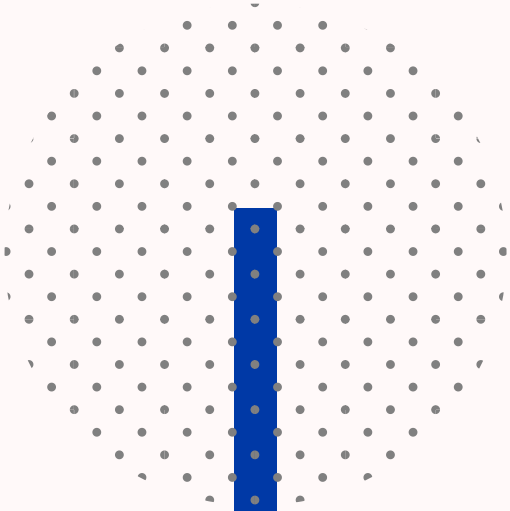
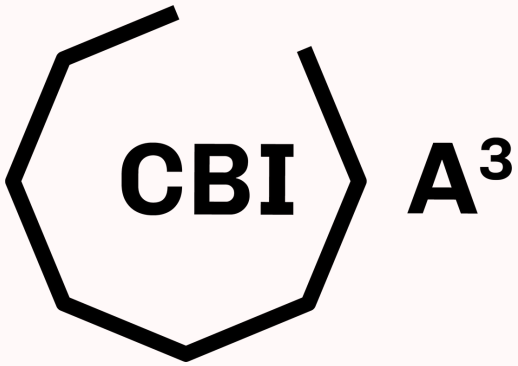
MEDIPOD

YOUR HEALTH ON YOUR TIME

Juhi Vora | Jennifer Rhau | Noah Eli | Myriam Valmeus



PARTNERS


CBI

A³


CERN
Ideas


PACE
UNIVERSITY
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and Information Systems


NYCDF
PACE UNIVERSITY

EXECUTIVE SUMMARY

MEDIPOD is an innovative system that addresses the lack of health literacy and healthcare accessibility within the population. MediPod enables widespread applications of public health interventions through state-of-the-art medical testing powered by CERN technology. MediPod provides fast, simple and stress free medical check ups, thus reducing the prevalence of preventable conditions and improving health overall

THE TEAM

MYRIAM IS A JUNIOR AT PACE UNIVERSITY STUDYING HEALTH SCIENCES WITH A CONCENTRATION IN GLOBAL HEALTH. SHE IS PASSIONATE ABOUT IMPROVING HEALTH IN COMMUNITIES ACROSS NEW YORK CITY AND ASPIRES TO CONTINUE HER STUDIES AND BECOME A PHYSICIAN ASSISTANT.

JENNIFER IS A SENIOR AT PACE UNIVERSITY STUDYING COMPUTER SCIENCE WITH A MINOR IN GRAPHIC DESIGN. SHE ASPIRES TO BE A USER EXPERIENCE DESIGNER BECAUSE SHE BELIEVES A FLAWLESS USER EXPERIENCE IS CRUCIAL FOR ANY PRODUCT.

NOAH IS A JUNIOR AT PACE UNIVERSITY STUDYING COMPUTER SCIENCE AND MATHEMATICS.HE ENJOYS DEVISING AND IMPLEMENTING CREATIVE SOLUTIONS TO COMPLEX PROBLEMS.

JUHI IS AN INTERNATIONAL GRADUATE STUDENT AT PACE UNIVERSITY STUDYING INFORMATION SYSTEMS. SHE AIMS TO BE A DATA SCIENTIST IN THE INFORMATION TECHNOLOGY SECTOR.

CONTENTS PAGE

PROBLEM SPACE

Home to over 8 million people, New York City is one of the busiest cities in the entire world ("U.S. Census Bureau QuickFacts: New York City, New York"). With the third-largest state economy, New York State is a great contributor to the economic success of the United States, ending the year 2015 with a gross domestic product (GDP) of $1.45 trillion USD (Perry 2011). This is equivalent to 8% of the nation's GDP. In 2017, the GDP of NYS was over $1.5 trillion USD and is expected to rise to $2.5 trillion by 2035 ("11 mind-blowing facts about New York's economy | Markets Insider", 2019). Such an economic powerhouse translates to being home to the busiest workers. Full-time employees worked the longest weeks with an average commute and work time of 46 hours a week (Hawkins 2015). This is compared to the national average of 34.4 hours a week. (Doyle 2019)

In recent years, accessibility to health care has become a largely debated issue. While the majority of Americans have some sort of insurance coverage, 45% of the total population was underinsured/uninsured in 2019 (Collins 2019). In New York, 12% of the adult population was uninsured. In the most populous community in all five boroughs, Flushing and Whitestone, 14% of adults were uninsured. (NYC Health). Throughout the country, health insurance coverage varies greatly. The United States healthcare system operates on a multi-payer system. This means that health care services for a population are paid for by multiple entities. Currently, the system is funded by both public funding from the government and private funding from insurance companies. (Backgrounder, n.d.)

The fact remains that those who are more informed on their health make better decisions in terms of their lifestyle. In a study conducted by Ma on the prevalence of noncommunicable diseases (NCDs) in China, Japan, and South Korea, it was discovered that there was a difference in dietary habits of those with hypertension and diabetes versus those who did not have these health conditions. Those who suffered from NCDs led healthier lifestyles. They were more likely to eat breakfast and cook their meals at home, rather than skipping meals and eating out at restaurants. Though NCDs were more prevalent in China, the awareness surrounding risk factor control was greater. This means that people were aware of what made them more at risk for a certain condition. This awareness can be attributed to patient education. Low health literacy is associated with lower health outcomes, meaning that increasing health education can likely produce the opposite effect. When people are more informed about their health, it can improve their health status over time (Ma et al. 2017).

If the average New Yorker follows on such a hectic schedule, when does one find time to see their primary care provider (PCP)?

With rising rates of sedentary lifestyles across the country and increasing prevalence of noncommunicable diseases, what is the future of New York City?

We conducted research on the access to healthcare of 12 New Yorkers between the ages of 19 to 56. From this, we discovered that the average New Yorker saw their PCP an average of one doctor's visit per year. Nationally, 30% of the population shares this same behavior. Based off of our interviews, we determined that many people fitting our target demographic of young adults fit this mold. Most people resort to seeking a solution to their problem when it begins to impair their daily living. Based on our study, this, along with limited time and delayed appointments prevents 50% of students aged 18 to 21 from seeing the doctor more than once a year.

The pandemic of 2020 showed the need for reform in the American healthcare system. We predict a shift to a more socialized healthcare system with universal coverage. This change in legislation is prompted by the improved health outcomes and reduced individual financial burden seen in countries who have long since adopted this system (Brown 2003). However, as an effect of the pandemic, graduating classes for medical school, nursing school, and other affiliated professions will be severely reduced and delayed. We expect many practicing medical professionals to either retire or switch careers due to stress, trauma, and overwork. This results in a reduced workforce.

We also expect that by the year 2030, air pollution will be a more pressing matter. During the COVID-19 pandemic, the US Environmental Protection Agency (EPA) suspended the enforcement of environmental laws that prevented companies from engaging in manufacturing practices that increased air pollution (Milman & Holden, "Trump administration allows companies to break pollution laws during coronavirus pandemic", 2020). In 2018, the Trump administration did away with regulations for power plants and their production of greenhouse gases. (Dichristopher & Schoen, "Trump's EPA just handed these states a way to keep burning coal", 2018).

