



BreezySure

Breath Monitoring device for asthma patients

Submitted in partial fulfilment of the requirement of the degree of

Master of Design

By

Ritik Verma

22m2236

Project Guide

Prof. Kums P Kumaresan



IDC SCHOOL OF DESIGN
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY (2024)

Declaration Form

I, declare that this written report represents my ideas in my own words, and where others' ideas or words have been included I have adequately cited and referenced the original sources.

I also declare that I have adhered to all principles of academic honesty and integrity and have not falsified, misinterpreted or fabricated any idea, data, facts or source in my submission.

I understand that any violation of the above will be caused for disciplinary action by the Institute and can also evoke penal action from the source, from which proper permission has not been taken or improperly been cited.



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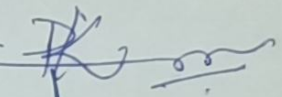
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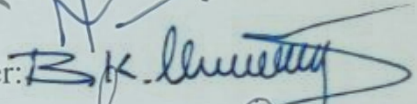
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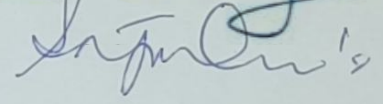
Approval Form

This is to certify that the Industrial Design Project entitled “BreezySure” by Ritik Verma is approved for partial fulfillment for the Master of Design degree in Industrial Design.

(Project Guide): Prof. Kums P Kumaresan 

Signature of the Chair Person: 

Signature of the Internal Examiner: 

Signature of the External Examiner: 

Acknowledgement

I would like to use this opportunity to give thanks to those who helped me going through this Course project. I would like to extend my respect to all the people who helped me in accomplishing this task.

First, I would like to thank my Course Guide, Prof. Kums P Kumaresan, for being extremely helpful and trusting me. His expert advise and helpful comments on my work has helped me to drive my work in a proper direction and reach my goal.

I also extend my gratitude towards all my batch-mates, juniors, family, who have always supported me and inspired me throughout this Project. I also want to offer my appreciation towards IIT Bombay for all the help and facilities they have provided.

Abstract

This college course project explores the design process for a novel breath monitoring biosensor, BreezySure, specifically targeted towards users with asthma. BreezySure prioritizes user experience, aiming to encourage increased adherence to medical device use and raise awareness of effective asthma management strategies.

Respiratory diseases, including chronic obstructive pulmonary disease (COPD) and asthma, pose a significant global health burden. While asthma remains incurable, effective management strategies exist. However, current management tools often have a medical aesthetic, potentially discouraging consistent use. BreezySure addresses this concern by adopting a user-centric design philosophy.

The report details the development process, focusing on critical aspects like intuitive design to encourage adoption and frequent use. BreezySure's design fosters curiosity and prompts questions about the product, promoting awareness of asthma management practices. Ease of use and maintenance are prioritized to enhance the overall user experience. Additionally, BreezySure prioritizes user comfort through ergonomic design and a visually pleasing form factor. Design elements and visual language are carefully considered to facilitate seamless user interaction.

By integrating BreezySure with asthma management, this project aims to address identified user concerns. Providing users with tangible feedback on respiratory health improvements can motivate consistent device usage. Ultimately, BreezySure strives to increase awareness of asthma management tools and empower users to prioritize their well-being through a user-friendly and visually appealing design.

Content

Approval Form

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Abstract

Acknowledgement

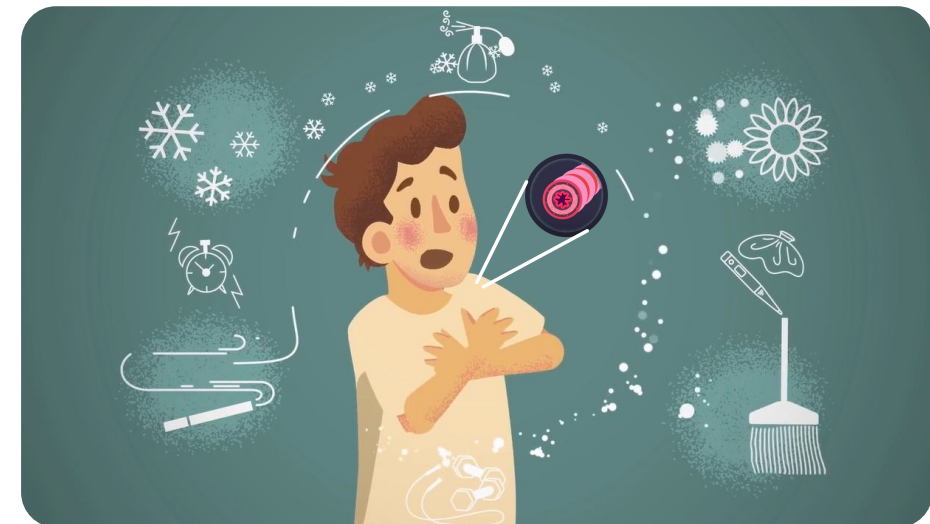
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Introduction

Respiratory diseases, encompassing a diverse range of conditions affecting the lungs and airways, pose significant health challenges globally. Among them, chronic obstructive pulmonary disease (COPD) and asthma stand out as prevalent and serious ailments, impacting millions of lives each year. These diseases not only affect individuals' quality of life but also contribute substantially to morbidity and mortality worldwide.

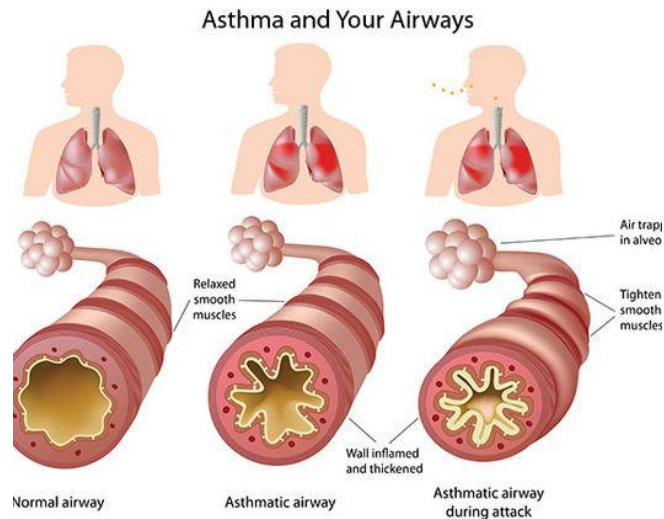
COPD, characterized by progressive airflow limitation and respiratory symptoms, is a leading cause of morbidity and mortality globally. According to the World Health Organization (WHO), COPD is estimated to be the third leading cause of death worldwide, with approximately 3 million people dying from it each year. It commonly results from long-term exposure to irritants such as tobacco smoke, air pollution, or occupational dust and chemicals.

Asthma, on the other hand, is a chronic inflammatory disorder of the airways, marked by recurrent episodes of wheezing, breathlessness, chest tightness, and coughing. It affects people of all ages but often starts in childhood. The Global Asthma Report indicates that over 339 million people suffer from asthma globally, with over 461,000 deaths attributed to the condition annually. Asthma can be triggered by various factors, including allergens (e.g., pollen, dust mites, pet dander), respiratory infections, exercise, cold air, air pollutants, and certain medications.



Source: www.youtube.com/watch?v=PzflDi-sl3w

Stages of Asthma



www.salinetherapy.com/salt-therapy-resources/aerosol-salt-therapy/

The severity of asthma can vary from person to person and can fluctuate over time. Generally, asthma is classified into four stages based on symptom severity and lung function:

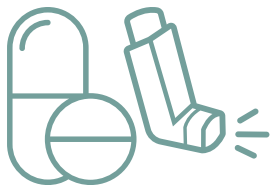
- 1. Intermittent Asthma:** This stage is characterized by symptoms that occur less than twice a week during the day and less than twice a month at night. Lung function is usually normal between flare-ups.
- 2. Mild Persistent Asthma:** Symptoms occur more than twice a week, but not daily. Flare-ups may affect normal activity and may occur more than twice a month at night. Lung function may slightly decrease during flare-ups.
- 3. Moderate Persistent Asthma:** Symptoms occur daily, and flare-ups may affect normal activity. Nighttime symptoms occur more than once a week. Lung function is further reduced compared to mild persistent asthma.
- 4. Severe Persistent Asthma:** Symptoms are continuous, significantly limiting physical activity. Flare-ups may occur frequently, and nighttime symptoms are common, often affecting sleep. Lung function is significantly reduced, and asthma symptoms may be life-threatening without proper management.

Understanding the triggers and management of asthma is crucial for controlling the disease and improving patients' quality of life. Asthma management typically involves a combination of monitoring, medication, and trigger avoidance strategies. Monitoring respiratory symptoms, such as wheezing, coughing, and shortness of breath, provides valuable insights into disease control and helps guide treatment decisions. Medications, including inhaled corticosteroids, bronchodilators, and oral medications, are used to control inflammation, open airways, and prevent asthma symptoms. Additionally, identifying and avoiding triggers through environmental modifications, lifestyle changes, and allergen avoidance measures play a vital role in asthma management.

Despite advancements in treatment and management strategies, ensuring regular monitoring and adherence to medication regimens remains a challenge for many asthma patients. Innovative solutions that integrate technology, such as wearable bio-sensor devices, offer promising avenues for improving disease management and enhancing patient outcomes. By providing real-time monitoring of respiratory symptoms and facilitating timely intervention, these devices have the potential to empower patients and healthcare providers in the effective management of asthma and other respiratory conditions.

Asthma Management Strategies.

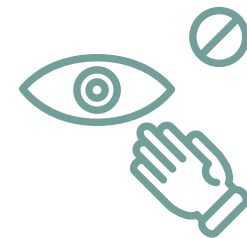
Medication



Monitoring



Avoiding Triggers



Asthma management involves a multifaceted approach aimed at controlling symptoms, preventing exacerbations, and improving overall quality of life. Key components of asthma management include medication, monitoring, and trigger avoidance strategies.

Medication:

1. Controller Medications: These medications are taken regularly to control inflammation and prevent asthma symptoms. They include:

- Inhaled Corticosteroids: Reduce airway inflammation.
- Long-Acting Beta-Agonists (LABAs): Help relax airway muscles.
- Combination Inhalers: Contain both corticosteroids and LABAs for comprehensive control.

2. Reliever Medications: Also known as rescue or quick-relief medications, these are used to quickly relieve asthma symptoms during an asthma attack. They include:

- Short-Acting Beta-Agonists (SABAs): Quickly relax airway muscles to relieve symptoms.
- Oral Corticosteroids: Used in severe asthma exacerbations to reduce inflammation.

3. Delivery Devices:

- Metered-Dose Inhalers (MDIs): Deliver medication as a fine mist.
- Dry Powder Inhalers (DPIs): Deliver medication in powder form.
- Soft Mist Inhalers (SMIs): Deliver medication as a slow-moving mist.



1. SABAs for immediate relief



2. LABAs and ICS for long-term control



3. Combination inhalers for maintenance therapy.



Source: www.mims.co.uk/smart-laba-ics-combination-inhaler-launched-automatic-usage-monitoring/respiratory-system/article/1829856

Monitoring:

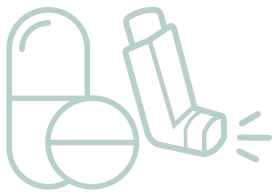
1. **Allergy Testing:** identifying and avoiding allergens that trigger asthma symptoms is crucial. Allergy testing, such as skin prick tests or blood tests, can help identify specific allergens to avoid.
2. **Smartphone Apps:** There are various smartphone apps available for asthma management, allowing users to track symptoms, medication usage, peak flow measurements, and triggers. Some apps also provide personalized asthma action plans and reminders for medication doses.
3. **Pulse Oximetry:** Pulse oximeters measure the oxygen saturation of arterial blood, providing a non-invasive way to monitor respiratory function. Monitoring oxygen saturation levels can help identify asthma exacerbations and assess the severity of an asthma attack.

Avoiding Triggers:

1. **Allergen Avoidance:** Common allergens that trigger asthma symptoms include pollen, dust mites, pet dander, mold, and certain foods. Taking steps to minimize exposure to these allergens, such as using allergen-proof bedding, regularly cleaning indoor spaces, and avoiding outdoor activities during high pollen seasons, can help reduce asthma symptoms.
2. **Environmental Control:** Other environmental factors, such as air pollution, smoke, strong odors, and cold air, can also trigger asthma symptoms. Minimizing exposure to these irritants by using air purifiers, avoiding smoking or secondhand smoke, and wearing a mask in polluted or smoky environments can help prevent asthma exacerbations.
3. **Lifestyle Modifications:** Maintaining a healthy lifestyle, including regular exercise, a balanced diet, and adequate hydration, can help improve overall respiratory health and reduce the risk of asthma exacerbations. Additionally, managing stress and getting enough sleep are important for asthma management.

