



A Business Plan for a Remote Patient Monitoring Startup

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Citation	De Armas, Ricardo E. 2020. A Business Plan for a Remote Patient Monitoring Startup. Doctoral dissertation, Harvard Medical School.
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Scholarly Report submitted in partial fulfillment of the MD Degree at Harvard Medical School

Date: 01 February 2020

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Scholarly Report Title: A Business Plan for a Remote Patient Monitoring Startup

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Abstract

Title: A Business Plan for a Remote Patient Monitoring Startup

Ricardo De Armas, BS

Purpose: Obstructive sleep apnea (OSA) is a sleep disorder characterized by complete or partial airway closure during sleep. The treatment for OSA is positive airway pressure (PAP), but 34% of patients who are receiving this treatment are non-adherent. One proven method of increasing adherence is through remote patient monitoring (RPM), or in other words, staying connected to patients through real-time monitoring of their physiologic data. Medicare, as well as other insurance companies, have become aware of the benefits of RPM, and have recently introduced new billing codes to incentivize clinicians to incorporate RPM in their clinical practice. However, the current systems for RPM are described by clinicians as being unfriendly and time-intensive, resulting in little to no monitoring of patient data. Thus, I developed a business plan for an RPM platform that keeps sleep medicine physicians updated on their patients' response to therapy, with the goal of improving adherence and overall patient outcomes.

Methods: To better understand the pain points in RPM, I developed a survey which I sent to board-certified physicians of sleep medicine who treat patients with OSA. The survey was sent to physicians in both private practice and academia (primarily within the Harvard hospital system including Brigham and Women's Hospital, Massachusetts General Hospital, and Beth Israel Deaconess Medical Center). The survey was completed by eleven clinicians (see Appendix for sample survey). Additionally, I interviewed four of the clinicians individually to better understand how they integrate RPM in their practice. The combination of survey responses and interviews provided me with a better understanding of the pain points in RPM, which I then used to design a startup responding to the clinicians' needs.

Results: Of the eleven clinicians who responded to the survey, nine (81%) were in academia and two (19%) were in private practice. Seven (64%) of them used RPM in their practice to track their patients on PAP therapy. Three (27%) reported that they did not know that RPM was billable by Medicare or other insurers. When asked about pain points, seven (64%) reported that time was a constraint and eight (73%) reported that software issues were another constraint in their ability to engage in RPM. Overall, there were five major pain points commonly reported by

clinicians: 1) RPM is not worth the effort, 2) I do not have the time to monitor all of my patients, 3) It is difficult to know who is doing well and who is not, 4) I cannot keep track of patients I monitored or contacted, and 5) I did not know you could bill for RPM.

Conclusions: Using the feedback I obtained from physicians, I developed a business plan for “MonitAir” – a startup that aims to improve RPM for the treatment of OSA. MonitAir consists of two parts: 1) a software that allows physicians to keep track of their patients’ sleep data, and 2) an outsourced monitoring service. Outsourced monitoring refers to contracting medical staff (i.e., nurses and medical assistants) who can keep track of patient data remotely, make interventions as needed, assist in billing, and provide updates to physicians. This two-part design solves the problems of time and software constraints, providing clinicians with a solution that is directly targeted at improving adherence to therapy and overall patient outcomes. Other RPM startups have emerged in this area and are focused on tackling other diseases like hypertension and diabetes, but MonitAir is the first startup focused on OSA. The vision for MonitAir is to eventually dominate the untapped respiratory care segment, beginning with OSA and expanding into the more prevalent COPD and Asthma populations once the current business model is proven.

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Project Description and Student Role

Project Description: This is a business plan for a remote patient monitoring (RPM) platform that helps clinicians keep track of their patients with obstructive sleep apnea (OSA). The idea is that, through RPM, clinicians can increase patient adherence to treatment, thereby driving better patient outcomes. The business plan outlines the problem, the solution, a description of the product, an analysis of the market and its competitors, a proposed business model, the team, lessons learned to date, and next steps in implementation. This business plan was submitted as part of my MBA degree.