In addition to the blatant dismissal of the existence of global warming and climate change, the environment will likely suffer. In countries like China and India, where coal-burning is a continued practice, residents are largely affected by air pollution, also known as smog ("Air pollution from coal burning in China, India and Eastern Europe: multi-year study being undertaken", 2015). Classic smog consists of mainly particulate matter and ground-level ozone, as well as nitrogen oxides, sulfur dioxides, carbon monoxide, and volatile organic compounds. When frequently inhaled, it can cause eye, nose, and throat irritation, decreased lung function, and in some cases cancer ("Smog", n.d.).

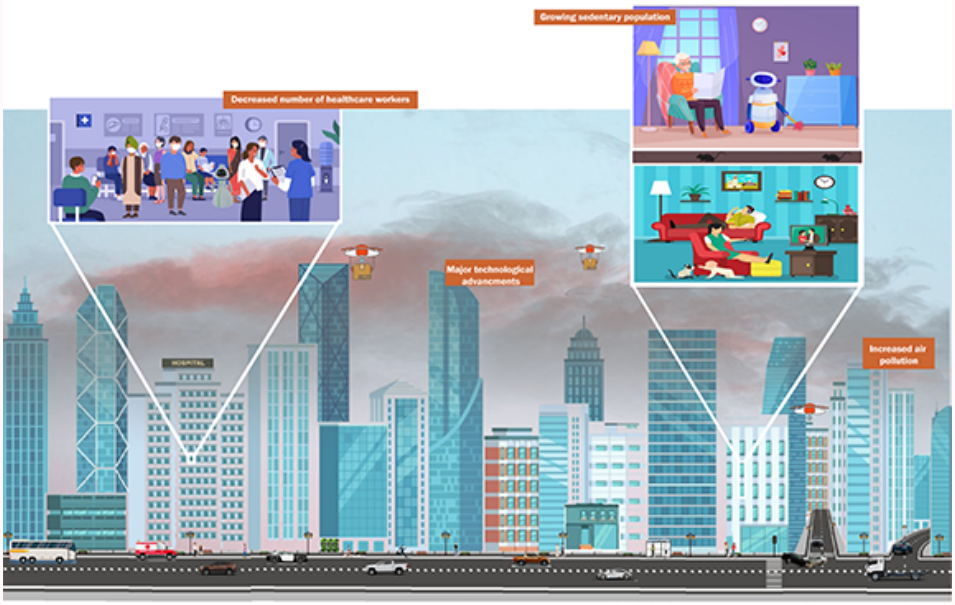
These greenhouse gases also accelerate the deterioration of the ozone layer and amplifying the effects of global warming. Though we expect that in the coming years, there will be a push towards adopting clean energy practices, the effects of these rollbacks will be presented in the year 2030. With decreased air quality and changing workspaces, there will be a large shift towards sedentary lifestyles.

Sedentary lifestyles promote the development of NCDs and lower the health status of the population. With a reduced workforce and a higher incidence of disease, the quality of medical services will increase. The increased demand for health services rendered while maintaining a mandated price would lead to a decreased supply and an overall shortage of medical services. What would then happen if the frequency of our checkups decreases as inconvenience and inaccessibility increase?

As sedentary lifestyles take hold and obesity rates continue to rise, how might we enable an average New Yorker to quickly and easily access essential information regarding their health?

HOW MIGHT WE ENABLE AN AVERAGE NEW YORKER TO *QUICKLY AND EASILY* ACCESS ESSENTIAL INFORMATION REGARDING THEIR *HEALTH*?

FUTURE SCENARIO



2030 Future Scenario

IMAGINE A WORLD WHERE THE POPULATION HAS BECOME MORE SEDENTARY, WHERE OBESITY RATES HAVE INCREASED, AND PEOPLE ARE LESS SOCIAL.

IN THIS WORLD, HEAVY AIR POLLUTION AND GREENHOUSE GAS EMISSION HAVE INCREASED,AND MOST PEOPLE ARE UNINFORMED ABOUT THEIR HEALTH, EVEN THOUGH LEGISLATION HAS BEEN PASSED FOR A UNIVERSAL HEALTHCARE SYSTEM.

IN THE HEALTHCARE SYSTEMS, AN INCREASED SHORTAGE OF DOCTORS AND NURSES HAVE CAUSED ROBOTICS TO PLAY A BIGGER ROLE IN HEALTHCARE THANKS TO THE FOURTH INDUSTRIAL REVOLUTION.

DESIGN SOLUTION

MEDIPOD IS THE ANSWER TO THE PROBLEM OF THE FUTURE. IT COMBINES THE TECHNOLOGIES OF CERN WITH STATE OF THE ART MEDICAL EQUIPMENT TO SOLVE THE INADEQUATE FREQUENCY OF HEALTH CHECKUPS.

RESPIRATORY FUNCTION TEST

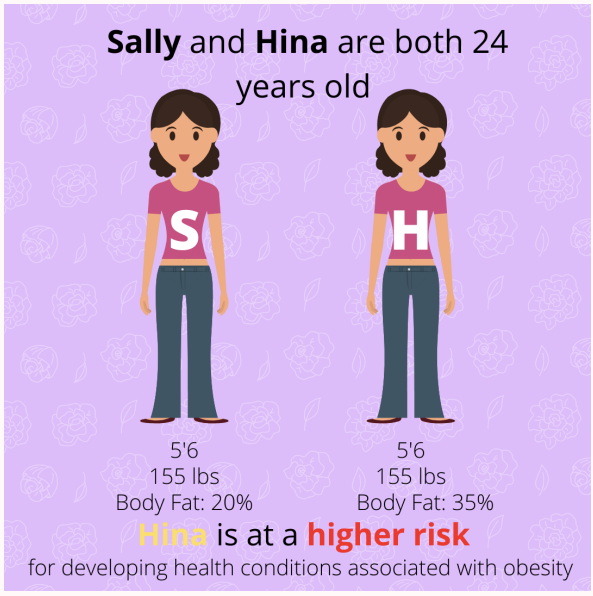
With an expected increase in the prevalence of respiratory conditions, we wanted to make this one of our highlights. Pulmonary function tests are performed to determine how well the lungs are functioning. The results can help diagnose conditions including asthma, allergies, lung cancer, and chronic bronchitis. This is usually done using a spirometer, which measures the amount of air inhaled and exhaled. Body plethysmography can also be performed, which involves a similar mechanism to the spirometer in an enclosed space. We designed Medipod with this functionality in mind. By means of current tests, the patient is required to breath into a plastic tube for a length of time until the machine can properly read the patient's lung capacity and respiratory efficiency. Applying this concept of lung capacity, we implemented a respiratory function test that measures the concentration of carbon dioxide and oxygen in the air throughout the test. Taking measurements as the user enters the enclosure, Medipod gains a baseline for the atmospheric composition. During the period of the test, which is to take between ten and fifteen minutes, Medipod will continually log any changes in atmospheric composition, watching primarily for dramatic changes in O2 and CO2. This is done with CERN's highly sensitive THRAC gas detector, amd the graphs of changing gaseous content will provide insights to the patient's lung health, akin to the more invasive pulmonary function test. Medipod will then input this data into a machine-learned neural network--trained to properly diagnose early stage lung diseases and cancers--and provides the diagnoses to the user's mobile app after they leave the pod.

DATA AND THE HEALTHCARE SYSTEM

Electronic health records (EHR) were created in an effort to compile medical information in a way that was easily accessible. It saw its humble beginning in the 1960s, with the creation of the clinical information system by the company Lockheed and the Computer Stored Ambulatory Record (COSTAR) by Massachusetts General Hospital. It has since developed from a rudimentary stem to a network for medical providers. With the passing of the Health Information Technology for Economic and Clinical Health Act in 2009 came the widespread promotion and adoption of EHR with the passing of the Affordable Care Act under former President Barack Obama's administration (Source: Backgrounder) Incorporating EHR and EMR as part of the Medipod system utilizes the available medical technology to better serve the clientele. We use the patient history obtained from the EHR to allow for a series of analyses to determine health progress.