Scope of Work

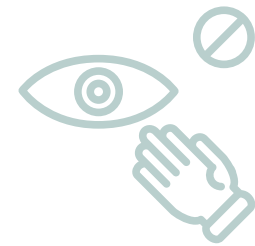
Medication



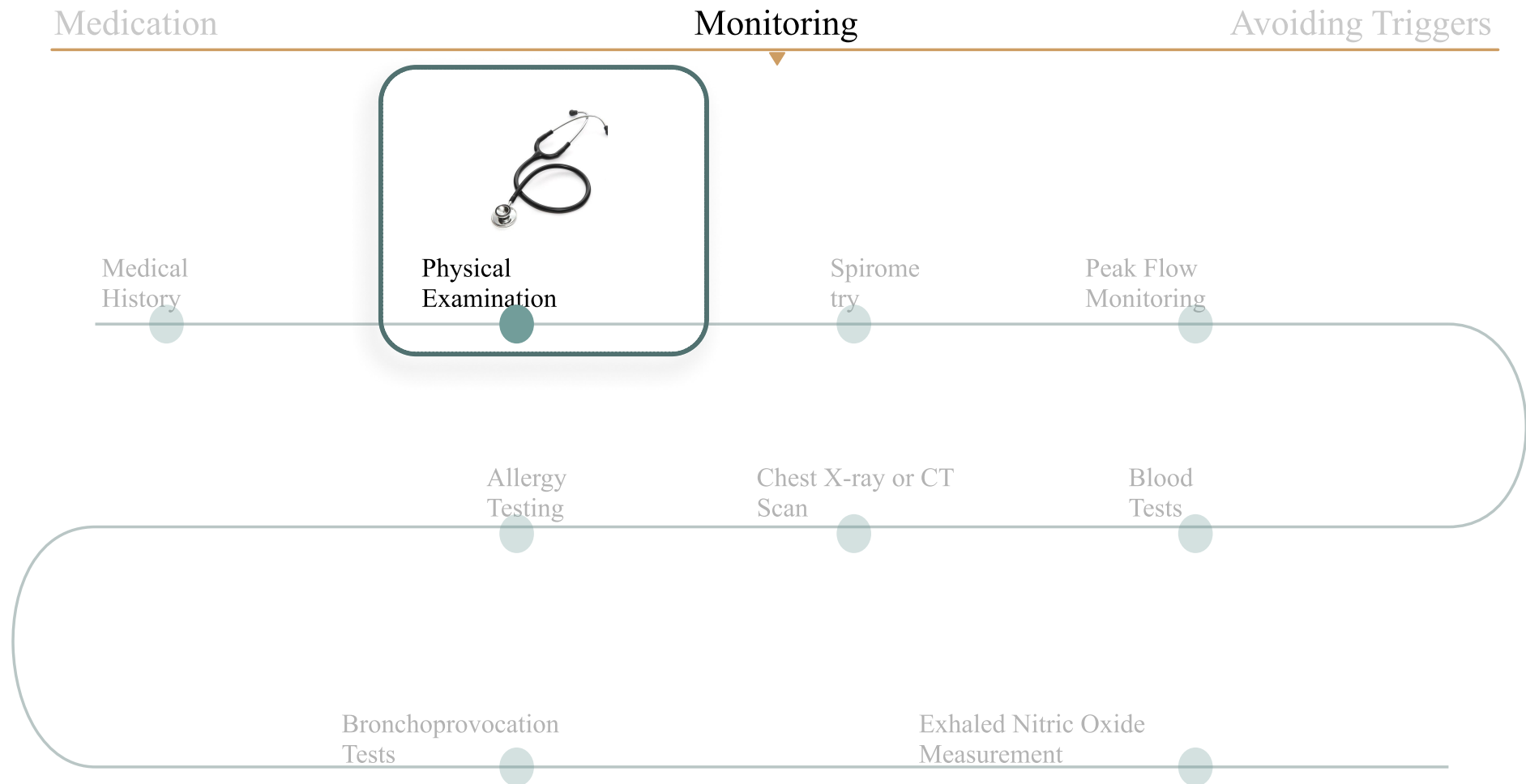
Monitoring



Avoiding Triggers



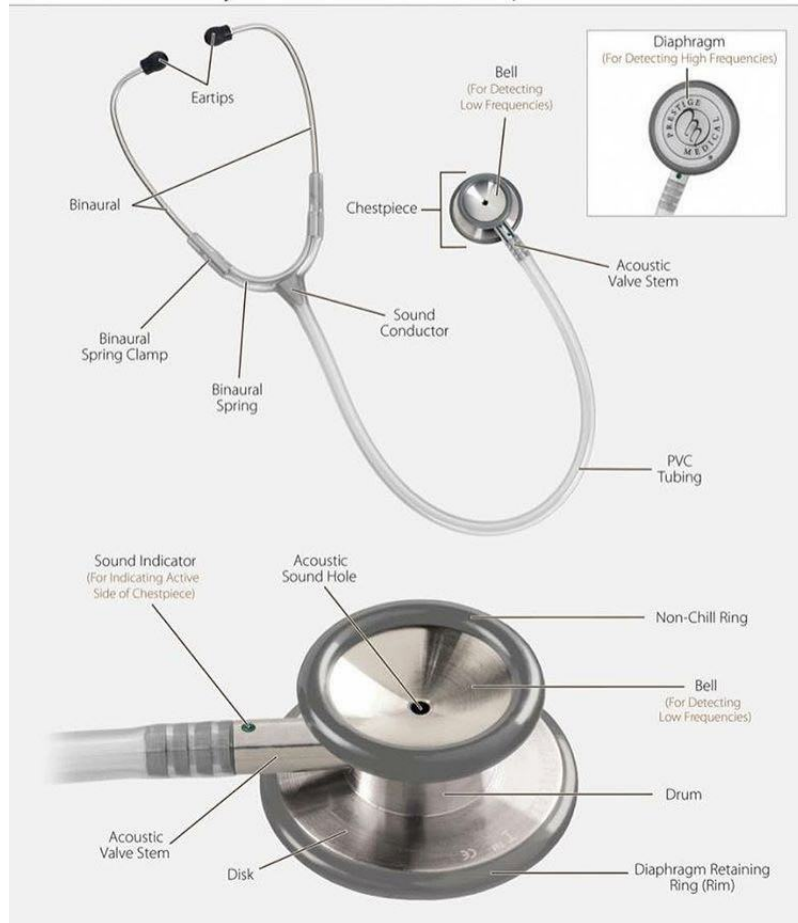
Scope of work



Source : <https://www.mometrix.com/academy/lung-sounds/>

Stethoscope

Anatomy of a Stethoscope



Source : aviknigam.com/blog/Anatomy-of-a-Stethoscope-20180512

Before a spirometry test, your doctor will listen to your chest with a stethoscope to check for wheezing or other abnormal breath sounds

Listening to breath sounds allows doctors to detect various abnormalities, including wheezing, which is a hallmark symptom of asthma. Wheezing is a high-pitched whistling sound caused by narrowed airways in the lungs. By identifying wheezing, doctors can gain valuable insight into the severity of an asthma attack and determine the appropriate course of treatment.

A stethoscope is a medical device used to **listen to sounds within the body**, including lung, heart, and bowel sounds. It helps diagnose respiratory conditions like asthma and heart conditions like arrhythmias. Checking lung sounds first is common because respiratory symptoms can indicate serious conditions requiring immediate attention, and lung sounds are easily accessible.

Source : <https://www.nhlbi.nih.gov/health-topics/asthma-management-guidelines-2020-updates>

Market Trends and Analysis

A Growing Demand for User-Centric Solutions

The market for wearable and mobile health monitoring devices is witnessing exponential growth. Users are increasingly seeking convenient, user-friendly, and aesthetically pleasing solutions for managing chronic conditions like asthma. Traditional respiratory monitoring methods often rely on bulky equipment or infrequent clinical visits, hindering patient adherence.

This gap by creating a bio-sensor that seamlessly integrates into users' daily lives. The ornamented design further enhances user adoption by transforming the bio-sensor into a personal accessory, potentially reducing the stigma associated with traditional medical devices.

By combining advanced biosensor technology with an aesthetically-driven design, this project has the potential to revolutionize asthma management. The proposed bio-sensor can empower patients to take a more active role in monitoring their health, leading to improved asthma control and overall well-being.

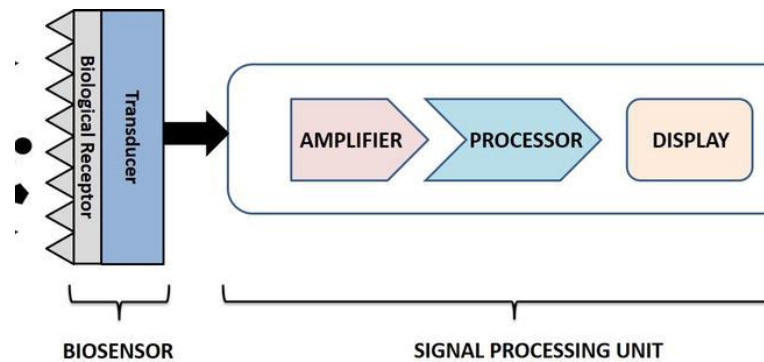
Bio-sensors are innovative devices designed to detect and measure biological signals or markers within the body, offering real-time monitoring and data collection for various health applications. In the context of respiratory health, bio-sensors play a crucial role in monitoring key parameters such as respiratory rate, lung function, and the presence of specific biomarkers associated with respiratory diseases like asthma and COPD.

How Bio-Sensors Work: Bio-sensors typically consist of three main components: a biological recognition element (such as enzymes, antibodies, or nucleic acids), a transducer, and a signal processing system. The biological recognition element interacts with the target molecule or analyte, initiating a biochemical reaction that generates a measurable signal. This signal is then converted into a detectable output by the transducer, which can be electrical, optical, or acoustic in nature. Finally, the signal processing system analyzes the output and provides relevant information to the user.

In the context of respiratory health monitoring, bio-sensors can detect various biomarkers present in breath samples, saliva, or sweat, providing valuable insights into lung function, inflammation, and disease progression.



Source: <https://www.intechopen.com/chapters/76543>



Components of Bio-Sensors for Respiratory Monitoring:

1. **Biological Recognition Element:** This component specifically interacts with respiratory biomarkers, such as exhaled nitric oxide (FeNO), volatile organic compounds (VOCs), or specific proteins associated with airway inflammation.
2. **Transducer:** Converts the biochemical signal generated by the biological recognition element into a measurable output, such as an electrical current, voltage, or optical signal.
3. **Signal Processing System:** Analyzes the output from the transducer, often using algorithms or machine learning techniques to interpret the data and provide clinically relevant information.

Market-available Bio-Sensors for Respiratory Diseases:

Several bio-sensor technologies targeting respiratory diseases are currently available in the market or under development. These include:

1. **FeNO Sensors:** FeNO levels are elevated in patients with airway inflammation, making FeNO measurement a useful biomarker for asthma diagnosis and monitoring. FeNO sensors, such as NIOX VERO by Circassia Pharmaceuticals, offer non-invasive measurement of FeNO levels in exhaled breath, aiding in asthma management.
2. **VOC Sensors:** Volatile organic compounds present in exhaled breath can serve as biomarkers for various respiratory conditions, including asthma and COPD. Portable VOC sensors, such as SensiVOC by SensiEDGE, enable real-time monitoring of VOC levels, facilitating early detection and management of respiratory diseases.
3. **Smart Inhalers:** Smart inhalers incorporate bio-sensor technology to monitor inhaler usage, track medication adherence, and provide feedback to patients and healthcare providers. Examples include Propeller Health's sensor-enabled inhaler attachments, which record inhaler activation and transmit data to a smartphone app for analysis and feedback.
4. **Wearable Respiratory Monitors:** Wearable bio-sensor devices, such as the BioSticker by BioIntelliSense, can continuously monitor respiratory parameters, including respiratory rate, cough frequency, and chest movement, providing comprehensive insights into lung function and respiratory health.

