiation therapy.**
- **Primary ovarian insufficiency.** (Premature menopause)

Symptoms:

We are focusing on the most severe and prevalent issues:

1. **Hot flash:** Sudden feeling of warmth in the upper body. Your skin might redden, as if you're blushing.
2. **Chills:** If you lose too much body heat, you might feel chilled afterward.
3. **Excessive sweating:** Hot flashes are also associated with sweating.
4. **Difficulty sleeping:** Hot flashes, chills, and sweating cause discomfort especially when sleeping.
5. **Brain Fog:** Forgetfulness, difficulty concentrating, inability to think clearly or problem solve, and confusion.
6. **Mood swings**



Problems

It has become increasingly apparent that our healthcare system doesn't cater to menopause as it should. Sadly, a recent study showed that 73% of women don't seek treatment for their menopause symptoms. What's worse is that it's estimated that only 6% of women seeking menopause symptom treatment actually get it. Yikes.

Current Medical Solutions

1. **Hormone Therapy:** Systemic Estrogen therapy, and low dose estrogen therapy.

Risks: Mood swings, Heart disease, Stroke, Blood clots, Breast cancer

Also very expensive, and less accessible.

2. **Supplements:** DHEA Hormones, Antidepressant, sleep inducers, vitamins, iron supplements, Calcium, Flaxseeds, Ginseng.

Either they are ineffective or have harmful side effects.

3. **Phenology Gummies:** Contain Geinstein, a plant based estrogen, that mediates physical symptoms such as hot flashes. They also contain other vitamins and saffron that help with stress management. The cost is on the higher end:

Very expensive: \$65 for gummies.

Current Tech Solutions

Mobile App that tracks period regularity and mood swings:

<https://www.sri.com/story/menopause-goes-high-tech-understanding-your-menopause-journey-by-leveraging-ai-and-wearable-sensing-technology/>

Web application for getting menopause specific prescription medicines:

<https://www.evernow.com>

At-home hormone tests: <https://www.mymodernmenopause.com>

Wrist cooling device (Embr Wave): <https://embrlabs.com/>

Other telemedicine services.

Meet Mecoo:

A Stylish Wrist Cooling Bracelet
Accessed via our Mobile App

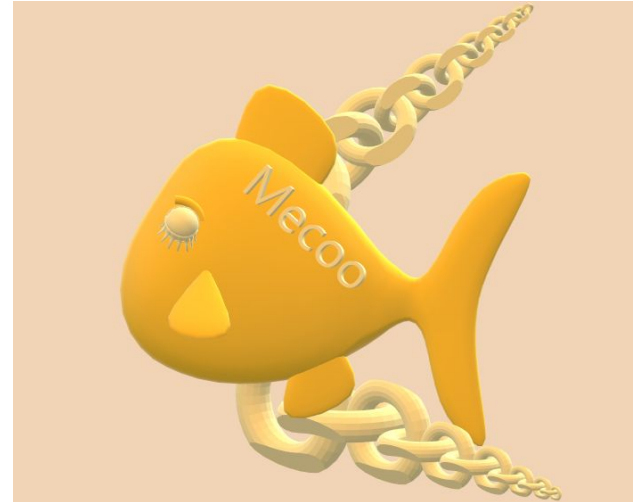
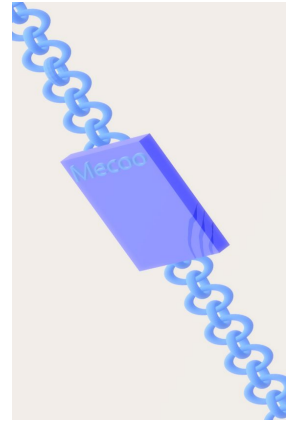
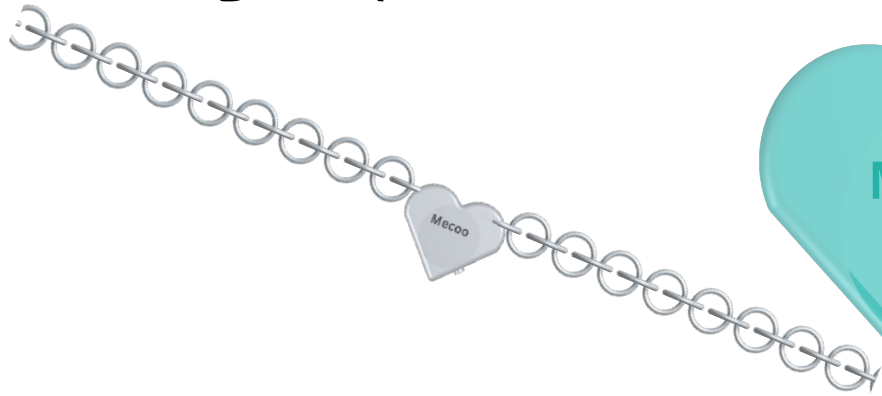