BIOIMPEDANCE- BODY COMPOSITION ANALYSIS

WWe wanted to include a body composition analysis because it aids greatly in giving insight into one's health status as well as preventing further health complications. An alternative we considered was the body mass index (BMI). It is commonly used to indicate whether someone is underweight, overweight, obese, or within a normal range. However, it is not an accurate measurement of one's risk for certain health conditions. BMI does not take into body composition and therefore cannot be a measure of adipose distribution (Kok et al. 2004). According to a report released by the CDC, "BMI does not distinguish between excess fat, muscle, or bone mass, nor does it provide any indication of the distribution of fat among individuals." (CDC ("SAFER HEALTHIER PEOPLE - Centers for Disease Control and ...", 2007). Person A and Person B can both have a BMI of 24, but Person A can have a higher lean muscle mass and be less at risk for developing conditions related to higher adipose mass.



It is important to note that excess adipose tissue can increase the risk of developing noncommunicable diseases such as diabetes and heart disease ("Bio-Electrical Impedance Analysis (BIA) - Body Mass Analysis"). Bio-electrical impedance is a non-invasive test that provides the exact breakdown of a person's body composition. It works by sending electrical impulses through your body via electrodes that are positioned at your right hand and foot. By measuring the lean body mass in comparison to body fat, a more accurate descriptor of health can be developed ("Bio-Electrical Impedance Analysis (BIA) - Body Mass Analysis"). Medipod uses the 4C model, which can be used to monitor "many conditions including over/dehydration, malnutrition, obesity, sarcopenia, and cachexia." (Ng, et al., 2018). As part of Medipod's functionality, we will be able to provide accurate reports of a patient's health.

USER JOURNEY

1.
ACCESSING MEDIPOD APP

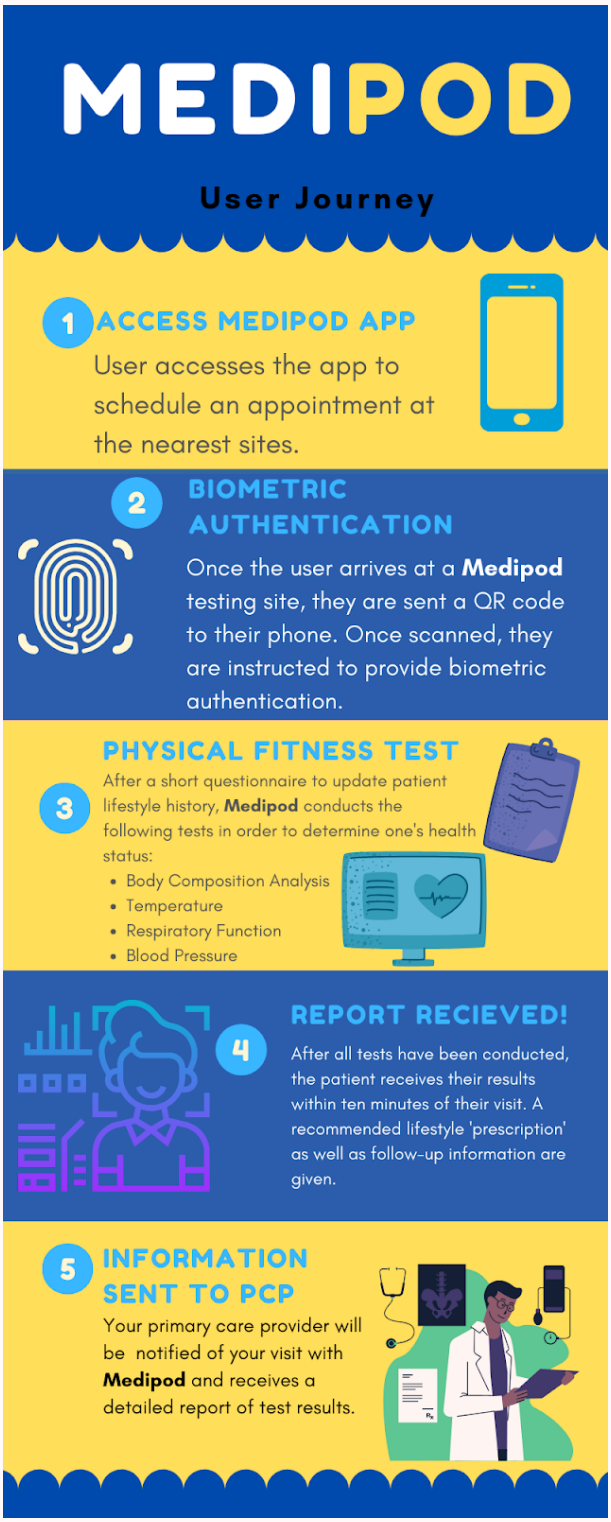
Patients begin their interaction with MediPod by logging into their app and finding the nearest MediPod.They will then use a one time password to unlock the doors.

2.
PATIENT AUTHENTICATION

Once they are inside of MediPod, they will be asked to provide Biometric authentication that includes fingerprint and eye scan. This will be used to connect the patient to their records and get them started.

3.
PHYSICAL FITNESS TEST

MediPod conducts a questionnaire to update the users lifestyle history the begins the following tests as the main feature for our patients: height, weight, blood pressure, Temperature, lung function, body composition, and Pulse.



USER JOURNEY

4.
ACCESSING MEDIPOD APP

The patient's Electronic Medical Record [EMR] is updated after every visit. It is made available to the patient on their app to keep them up to date on changes with their health. An AI is also used to give a recommended course of action for the patient based on changes noticed from their physical fitness test and/or the patients responses to the questionnaire.

5.
PCP UPDATE

After every visit similar to the EMR, the patient's Electronic Health Record is updated and made available to their primary care physician. Their physician can assess the test results from each visit and provide their own recommendations. If a healthcare provider feels it necessary that their patient makes a visit to their office, they will be able to contact the patient through the app.

Multi factor authentication - Security features

1. Application

Medipod will have mobile application and website where one is suppose to login and give all their health information . This in backend will be connected to Healthcare records.

2. One-time password

OPT will be sent on phone via email which should match to the one persona enters to the MEDIpod

3. Biometric Scanning

As a security measure one should usee eye scanning which gives confirmation of your reccords

5. Blood Pressure Measure

Machine that patient/customer uses for measuring blood Pressure by wear the wrist band in order for check up. Device is self -sanitize itself after each check up.

6. LED Screen Background

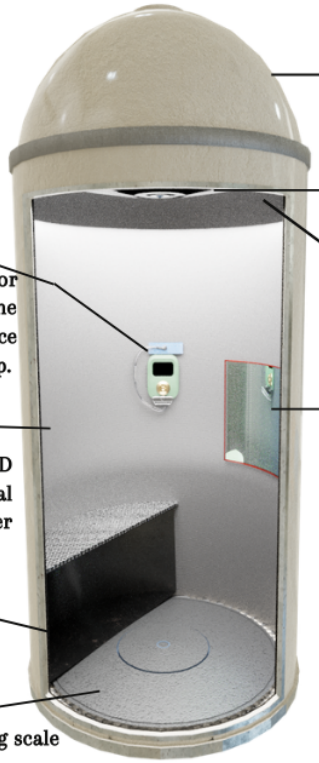
For peole with claustrophobia this LED will help to create vieo of natural virtual background helping them getting over their fears

7. Storage space

Used for storing shoes, coats ,etc. for customer/ persona using MEDIpod

8. Weight Measure

Used for measuring weight using weighing scale



1. Respiration monitor filter

These sensors perform pulmonary function test, determining the capacity and efficiency of the user's lungs.