Market Research



StethoMe

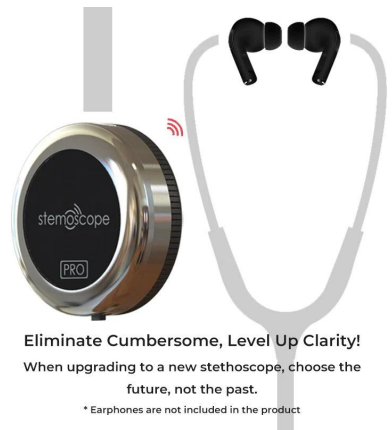
The EU-certified medical device, which records respiratory abnormalities, is intended to be used in the home and uses smart technology to provide an instant analysis of a simple patient examination. Patients are guided through their self-examination with the help of an app which records its analysis and sends it to a clinician to advise on next steps.

Market Research

Bluetooth stethoscope



Stainless Steel Body
+
Glass Cover



Market Research



 BioHub



 BioSticker

BiontelliSense

BiontelliSense is a company that specializes in developing wearable remote patient monitoring solutions. Their technology involves tiny, coin-sized sensors that can be attached to the skin like a bandage. These sensors gather continuous data on vital signs, such as temperature, heart rate, respiratory rate, and activity levels. The collected data is then transmitted wirelessly to a smartphone or other devices, allowing for real-time monitoring of a patient's health status. This kind of technology holds promise for various applications, including in healthcare settings, where continuous monitoring can help detect early signs of health issues and improve patient outcomes.

Market Research



ADAMM Smart Asthma Monitoring:

ADAMM is a wearable technology that helps in monitoring asthma symptoms. It includes features like cough counting, respiration rate monitoring, and wheeze detection. The device also reminds patients to take their medication and keeps track of their usage.



Type of Breath Sound

Normal

- Vesicular
- Bronchial

Abnormal

Crackles

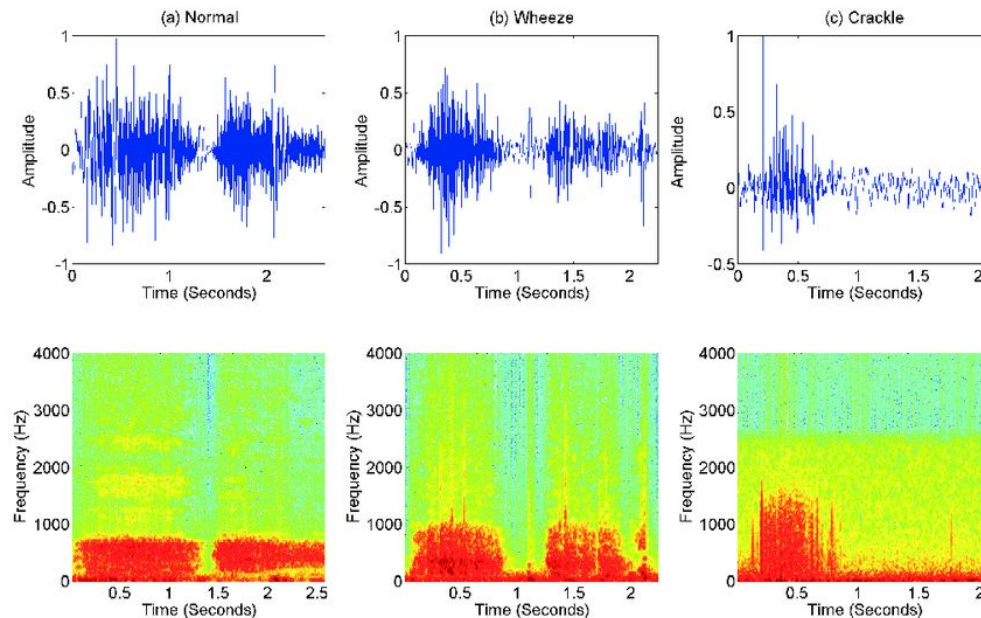
wheeze → • Musical
Rhonchi • Continuous

Stridor

Pleural Rub

- **Wheezing:** High-pitched whistling during breathing, often in asthma or COPD.
- **Crackles (Rales):** Crackling sounds in lungs during breathing, seen in pneumonia or heart failure.
- **Rhonchi:** Low-pitched rattling sounds, usually due to mucus in airways in bronchitis or COPD.
- **Stridor:** High-pitched crowing sound on inhalation, indicating upper airway obstruction like croup or epiglottitis.

Wheezing sound



Source : https://www.researchgate.net/figure/Time-domain-characteristics-and-spectrogram-of-a-normal-b-wheeze-and-c-crackle_fig8_303382347

Wheezing, a hallmark symptom of asthma and other respiratory conditions, is a high-pitched whistling sound produced during breathing.

Frequency:

Wheezing sounds typically fall within a range of 200 Hz to 1200 Hz. This range overlaps with the human voice, making it easily audible.

Expiratory Wheeze: This occurs during exhalation and is usually the most characteristic sound in asthma. Its frequency may vary depending on the severity of airway obstruction.

Inspiratory Wheeze: Less common in asthma, this occurs during inhalation and might indicate a more severe airway narrowing.

Waveform Characteristics:

Wheezing sounds are characterized by a periodic waveform. This means the pressure variations causing the sound repeat at regular intervals. The specific waveform properties can be analyzed to understand the nature of the wheezing.

Pitch:

The pitch of a wheezing sound is directly related to its frequency. A higher frequency (more Hz) translates to a higher-pitched sound.

Wheezing often exhibits a variable pitch, meaning it can fluctuate throughout a breath cycle. This is due to dynamic changes in airway caliber during breathing.

Source : <https://www.mometrix.com/academy/lung-sounds/>

Interview Insights

using the daily inhaler for the next 6 months.

food Triggers
Fried food, cold food , ice-cream

Triggers
Climate change, cold, rain

I don't like showing my inhaler to everyone, everyone thinks I'm sick.

I tend to forget to bring my Inhaler pump when I go to parties or other social events.

We panic when we miss the pump.

I don't usually go to the doctor for regular checkups, but I do go when I'm sick.

It is difficult for me to identify the sound of my wheezing, particularly when it first starts

I forget to carry the mask while goin out

If I ignore the wheezing sound, there is a high chance my health will become critical.

The inhaler is always kept in a bag or purse.

To avoid using the pump in the initial stages, I usually drink warm water or coffee.

The doctor recommended that I eat a balanced diet and practice yoga.

Sometimes I don't have my inhaler, so I just let it be even when I have to go out.

If someone in my family has a cold, I will get it quickly too.

I often don't realize that my breath is wheezing, mostly my mom is the one who tells me.

Sometimes when I ignore chest tightness or wheezing, my health deteriorates quickly.

Friends and family help me remember to take my inhaler and wear my mask.

When I'm alone, I usually set reminders on my phone.

When I visit the doctor, they always ask about my Inhaler doses for the past week, but I struggle to remember.

Others notice the wheezing in my breath before I do.

Interview Insights

My interviews with asthmatic patients revealed a critical issue: inhaler accessibility during emergencies. Many participants reported carrying their inhalers in purses or bags, not readily available during sudden asthma attacks. This can be risky, especially when the bag might be 10-15 minutes away.

Furthermore, these interviews highlighted a social concern – avoiding masks and inhalers in social settings due to stigma. Asthmatics often feel judged for their reliance on medical devices, leading them to potentially compromise their health for social acceptance.

Secondary Research: Social Stigma and Medical Devices

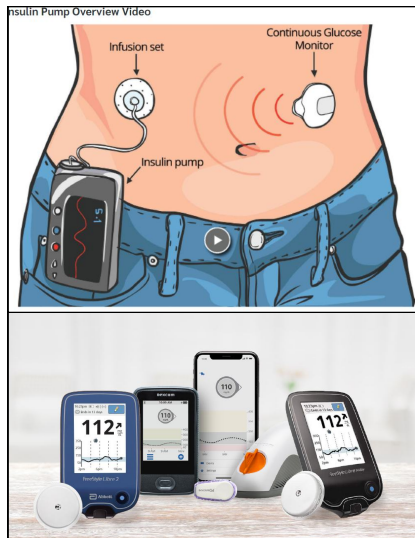
1. Research supports these observations. Studies like "The Stigma of Illness: A Review of the Literature" by Goffman (1963) explore the social stigma associated with chronic illnesses. This stigma can manifest as:
 - Isolation: Feeling ostracized due to reliance on medical devices.
 - Anxiety: Worrying about others' perceptions.
 - Desire to Hide: Attempting to conceal medical devices and illness symptoms.
2. Research by Hawkins et al. (2017) titled "Design and Stigma: Reducing the Social Burden of Medical Devices" emphasizes the potential of design to address this issue.

Market Analysis: Reducing Stigma Through Design

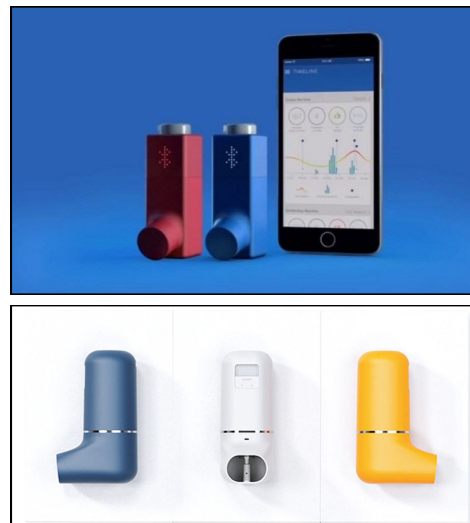
There's a growing market movement towards discreet and stylish medical devices. Here are some examples:

1. Continuous Glucose Monitors (CGMs): These are often small and discreet, sometimes resembling patches or jewelry.
2. Smart Inhalers: Some inhalers now come in sleek designs that blend in with everyday accessories.
3. Stylish Diabetic Testing Kits: Companies are offering kits in fashionable carrying cases.

These examples demonstrate a growing demand for medical devices that integrate seamlessly with everyday life, potentially reducing the associated stigma.



Continuous Glucose Monitors (CGMs)



Smart Inhalers



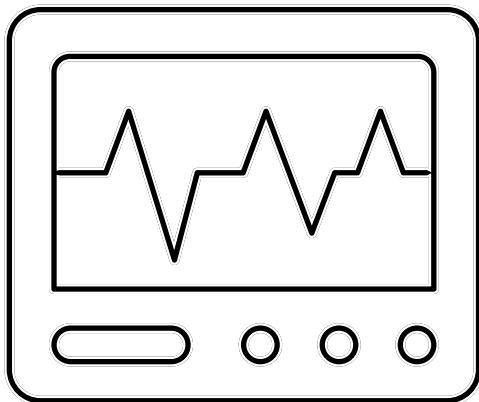
Stylish Diabetic Testing Kits

Introducing Medi-ornamentation:

Building on this trend, I propose the concept of "**medi-ornamentation**". This approach aims to transform medical devices into aesthetically pleasing and potentially functional ornaments. By making them visually appealing and potentially integrating them with existing accessories, the goal is to:

Increase Confidence: Encourage asthmatics to wear their medical devices openly without feeling judged.

The social stigma and incorporating "medi-ornamentation" principles, we can create medical devices that people are proud to wear, promoting confidence, better health management, and potentially reducing the risks associated with delayed access to medication.



Medical device



Ornamentation

Scope Of Work

The scope of this project involves the design and development of a breath monitoring device primarily targeting asthma patients with chronic conditions, particularly those experiencing intermittent and mild persistent asthma. The device aims to amplify and analyze breath sounds, specifically focusing on wheezing sounds indicative of asthma exacerbations. Additionally, the device will be equipped with features to alert users in case of emergencies, such as high wheezing frequency, and to remind users to take their inhaler medication when necessary. The project also involves the design of a companion mobile application for data visualization and sharing with healthcare professionals.