Bracelet Design Components:

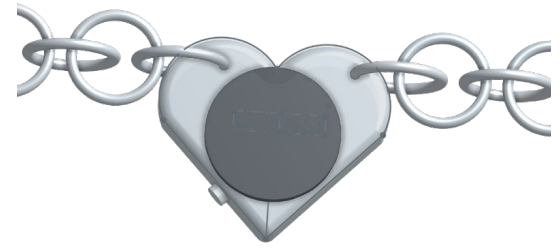
- Sleek metallic body: all-weather, corrosion resistant
- As the bracelet chain is made of small metal rings, it is very breathable as compared to silicon and leather straps.
- Compact and lightweight, does not resist/restrict wrist movement.
- Elegant design that camouflages with your outfit, perfect for every occasion.



Design Options? Yes!



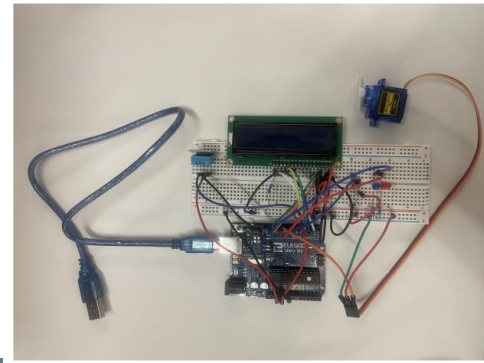
Bracelet Tech Components:



- Display screen: Shows body temperature and sweat percentage
- Temperature sensor: Detects body temperature
- Humidity sensor: Records moisture percentage (sweating)
- Pushbutton: Starts cooling on being pressed
- Cooling mechanism: Fan or cooling pad
- Indicator lights:
 - Red: Temperature and/or sweat percentage higher than threshold values
 - Blue: Cooling is on
- Microcontroller: Programmed to receive data from sensors, send data to app and send commands to actuator; connector type USB B/Micro USB

Inside the Bracelet

- Temperature sensor:
<https://www.te.com/usa-en/product-CAT-DTS0001.html>
- Humidity Sensor: <https://www.te.com/usa-en/product-HPP801A031.html>
- Microcontroller:
 - Lilypad Arduino (microcontroller): <https://electropeak.com/tiny-lilypad-arduino-board>
 - Arduino Seeed Xiao BLE Sense (microcontroller):
<https://shop.pimoroni.com/products/seeed-xiao-ble-nrf52840-sense>
- Cooling Pad: <https://www.adafruit.com/product/1331>
- Pushbutton: <https://www.te.com/usa-en/product-1825910-6.html>
- Battery charger module, to MCU: <https://www.adafruit.com/product/259>
- LiPo Battery: <https://www.adafruit.com/product/258>



Looking ahead

- Using the collected data and tracking patterns using Machine Learning to make predictions about possible hot flashes, mood swings, anxiety attacks and more.
- Adding more sensors to track heart rate and blood oxygen saturation to collect more data that can help in making better predictions.
- Develop features to address other menopausal symptoms such as Brain fog, mood swings, and loss of appetite.
- Use the microchips to design our own PCB.
- Customizing electronic components.

<https://www.grepow.com/button-cell-battery/grp1254-g1-75mah.html>

Team Mecoo

Aurchie

MSE in Electrical
Engineering, UPenn



Onsang

MS in MCIT, UPenn



Suhani

BE in Bioengineering,
Computer &
Information Science,
UPenn



Lina

Web Development
and Design,
Montgomery County
Community College