2. Height measure sensor

These sensors perform height measure using Ultrasonic distance sensor.

3. Ventilation

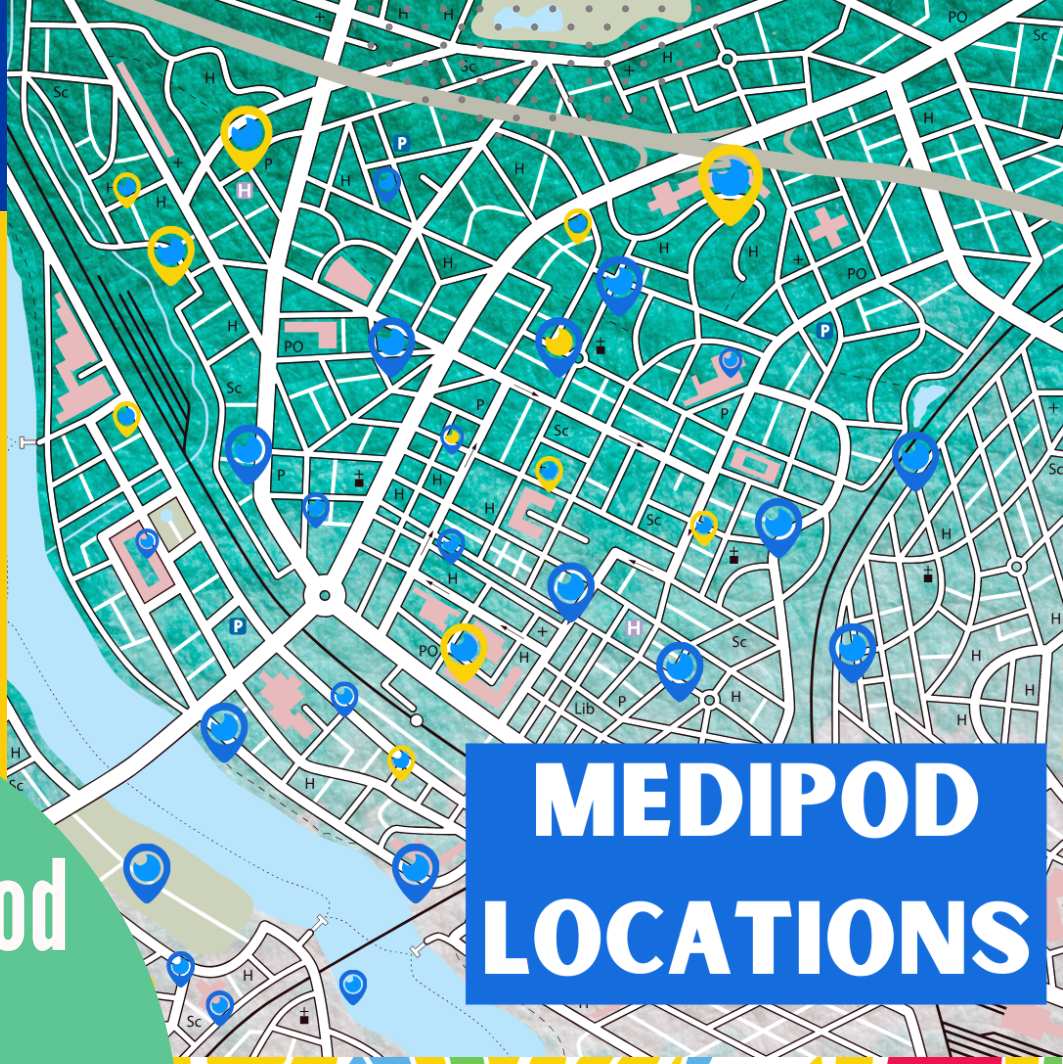
For air circulation and also for UV disinfecting light .

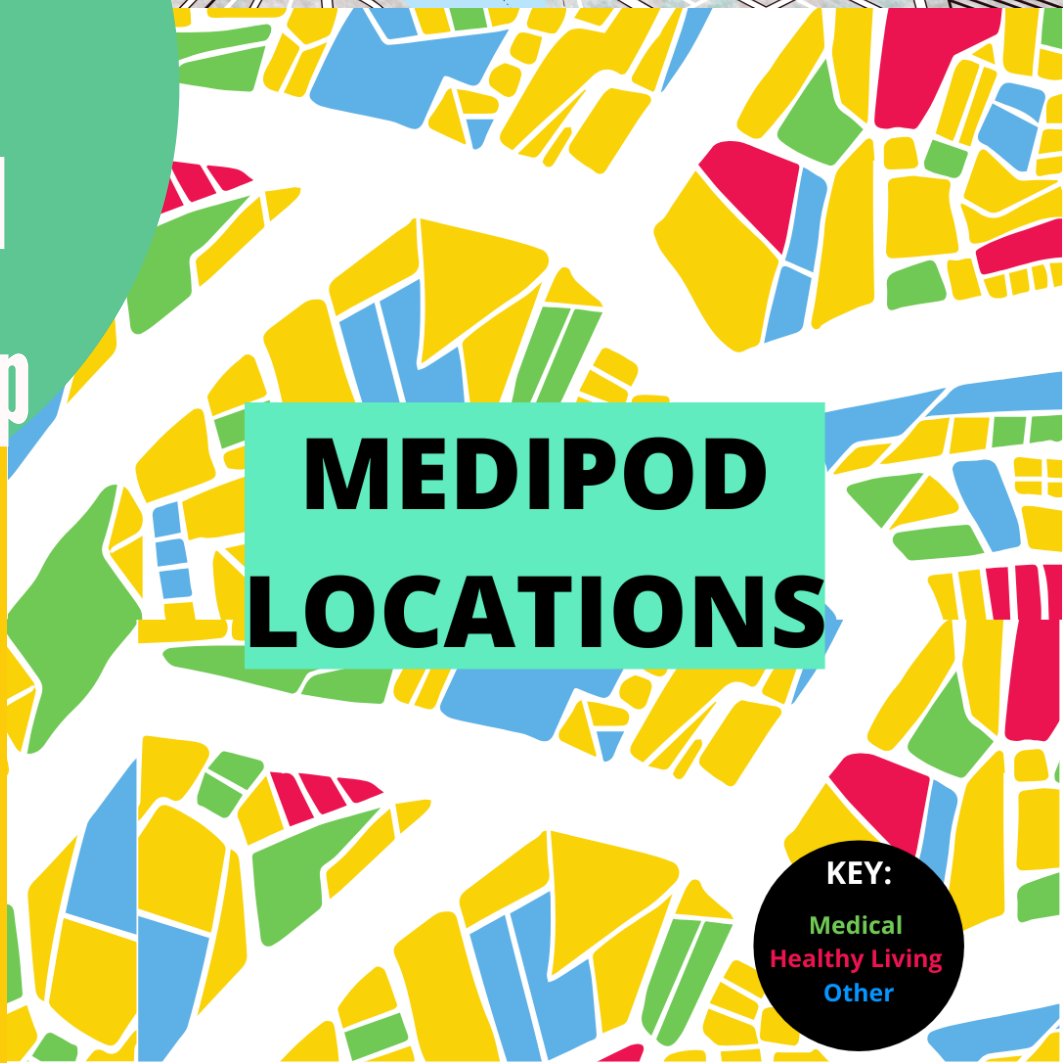
4. Interactive Screen

These interactive screen are touch screen where peole can be asked questions about their health like syptoms , thire health care id details . Also, display during measuring blood pressure . It is voice to the MEDIpod