Focus area

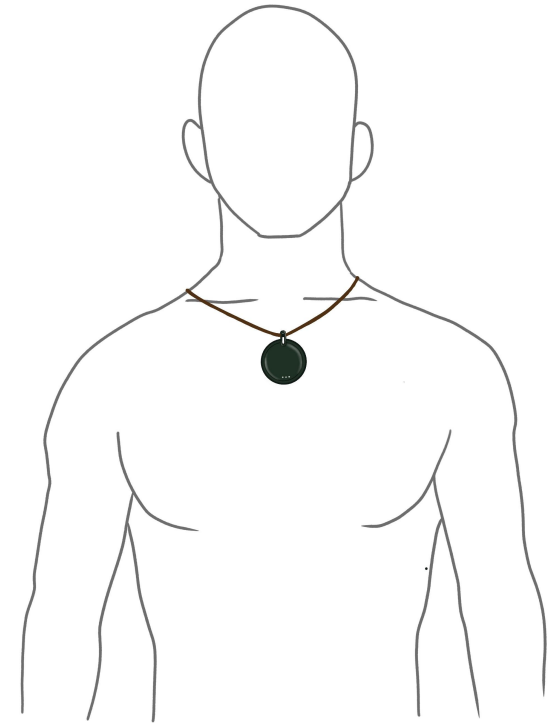
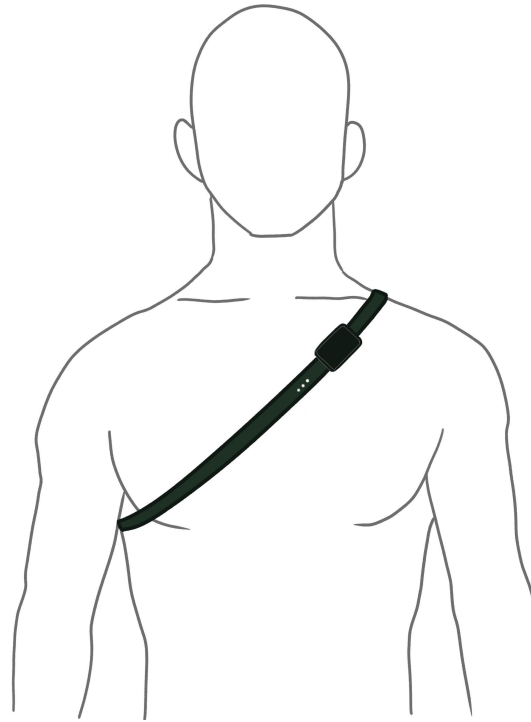
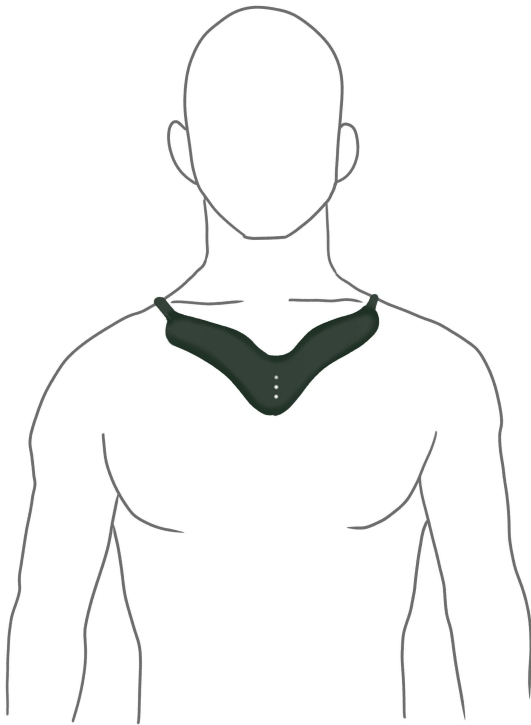
- **Amplification and Analysis of Wheezing Sounds:** Develop technology to accurately detect and amplify wheezing sounds in real-time.
- **Emergency Alert System:** Implement a system to detect critical wheezing frequency levels and trigger audible alerts for the user and their inhaler.
- **Mobile Application Development:** Design a user-friendly mobile application for data visualization, tracking inhaler usage, and sharing data with healthcare professionals.
- **Medi-Ornamented Design:** Incorporate aesthetic elements into the device's design to make it more appealing and socially acceptable for users to carry in public spaces.

Design Brief

Designing a breath monitoring device for respiratory patients, focusing on wheezing sound detection in asthma patients and emergency response capabilities. Additionally, address user hesitancy to carry medical devices in public by ensuring the device is aesthetically pleasing and seamlessly integrates into users' daily lives.