USER JOURNEY

Potential MediPod site maps; available to all patients via app





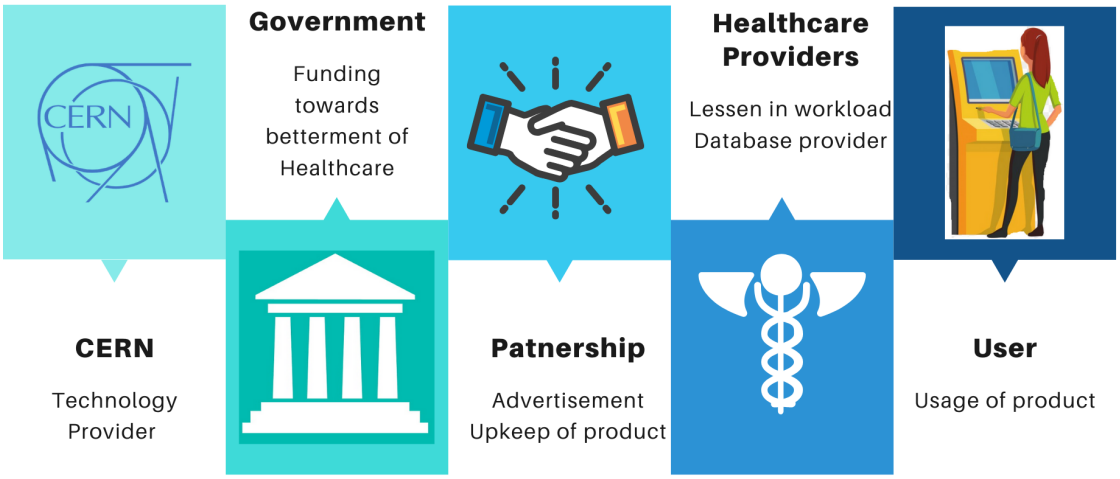
RESEARCH & DEVELOPMENT

Further research and development into the respiratory function test is needed. It is important to ensure that we have the most accurate and reliable test because there is not much like it on the market. The automation of this testing machine removes the human element from a normal respiratory function test. Machines like spirometers require a patient to insert a breathing piece into their mouth. Sanitary concerns are especially heightened post-"COVID-19" and a respiratory function test that did not need an individual to use a mouthpiece was important. However, because a test like this would require highly sensitive sensors, we would need to make sure that we develop sensors that can accurately measure the atmospheric volume and composition. Investing into further research would help us better align this test for its functionality.

We want Medipod to be an innovation that works with the dynamic field of medicine and scientific research. Medipod should be able to adapt with new technologies and systems as time goes on. We plan to implement blood and urine testing to provide patients and medical providers with more accurate and detailed health reports. With this added functionality, we will be able to track more conditions and implement more primary preventive methods. We would have to develop a newer version of Medipod that can accommodate for these tests. It is also important to keep the speed and efficiency of these tests because this is a hallmark feature of Medipod. We need to be able to research and develop a product that can perform all these tests in a quick, simple, and safe manner.

FUNDING REQUIREMENTS

Funds are a critical part of any project , this product support depends on two main factors - Partnership with local businesses such as gym, pharmacy, etc. with product maintenance and product awareness deal for advertisement along with discount offers for the patients. And a single handed fund provider like government or sponsor which can provide single- payer healthcare system support .



SUMMARY VISUALIZATION

Design Solution

- Quick physical check-up
- Weight, height, temperature, blood-pressure and lung test

Stakeholders

- User
- Government
  (socialized healthcare provider)
- Partners
  (Gym, Healthcare Providers, etc)
- Doctors / Medical Professionals
- CERN




Resources

- CERN Technology
  - REMUS
  - ROOT
  - THRAC Gas Detector
  - 3D Tracking Semiconductor
- Other Technology
  - Dingheng DHM-800Z

Future

- ease access to Healthcare
- Time- efficient

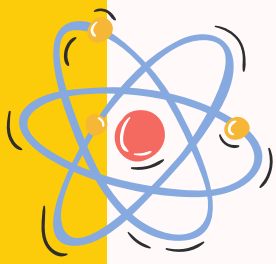
STAKEHOLDER ENGAGEMENT

Contributor	Contributions	Motivations	Enablers	Engagement
User	their cooperation and usage, people like you keep this whole thing alive ;)	keeps user informed with health status and gives good advice to maintain wellbeing	It is a cheap (be specific) and quick process within an (ideally) very nice machine (clarify → clean)	advertisements, medical hear-say (professional recommendation), unprofessional hear-say (personal recommendation)
Government (socialized healthcare provider)	Means of production , funding, and implementation	Better, happier, healthier peoples. Provides jobs in manufacturing and maintenance. Future	Involvement will literally be costly as they will fund it. Ideally the offering of the technology and designs will make acceptance painless	Government contacts (likely within healthcare industry)
Partners	Their name and incorporation into the system. In turn they provide funding for upkeep and production	They are given advertising space to a huge variety of people (ideally a majority of the population within their nearby vicinity)	They request advertising space in our system (ideally process is painless), then they are registered within our recommendation system	They contact us, following up on advertising placements within the capsule
Doctors / Medical Professionals	Access to virtual medical records for our routine checkup system	Workload is lifted from their shoulders (performing rudimentary checkups)	Ideally this would be a simple file-transfer process, making it virtually costless and simple	Communicate through patients, the patients requesting their information to be transferred to the system.

STAKEHOLDERS

Moving to those who hold major stakes in the project, we have the government, We expect the national adoption of socialized healthcare system. It is under this single payer coverage that we expect to pay for the services rendered by Medipod.

Local businesses are also involved in our project. We hope to collaborate with local businesses to provide patients with incentives to adopt a healthier lifestyle. This could be promoting a healthier diet by offering discounted produce at the supermarket or a free class at the gym. This partnership benefits the three major parties involved. Patients get to save money and practice healthier lifestyle choices, businesses profit from their patronage, and we are able to support Medipod.



One of our other stakeholders is CERN. CERN technology plays a big part in our innovation. It provides for much of Medipod's functionality, most notably the Respiratory function test.

Our final stakeholders are Healthcare providers. We will collaborate with these providers to make sure they are consistently updated in their patient's health. We want to include the healthcare provider in the equation and not replace them completely. We recognize the importance of a medical professional in improving health outcomes and rely on their expertise to help refine our system.

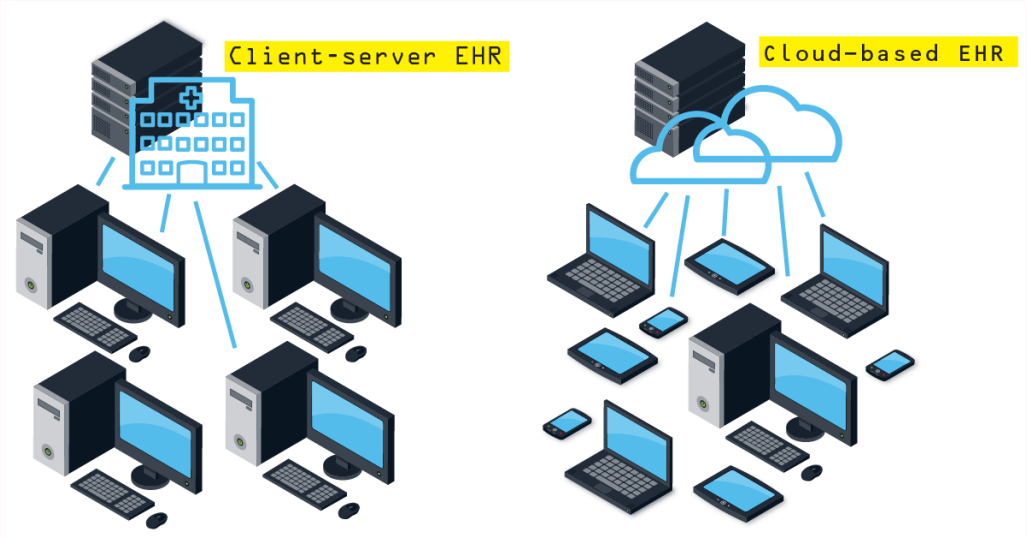
FOOTPRINT & LOCATION

The primary focus of Medipod is to provide quick and accessible routine medical tests to residents in metropolitan areas. Taking the landscape into perspective, we decided to maximize on space where it was limited. Implementing Medipod into existing medical spaces such as clinics, urgent care centers, and hospitals can provide an extension of services without requiring additional personnel. We also thought it was important for MediPod to play a role in revolutionizing the way people think about their health. Improving health is not only restricted to medical procedures and prescribed medications. Our lifestyles and habits can play a big role in our health status. It is important to note that noncommunicable diseases, which are responsible for 70% of the global burden of disease, are largely caused by these factors.