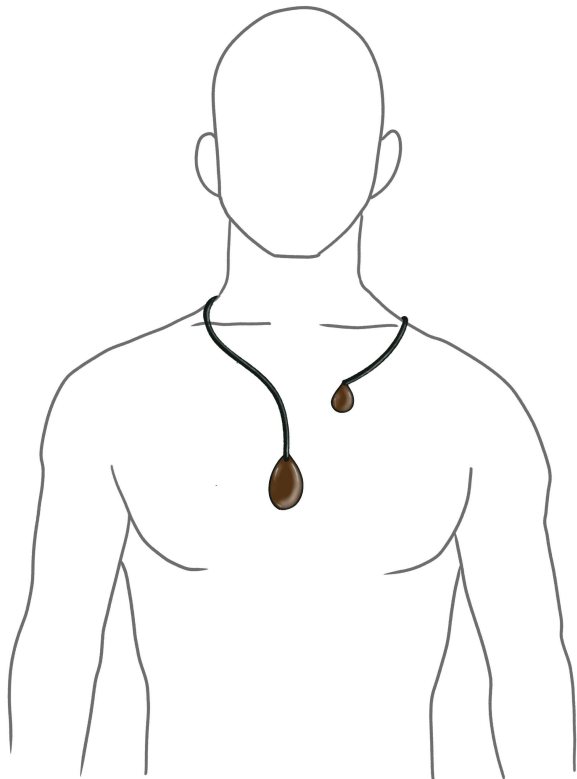
Ideation

Wearable device in neck



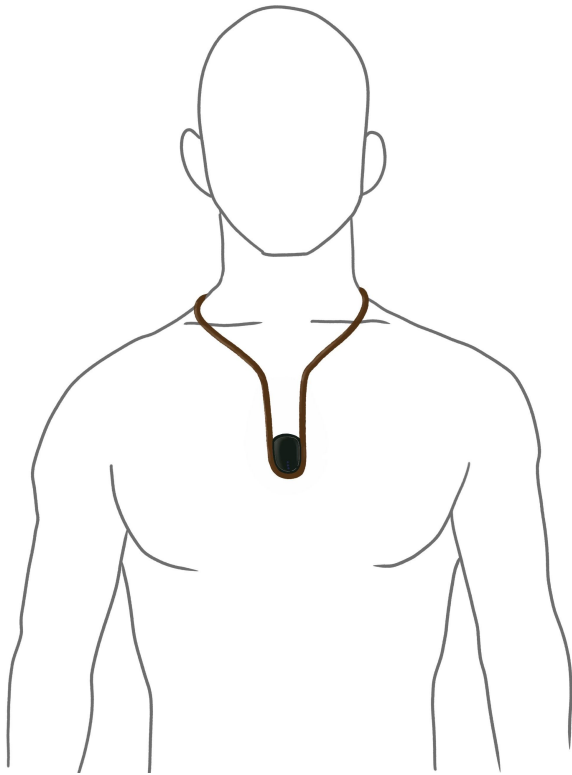
Ideation

Wearable device in neck



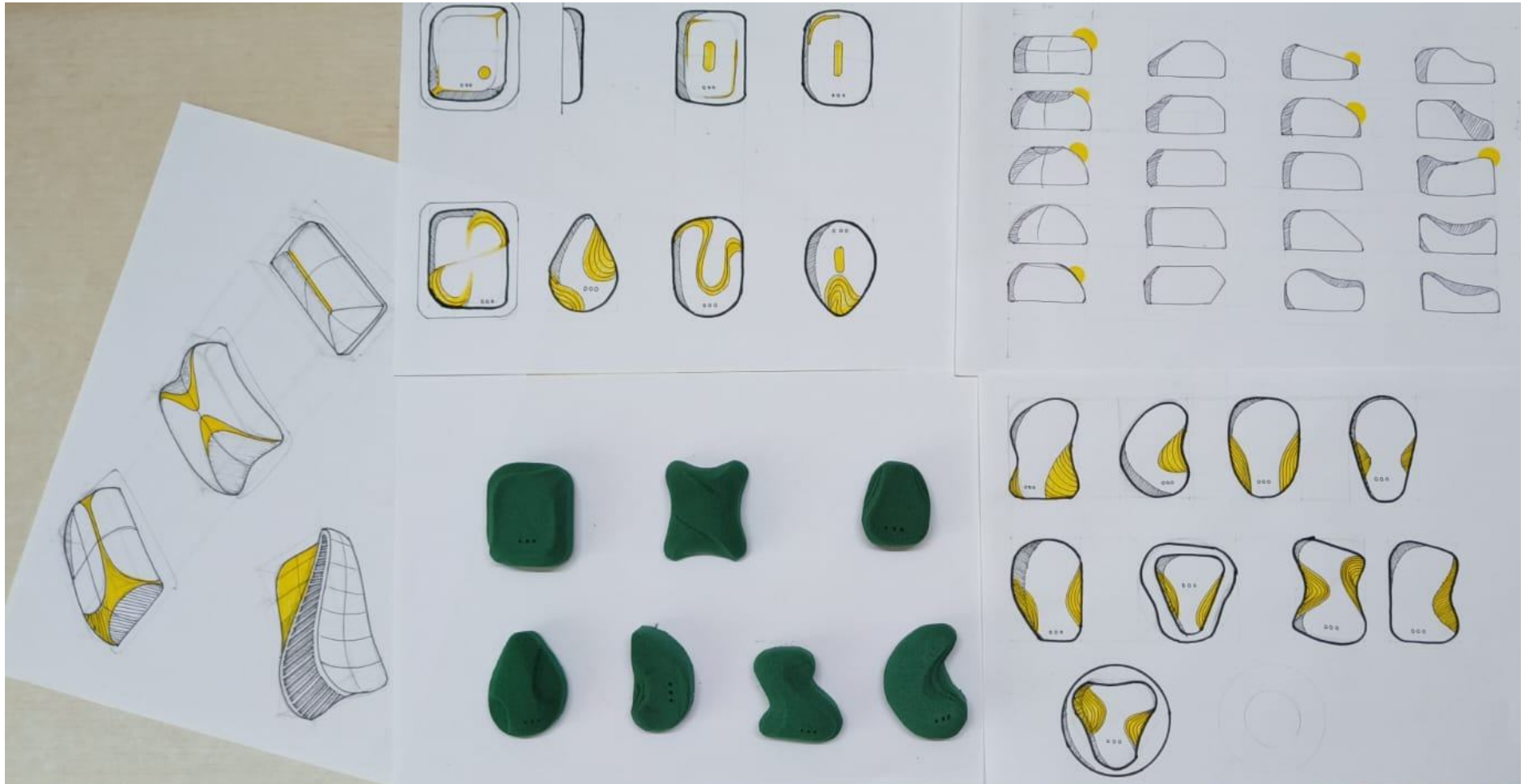
Ideation

Wearable device in neck



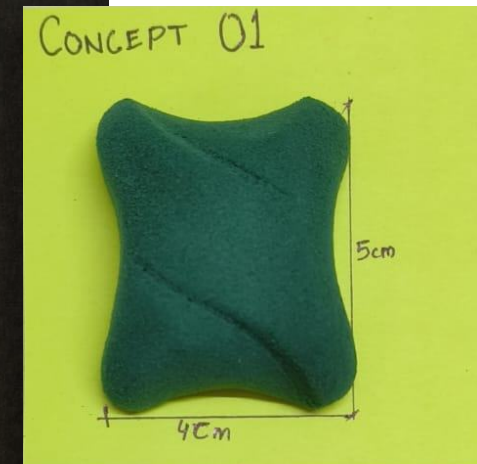
Ideation

Silicon based wearable device



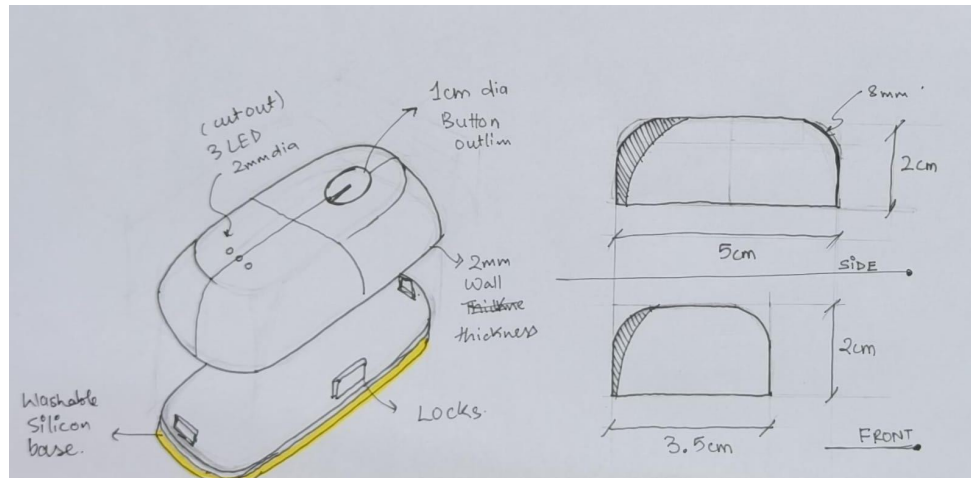
Ideation

Silicon based wearable device



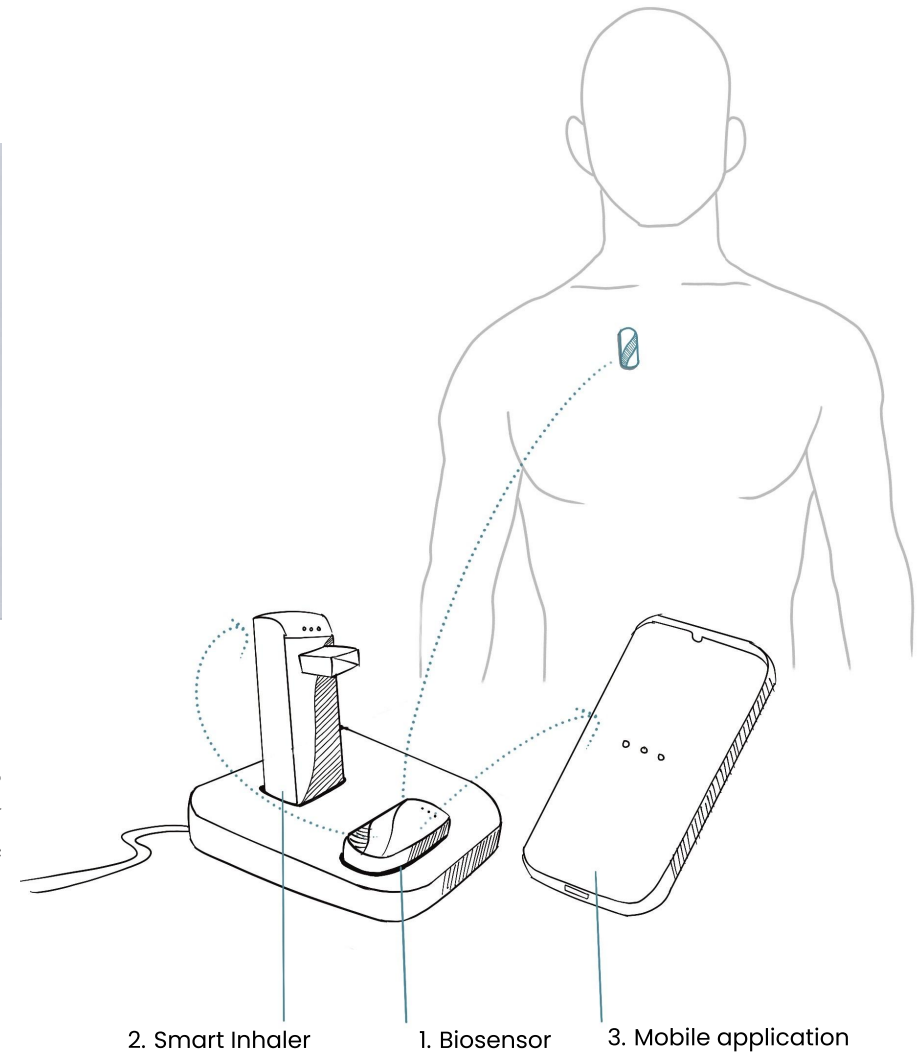
Ideation

Silicon based wearable device



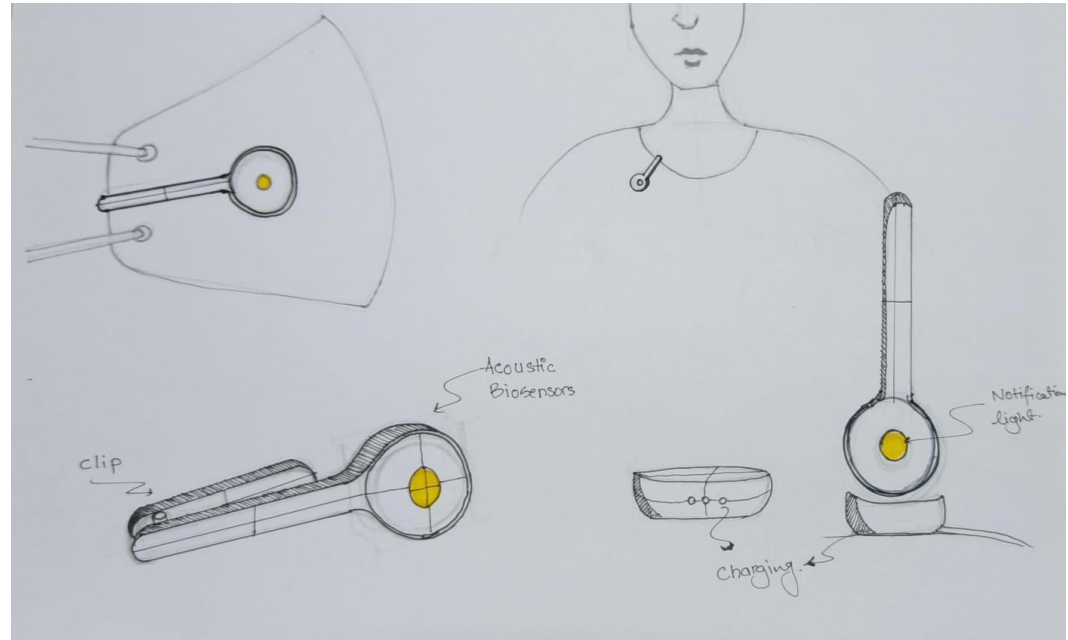
The frequency of normal breath sounds is generally below 800 Hz.

The frequency of wheezing sounds typically falls within the range of 200 to 2000 Hertz (Hz). However, wheezing can vary in pitch and intensity depending on factors such as airway obstruction and the severity of the underlying condition.



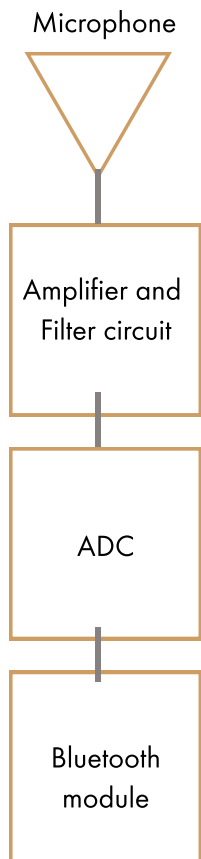
Ideation

Clip based wearable device

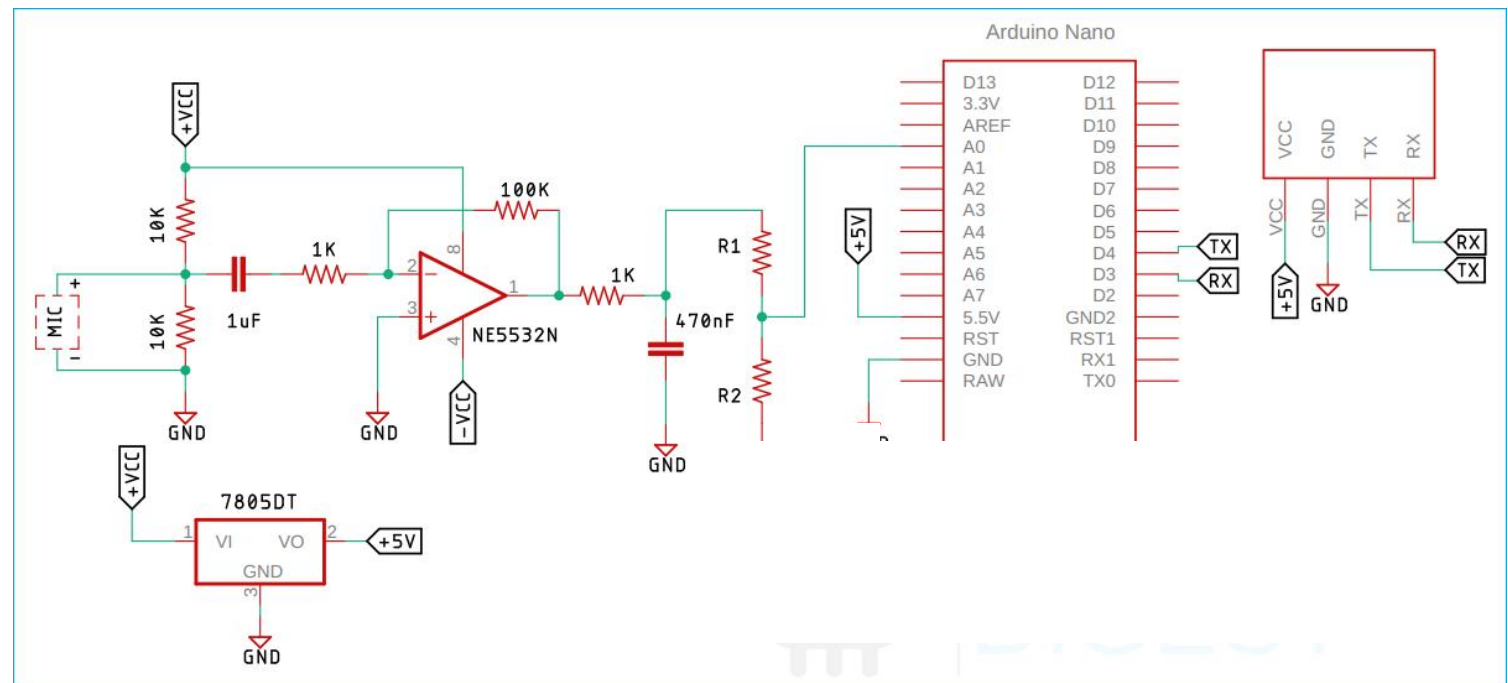


Electronics.

Schematic Diagram of the Wireless Stethoscope



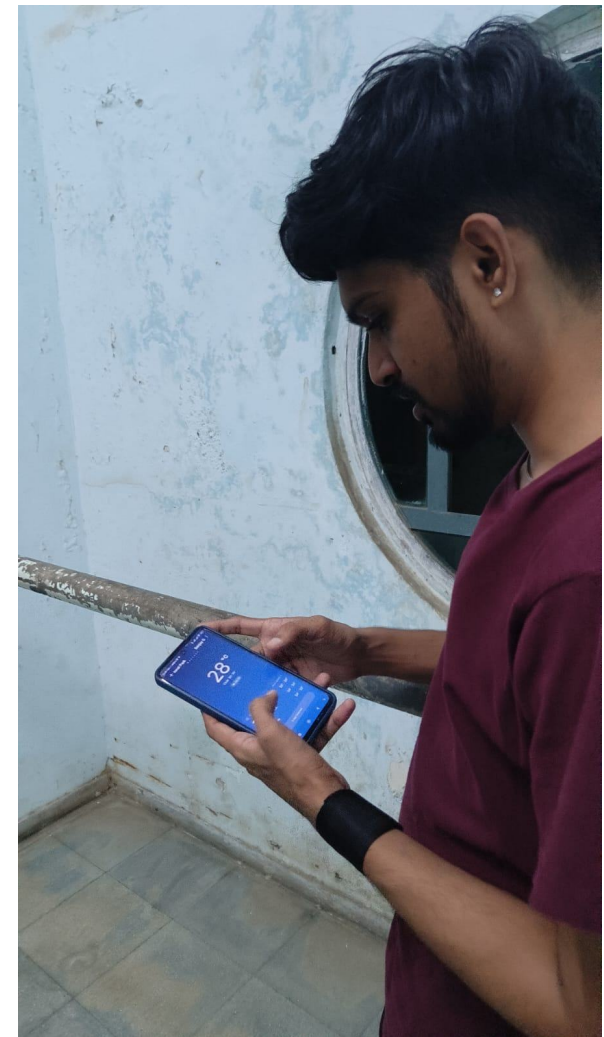
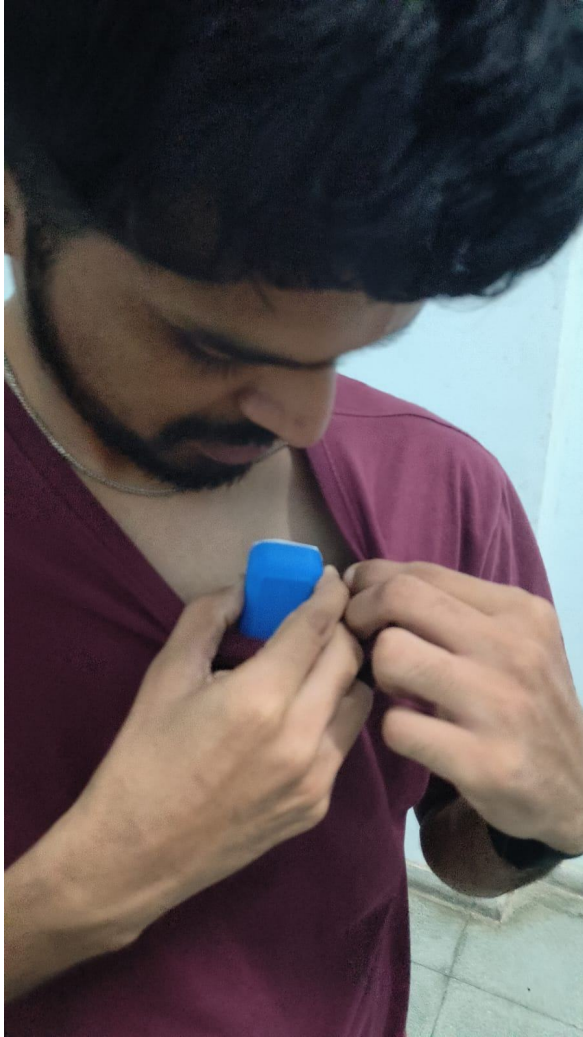
Schematic Diagram of the Wireless Stethoscope