By creating MediPod sites at centers that promote healthier lifestyles, we can make healthcare a more established part of lifestyles (“Noncommunicable Diseases”, n.d.). Centers that could serve as MediPod sites include gyms, yoga centers, health supplement stores, and even farmers markets. It would essentially become a normal part of one’s routine. For example, a New Yorker who exercises often might visit the MediPod site at their local gym after a workout. They will be able to track their fitness progress through the body analysis and have a quick look into their health status over time. Medipod will also be implemented as part of the built environment. We want it to be something that is easily accessible all across the city, especially in areas where residents have difficulty easily accessing health-care facilities. Furthermore, our aim is to expand the Medipod product outside of metropolitan areas so that it might aid rural communities, where access to medical care might be equally as (or more so) limited.

MATERIALS, ENERGY, & PHYSICAL INPUTS

This innovation would need a cloud based EHR system that is fully integrated into healthcare services. In summary, a system connected to the cloud that gives easy access to the EHR database to the patients and doctors could be useful in analysis. With cloud based EHR, we can expand past the limitations of client-server EHR and provide more users with access to their records. Energy is an important factor as this product comes with super easy to use it needs patients 5-10 min of physical energy and interactive time in order to complete the test process .Patients' various physical inputs are needed for accessing and using the Medipod. Further, the patient will be required to pass an authentication process through biometric scanning. Within the pod, there is a touch screen that requires touch inputs for the various questionnaires. Finally, measuring blood pressure will require placing and fastening the arm band inside.



Source: https://www.modernhealthcare.com/article/20170807/TRANSFORMATION02/170809936/internet-based-ehrs-gaining-some-customers-but-still-a-small-segment

MAIN MATERIALS

The Medipod houses different components that will be constructed of varying components to properly fit their function.

The outside chassis is created primarily with stainless steel to provide structural integrity, durability, and longevity. The border plating could be constructed of the same material, or of something equally as effective, such as titanium or ceramics. This chassis includes the door, however a difference in material color proves visually appealing.

The inner chamber will follow a similar material palette, the walls being at least lined with stainless steel, although there is an intended gap in specificity to provide room for creativity. In the model rendered, the outer wall is created from carbon fiber. The base plate of the floor, as well as the shell of the weight sensor (which will be fitted with the appropriate electronic materials within) are to be made of metals no weaker than steel due to the constant pressure exerted on them by concurrent users.

The inside bench and cubby can be constructed from either one ubiquitous material or split between two different materials, one embodying the nook-like structure and the other the flat-faced top. The structural material should be something durable as it is made to support the weight of people who sit down within the pod, as well as hold their things within the inlay. Again, this could be something akin to stainless steel, titanium, or carbon fiber.

The top material could then follow suit, a hard surface allowing for easy cleaning and maintenance. A softer material, however, would provide the user with added comfort, to which we suggest foam or cotton padding under a durable plastic fabric, such as nylon or polyester.

MAIN MATERIALS

The screen component is made with durability as its primary concern, given the inherent magnitude of use it should experience between users without need for maintenance. For this, the edges are to be made of something strong such as concrete or ceramic.

The screen will be capacitive touch, and can be created with any of the industry standards: that is OLED, P-OLED, LED, AMOLED, or any new methodology that is invented in the time between our publishing and the construction of the pod. This notion extends to the glass, as it is to be made of nothing less durable than the current industry standard of sapphire glass, but can be replaced with any more cost-efficient and/or durable alternatives.

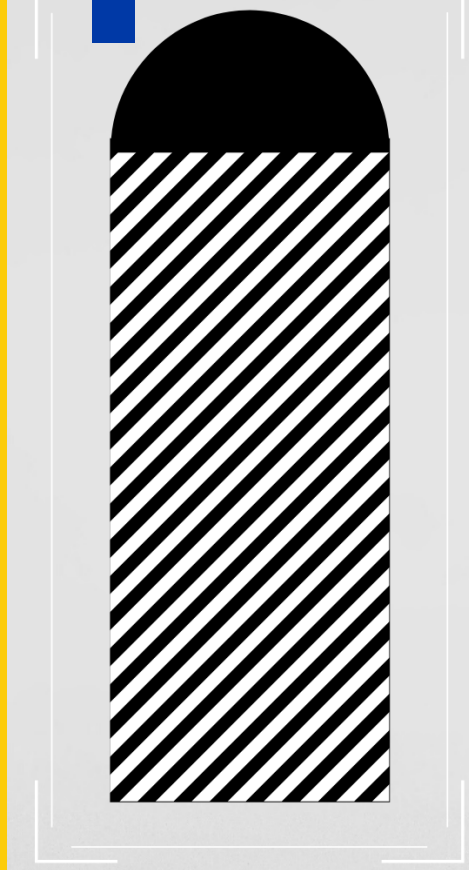
The blood pressure monitor chassis will be created with any durable plastics for the chassis and elastic fabrics for the band. There is a need for a temporary adhesive to enclose the band around the user's arm, so we suggest industrial velcro, or any adequate alternative. There is no need for a bulb, as the pressure sensitivity is something that will be controlled by the pod to ensure consistency within testing between users.

Finally, the top of the pod will be constructed again from the stainless steel, the exception within the structure being the infrared distance sensor placed in the center to measure the user's height as the stand within the pod. The advanced atmospheric sensors will be placed within the steel enclosure, the cycling of air to be allowed through small slits in a circular formation at the edges of the ceiling.

medipod:

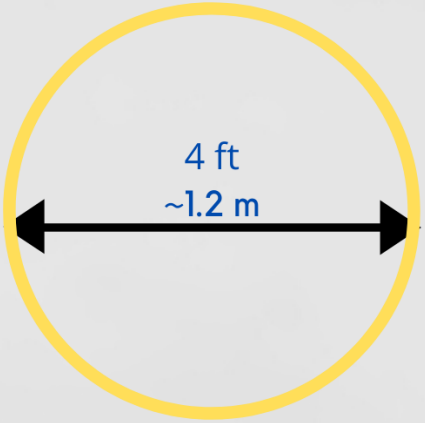
[the future of healthcare]