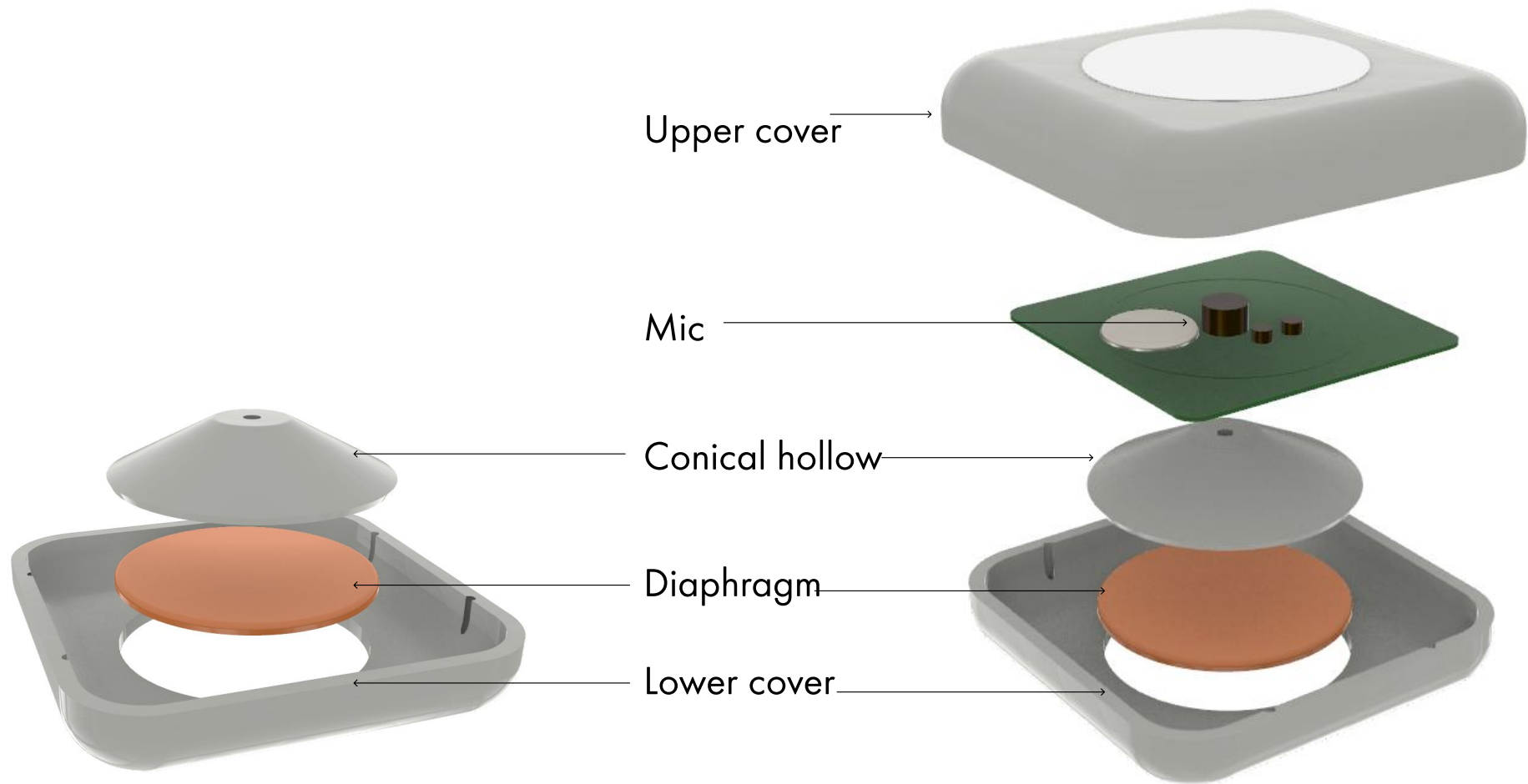
User testing



User testing



Assembly



Concept 01



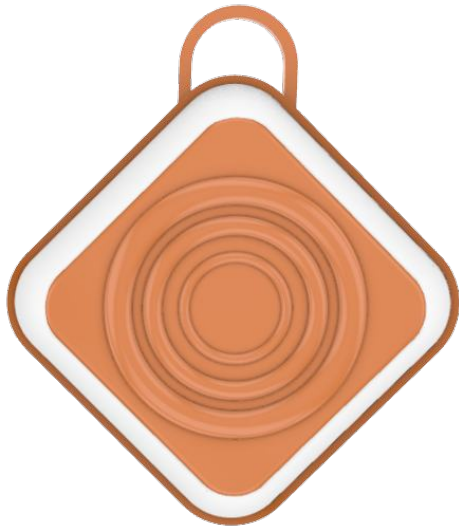
Concept 02



Concept 03

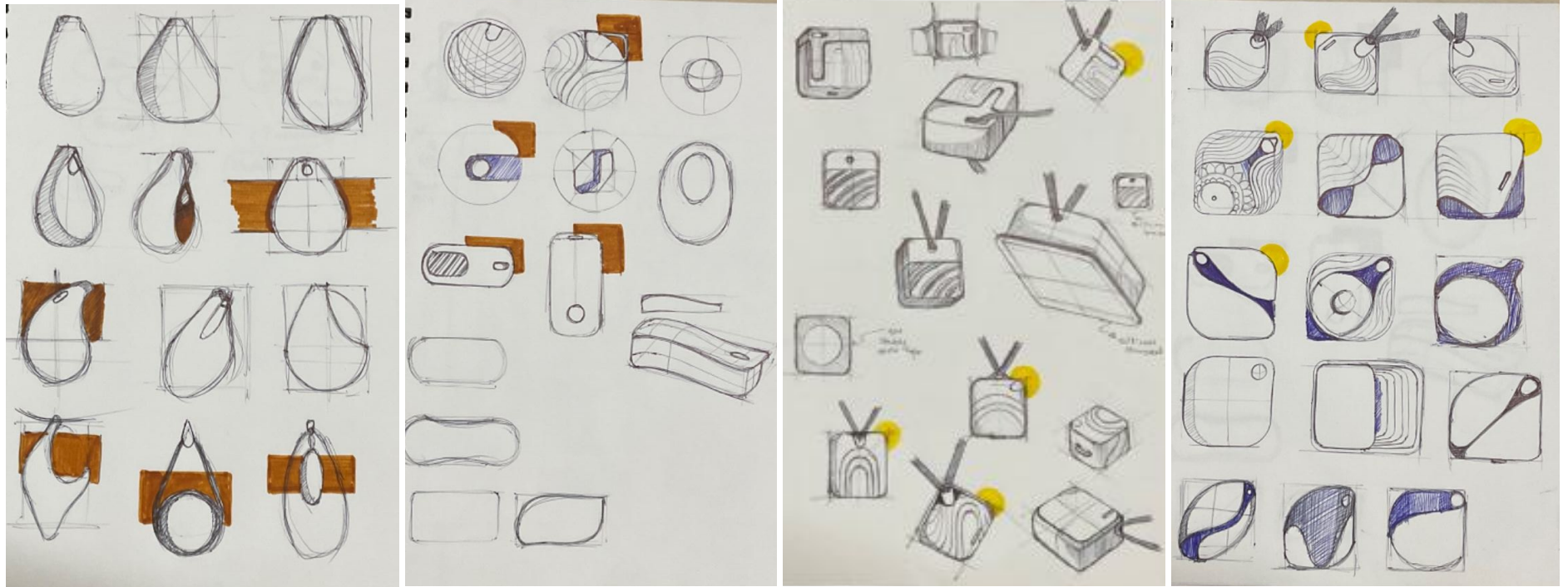


Evaluation of concepts.



- Stylish & Discreet: Necklace design complements your look, unlike bulky trackers.
- Simple Monitoring: 2-minute routine (before, during, after) for effortless tracking.
- Comfortable Wear: Comfortable fit throughout monitoring, unlike intrusive clips.

Ideation as per final concept.

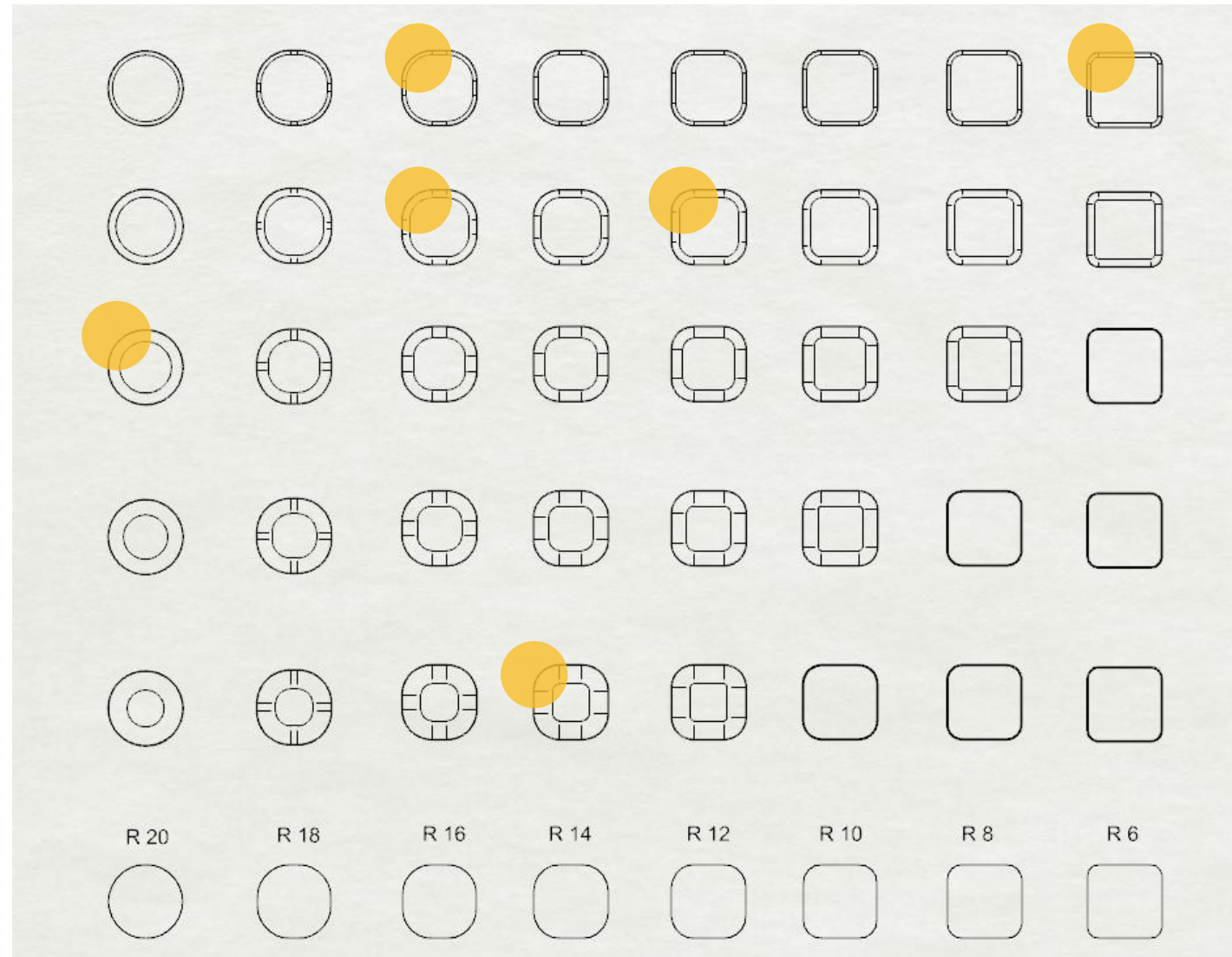


Mockups



Ideation as per final concept.

I experimented with various radius manipulation options for the casing of the biosensor, and based on that, I selected specific shapes for the device.



Mockups.

Mockups for selected radii manipulation shapes.



User study.



User 01

Visually Selected: Preferred designs with more curved shapes, resembling a pendant-style rhombus with a slightly elongated form.

Wearing Appearance: Favored designs that were flatter and considered handy (easy to use).

User study.

Mockups for selected radii manipulation shapes.



User 02

Visually Selected: Preferred designs with less sharp edges, appearing slim and small.
Wearing Appearance: Favored designs with less flat surface area and a soft shape.

User testing

User 03



Visually Selected: Preferred designs that were circular and curved, with a jewelry-like and ornamented appearance.
Wearing Appearance: Favored designs that were small.



Visually Selected: Preferred designs with softly curved shapes that maintained a balance between curves and straight lines.
Wearing Appearance: Favored designs that were small and had a curved shape.

User 04



Evaluation of concepts

								
Model	A	B	C	D	E	F	G	H
visual	02	04	03	05	02	03	04	03
On-Body Appearance	01	03	03	02	02	02	04	02
Usability and Interaction	01	03	04	04	04	04	03	04
Total	04	10	10	11	08	09	11	09

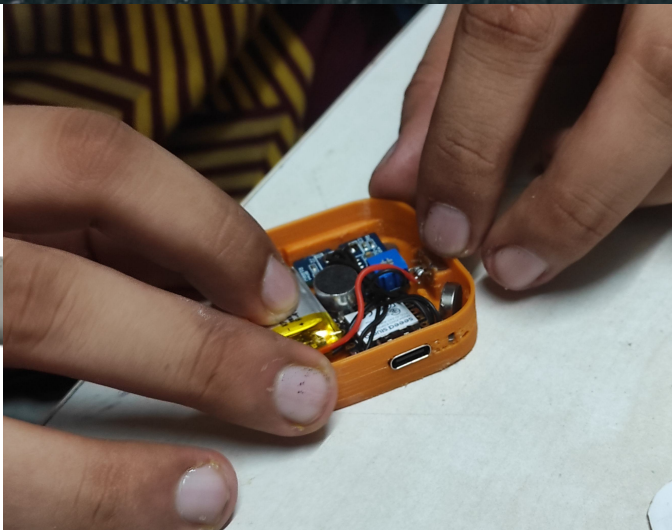
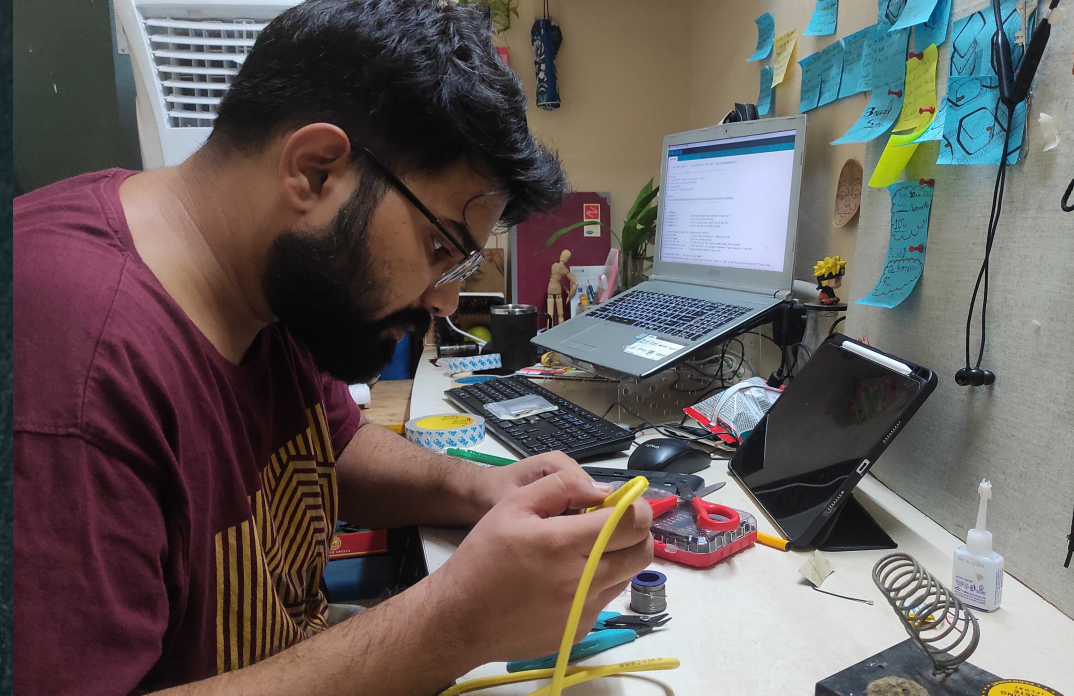
Final Form Selection.



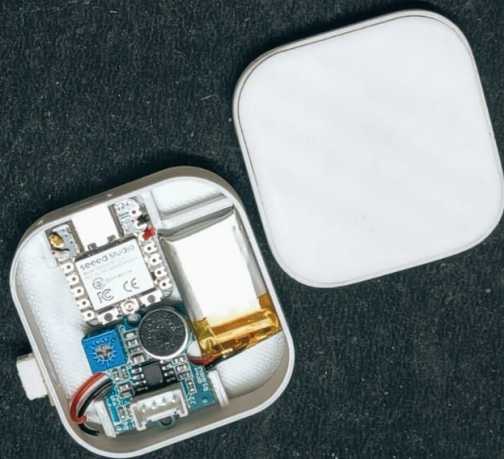
Form Features.

- Stylish & Pendant-like: Stands out with a sleek, pendant-like aesthetic.
- Intuitive Placement: Unique shape subtly guides users for optimal wear.

Proof of concepts



POC



Proof of concepts



- SeedReader Grove Sound Sensor Module

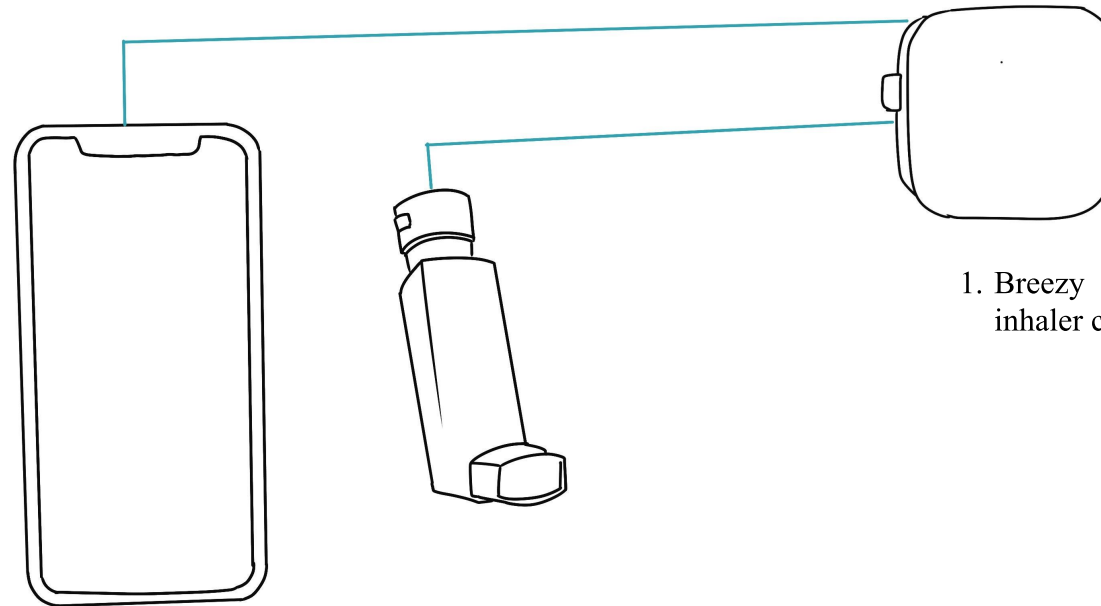


- SeedReader Grove Sound Sensor Module



- ERM Coin Vibration Motor , 8 mm Dia.,3.4mm width

Market Trends and Analysis.



1. Breezy sure, connect with smart inhaler cap and mobile application

2. BreezySure Mobile App:

- Track Your Progress: View a month's worth of monitoring data in one place.
- Share with Ease: Directly send reports to your doctor for convenient communication.

3. Smart Inhaler Cap Integration:

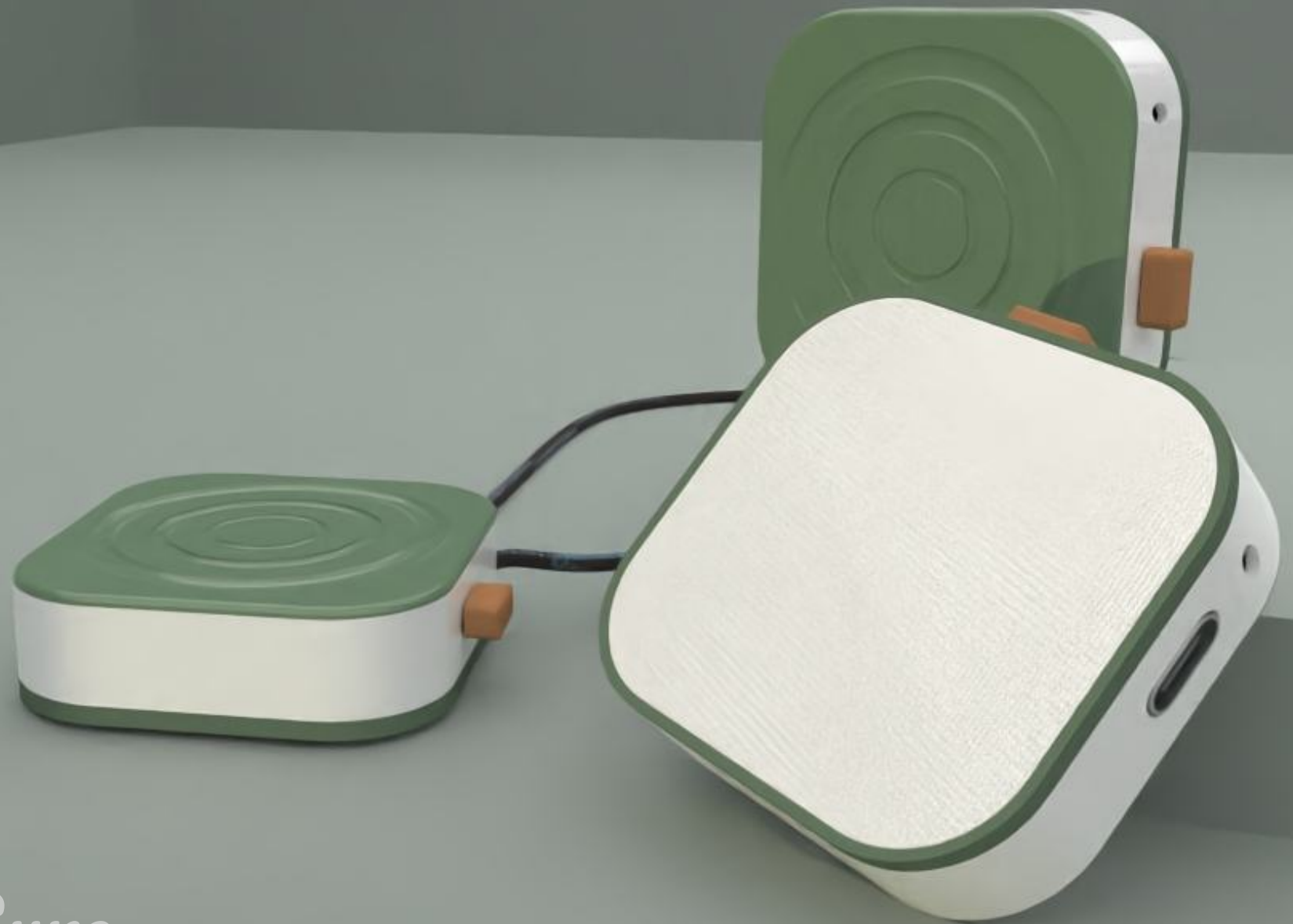
- Tracks Usage: Monitors inhaler use with timestamps and GPS location.
- Mobile App Connectivity: Seamlessly transmits data to your mobile app.
- Proximity Alerts: BreezySure sensor triggers alerts if the inhaler strays far.