a closer look

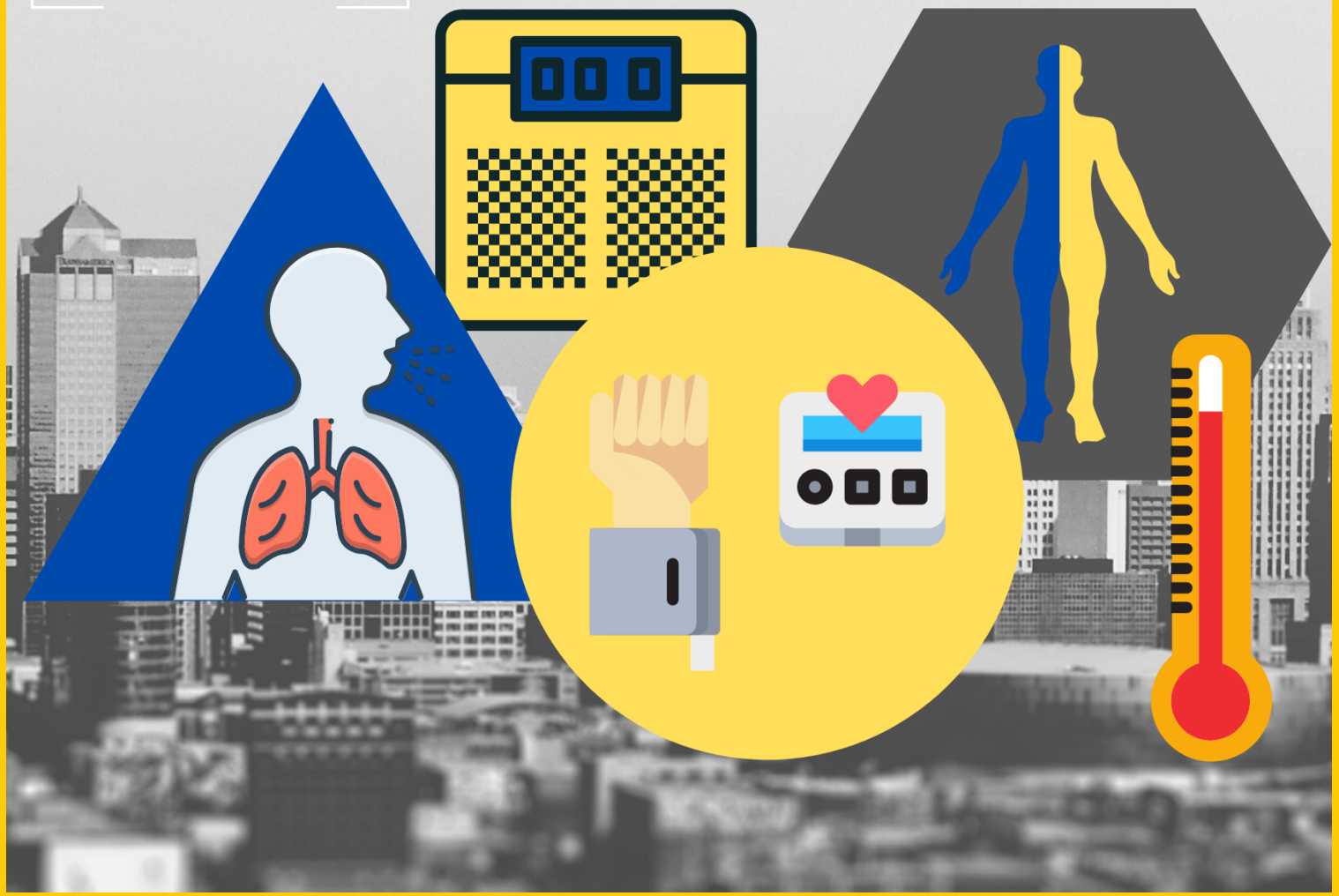


10 ft

~3 m



features:



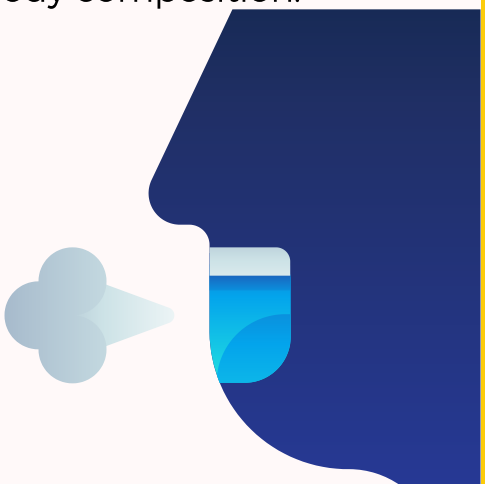
FUNCTION

With so many features MediPod has quite a few technologies working together to provide patients with a thorough check-up.

Our main feature--the lung function test--uses the THRAC gas detector to notice minimal changes of air inside of Medipod, detecting any respiratory issues from the patient's breathing. Security is always important when dealing with such sensitive information, so we implemented REMUS, which handles the backend communication between the varied individual components, such as the multi-factor authentication process. REMUS is also used to function the doors and give the patients access to the proper medical records.

ROOT, a program designed for analyzing massive amounts of data efficiently, is used in tandem with REMUS and the AI system to process the patient's data and give adequate feedback. MediPod is built with a scale in the flooring to measure the patient's weight, a ultrasonic height meter to measure the patient's height, and a non-contact infrared thermometer to measure the patient's temperature.

A pulse oximeter and automatic sphygmomanometer that are mounted to the wall of MediPod that measure the patient's pulse and blood pressure. The body composition test is implemented using the custom-made body composition test found in the DHM-800Z ("DHM - 800Z Weight Scale Vending Machine , Digital Weighing Scale With Height Measurement"). The user will squeeze two handles that can then measure their body composition.



SERVICE & SYSTEM TO ADOPT

Medipod will be an integral part of a public health initiative known as MetroMedic. This will be a plan for metropolitan areas to help improve health outcomes through health literacy and widespread access to basic medical services. This is based on the principle of preventive healthcare, which is explained in the chart below:

	Primary	Secondary	Tertiary
Aims to...	Prevent disease or injury before it occurs	Reduce the impact of disease or injury once it has happened	Reduce the impact of chronic disease/long-term health issues.
Method	Preventing exposure to health hazards and pathogens.	Early detection and treatment of disease to stop or slow its progression.	Programs that aim to improve quality of life, for example, rehabilitation.

Currently, there is an emphasis on secondary and tertiary prevention. While early detection and rehabilitation can help in improving health outcomes, it is generally accepted that the earlier the initiative is implemented, the greater the benefit. In developed countries, the main contributor to the burden of disease are noncommunicable diseases ("Chapter 1: Global Health: today's challenges", 2010). According to the World Health Organization, these are conditions that “of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors.” Medipod is the main vessel for MetroMedic because it provides the foundational services expected in rudimentary healthcare.

VALUE PROPOSITION TO USERS & SOCIETY

MediPod will increase the accessibility of healthcare services without contributing to the burden caused by the physician shortage. While studies have projected this decline for many years, we expect the pandemic of 2020 to aggravate this situation. Many potential medical students or any students pursuing a career in medicine have largely been set back by the pandemic. Volunteer opportunities were slashed and MCAT exams were cancelled until the month of May (Murphy, 2020). Furthermore, a socialized healthcare system would upset the monetary motivations of a portion of medical students due to a decreased pay result. We expect these factors, combined with the financial and social repercussions of the COVID 19 pandemic, to shrink the class sizes for medical professions.

After MediPod is introduced, medical professionals can be less overwhelmed by surges of patients. More time will be available for doctors and other certified professionals to focus on urgent cases. The purpose of Medipod is primary prevention, which can greatly reduce the prevalence of noncommunicable diseases. A study published in Family Practice showed that primary prevention of diabetes was in fact effective. The methods used to help prevent diabetes were all simple lifestyle changes: things like going on a walk and limiting one's caloric intake (Green, Brancati, & Albright, 2012). As part of Medipod's functionality, providing patients with a prescription of interventions rather than medications to treat preventable conditions.

Medipod will be easily accessible in convenient locations for all kinds of patients. This will also increase the overall availability of healthcare by allowing those who would otherwise not have time or the means to obtain a basic check up that opportunity. New Yorkers have some of the longest work weeks compared to the national average. The busy lifestyles that are a product of their environment leave little time to focus on one's well being and accessing healthcare services. Medipod will be introduced into all types of communities across the metropolitan area. Communities play a big part in health outcomes. In community based initiatives, the community is present in seven different models. Medipod focuses on the community as the setting, agent, and resource in our intervention (Mcleroy, Norton, Kegler, Burdine, & Sumaya, 2003).

Improving the health of the community not only strengthens it but allows for further development by increasing community capacity. Community capacity involves the usage of “human capital, organizational resources, and social capital” ("Community Capacity Building") to better the community. According to an article published in BMC Public Health, “Community capacity building is about developing sustainable skills, organisational structures, resources and commitment to health improvement in health and other sectors, and prolonging and multiplying health gains many times over” (Groot, Robertson, Swinburn, & Silva-Sanigorski, 2010). It is important that community building is a focus for Medipod as part of the MetroMedic initiative because we want to enforce the concept of health as a human right. By empowering our communities to take their health into their own hands, we can help increase community capacity and help improve lives.

CERN TECHNOLOGY

CERN technology provides much of the functionality for Medipod. This includes the following:

REMUS

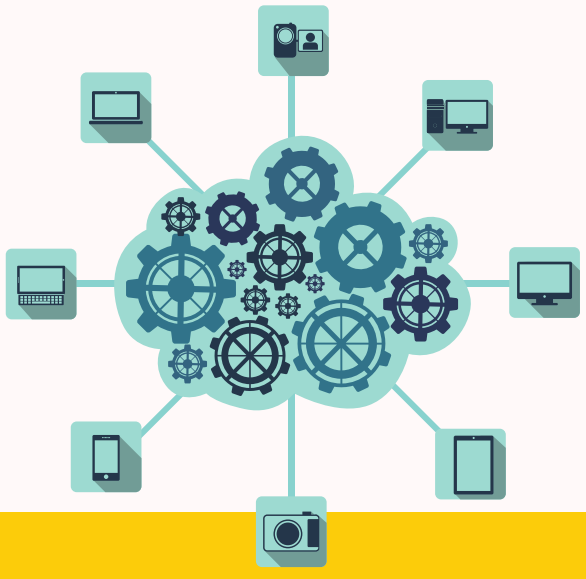
The Radiation and Environment Monitoring Unified Detectors Supervision provides the functionality of Multiplatform and Scalable Supervision, Control and Data Acquisition systems (“REMUS” 2019). These features would support the Multifactor Authentication security system that stores and protects the patient’s personal information as well as their medical records.

ROOT

ROOT supports big data processing, statistical analysis, visualisation and storage (“ROOT” 2019). This technology is important for Medipod’s storage and analysis of patient data. Healthcare providers will be able to access the records and cross-analyze each patient’s medical history. In the event that a medical provider feels the patient requires additional feedback based on the EHR available, they can schedule a televisit or contact the patient through the app.

THRAC GAS DETECTOR

Timing and High Rate Capable Gas Detector provides sub nanosecondTime resolution, high rate capability, exceeding 1MHz/cm2, and simultaneously ("THRAC" 2019). This technology would be used to support the lung function test by reporting the atmospheric changes inside the MediPod during the lung function test.

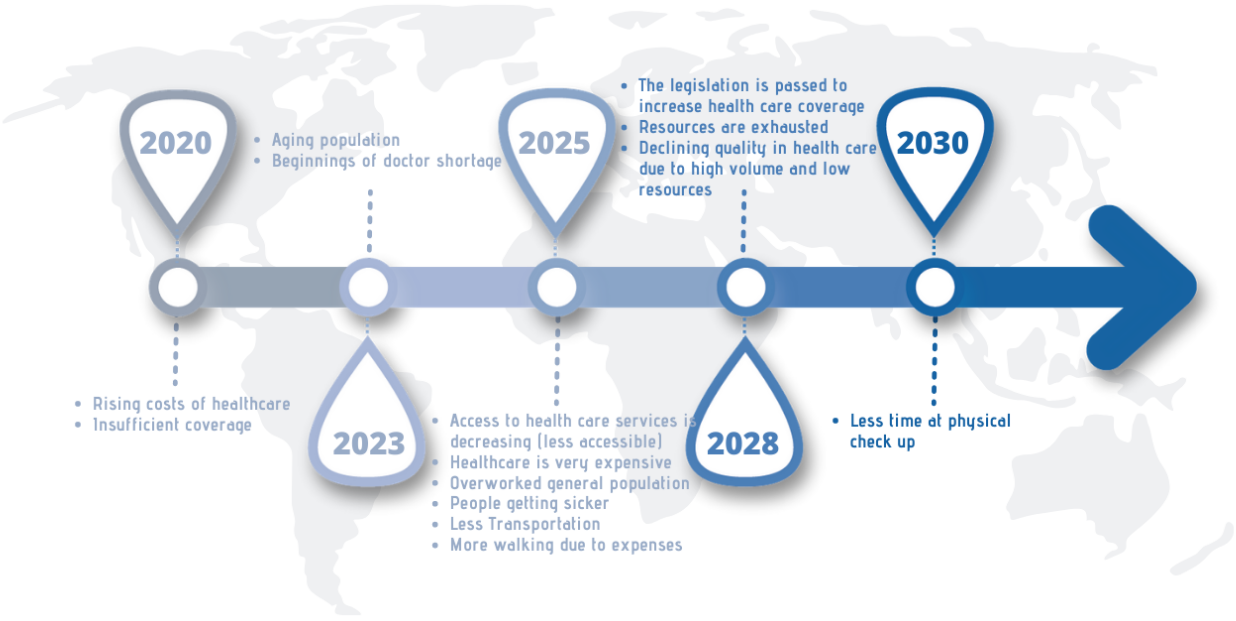


CONCLUSION & NEXT STEPS

To provide our timeline, we begin in 2020 with rising cost and insufficient health care coverage in the wake of the pandemic. By 2023, we expect a shortage of affordable medical providers. 2025 finds accessibility plummeting as costs increase and the population continues to overwork itself. We expect health quality and literacy to be lowest at this time.

Fortunately, by 2028 we expect legislation to increase the health care availability. Furthermore, the MetroMedic plan will be introduced, under which the Medipod will be deployed in 2030, introducing quarterly checkups as the norm.For future expandability, we hope to implement a skin exam with very high resolution imaging in hopes of detecting early stage skin cancers and diseases.We would also like to implement blood, saliva, and urine testing to the automated processes of Medipod, providing higher quality insights into the overall state of the user's health.

Our goal is that following 2030, citizens will have easy access to remedial health care services. We also hope to leave a legacy of automation within the health care industry, to expand the MetroMedic agenda beyond its initial metropolitan scope, and to dramatically increase health literacy.



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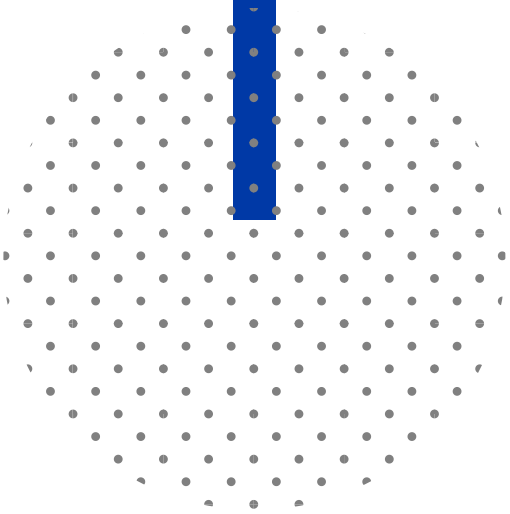

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