POC (Renders)



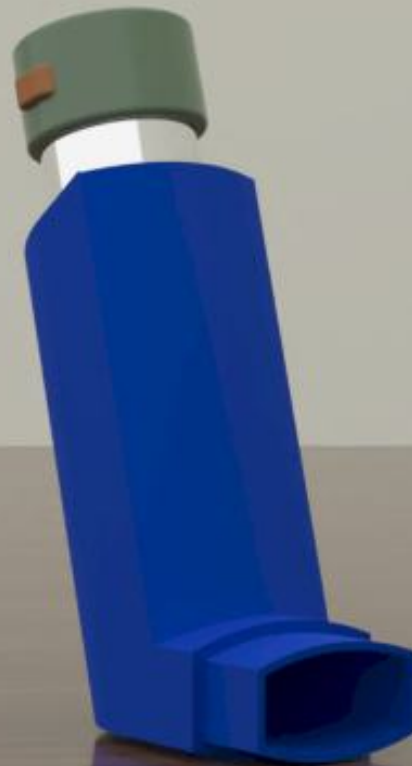
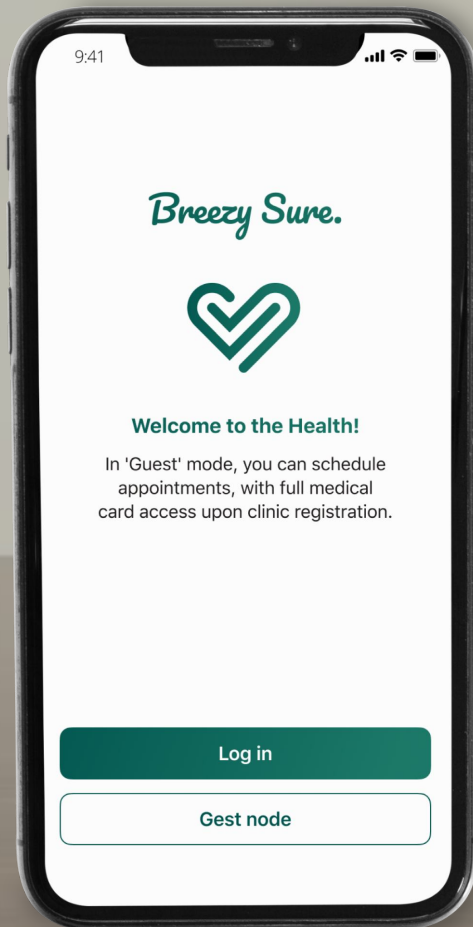
Breezy Sure.

POC (Renders)

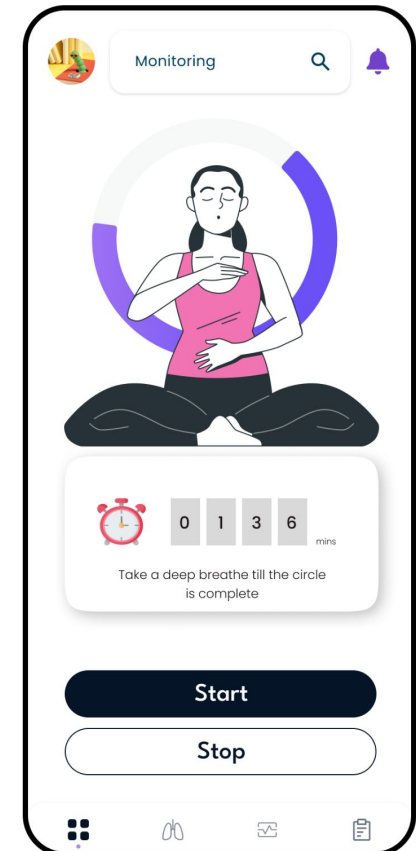
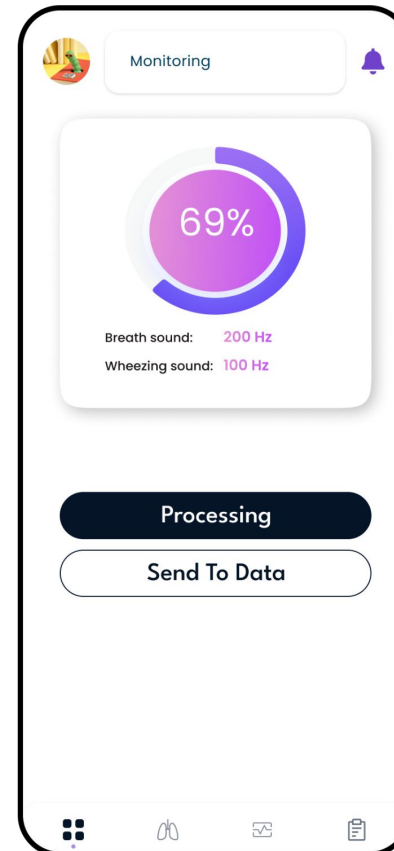
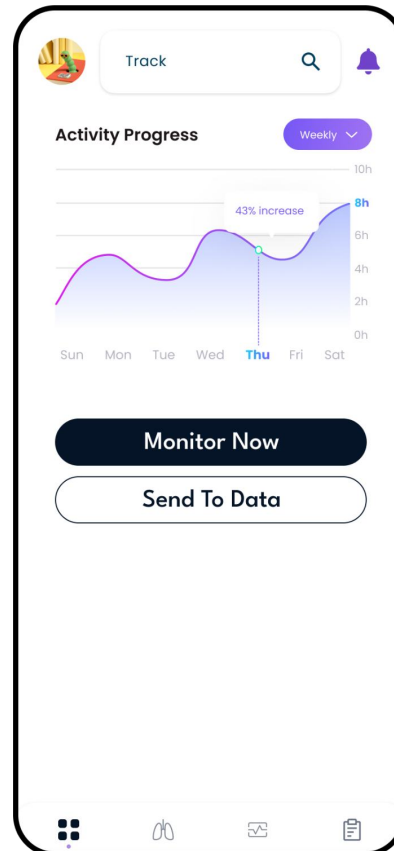
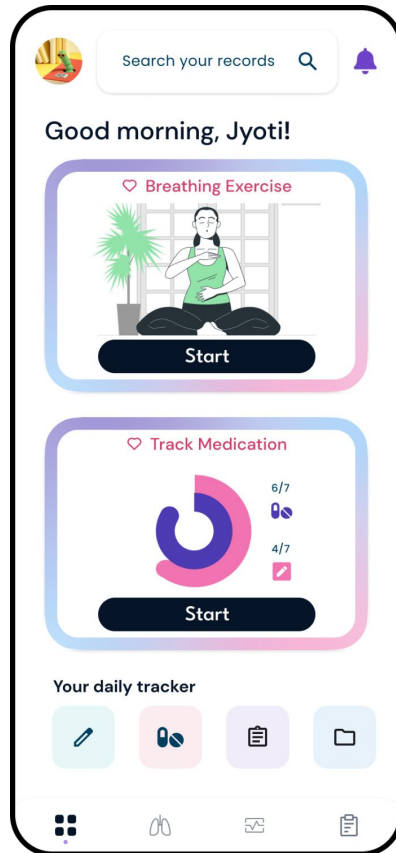


Breezy Sure.

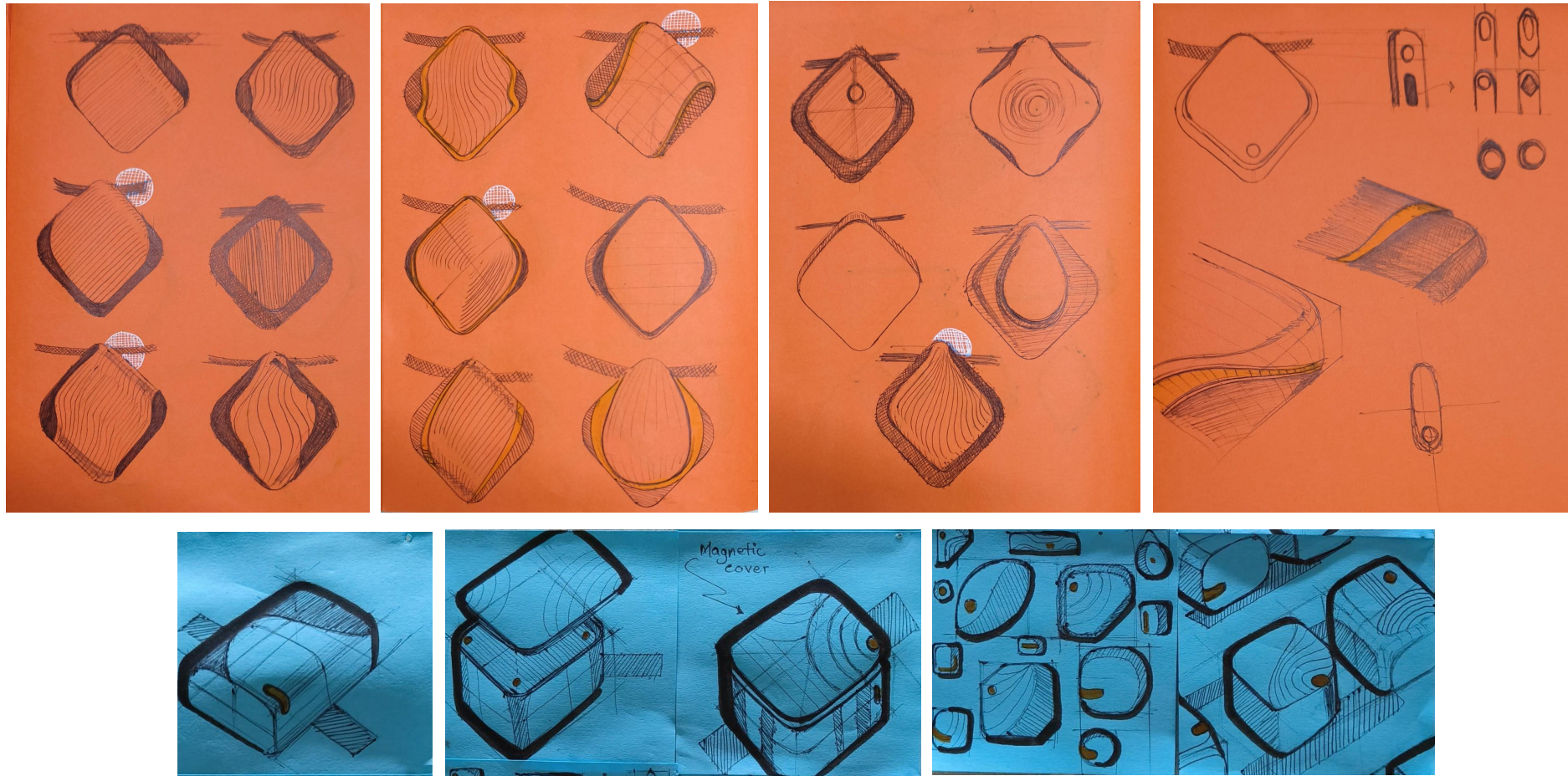
Final POC



BreezySure Mobile App



Ideation based on final concept.



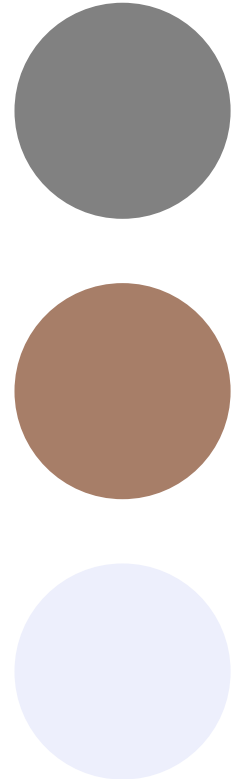
Mockups.



Inspiration Board.



Inspiration Board.



Renders.



Renders.







Slider Power Button



C-Type USB Charger



Diaphragm

Support Wireless charging





References.

1. www.mometrix.com/academy/lung-sounds
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Project Learnings: BreezySure

The BreezySure project provided a comprehensive understanding of the multifaceted challenges faced by individuals with asthma. By placing the user at the core of the design process, we were able to develop a solution that effectively addresses both the physical and emotional aspects of the condition.

Through rigorous user research and iterative design, we gained invaluable insights into the daily struggles of asthma patients. Their desire for a discreet, stylish, and effective management tool became the cornerstone of the BreezySure concept. The project emphasized the importance of seamlessly integrating technology into everyday life, transforming a medical device into a fashion accessory.

Furthermore, the development of BreezySure underscored the potential of wearable technology to revolutionize healthcare. By combining advanced sound sensor technology with a user-centric design, we created a product that not only monitors respiratory health but also empowers users to take control of their condition.

Key learnings from this project include the critical role of user empathy, the power of design in healthcare, and the potential of wearable technology to improve quality of life for individuals with chronic conditions.

BREEZY SURE.



THANKYOU