Design: As a co-founder of this startup, I led most aspects of this project. The idea for the project was conceived with my co-founder, Dr. Edward Mezerhane. Dr. Mezerhane provided his expertise on OSA and how he uses RPM in his practice. I then performed a literature review on RPM to better understand how it works, how it is reimbursed by insurers, and how it may be applied to respiratory care. I then created a survey and led interviews to elicit more opinions from other sleep medicine specialists in both academia and private practice. Using their responses, Dr. Mezerhane and I worked together to come up with the design of our current business model. This project was also part of an MBA course, Field X, during which I worked with advisors, including Dr. Randolph Cohen, who helped me refine my business plan.

Execution: I developed the initial survey (see Appendix) and then met with four sleep medicine specialists at Harvard to obtain more in-depth interviews. I analyzed the responses from our physician feedback, and then developed a business model idea with Dr. Mezerhane. Dr. Mezerhane then enrolled ten patients from his clinic in a study to track their data over time, make interventions as needed, and assess whether it is billable. Dr. Mezerhane de-identified the patient data, and I was responsible for performing the monitoring of data and providing updates to Dr. Mezerhane. This work is ongoing and will be used to determine whether outsourced monitoring is possible and whether the business model needs to be modified.

Analysis: I performed the analysis of the physician surveys and interviews and came up with the five major pain points as reported by clinicians. Currently, I am performing the analysis of sleep data from the ten patients that Dr. Mezerhane enrolled in this study. I am tracking their data over time (using metrics such as adherence rate, apnea-hypopnea index, reimbursability, etc.) and will use this data to continue modifying the business model.

Writing: I wrote the business plan which I submitted as part of an MBA course requirement. I also prepared the original Pitch Deck for this startup which I delivered as a final presentation at Harvard Business School. Dr. Mezerhane and Dr. Cohen supervised my work and provided resources and guidance throughout the project. All collaborators reviewed the final business plan.

Appendix

Business Plan as Submitted to the MBA Degree

“MonitAir”

A Remote Patient Monitoring Platform for Sleep Apnea

Ricardo De Armas

1. Executive Summary:

MonitAir is a remote patient monitoring platform for doctors who treat patients with obstructive sleep apnea (OSA). The treatment for OSA is positive airway pressure (PAP), but 34% of patients are non-adherent. Remote patient monitoring (RPM) can be used by clinicians to improve adherence rates, but the current systems for remote patient monitoring are difficult and require a lot of time to do. Thus, MonitAir aims to improve the remote patient monitoring experience, with the end-goal of improving patient outcomes (i.e., increasing adherence rates for patients on CPAP). The market size for sleep apnea is substantial, at around 4.5 million and expected to grow as awareness for sleep apnea grows. But sleep apnea is only the beginning, our vision is to dominate the entire respiratory care space. MonitAir is built on a profit-sharing business model, essentially making it a triple-win scenario: 1) improved outcomes for patients, 2) new and increased revenue streams for physicians, and 3) substantial earning potential for MonitAir. We have assembled the perfect team to be able to deliver on the objectives of MonitAir. Currently, we are two co-founders: 1) Ricardo De Armas, an MD/MBA Candidate at Harvard and 2) Edward Mezerhane, MD, a leading expert in Sleep Medicine with over 5,000 patients on CPAP.

2. Problem:

The treatment for obstructive sleep apnea is continuous positive airway pressure but 34% of patients are non-adherent.⁶ Remote patient monitoring can be used by clinicians to improve adherence rates, but the current systems for remote patient monitoring are difficult and require a lot of time to do.

2.1 Overview of Obstructive Sleep Apnea

Definition: Obstructive sleep apnea is a disorder in which breathing repeatedly stops (“apneas”) or is shallower than normal (“hypopneas”). It is caused by partial or complete collapse of the upper airways during sleep.¹ Clinically, OSA is defined as an apnea-hypopnea index (i.e., AHI or the amount of apnea and hypopnea episodes in one hour of sleep) greater than five episodes.³

Prevalence: OSA is a common chronic respiratory disorder, estimated to affect 15 to 30 percent of male adults and 5 to 15 percent of female adults. The risk factors for sleep apnea include older age, male gender, obesity, craniofacial and upper airway abnormalities, and other medical conditions (e.g., commonly end-stage renal disease, congestive heart failure, chronic lung disease, etc.).¹⁷

Diagnosis: Typically, the presenting complaint of patients with OSA is daytime sleepiness, or their partners complain of increased snoring, gasping, or choking during the middle of the night. Generally, diagnostic testing is done in patients who complain of excessive daytime sleepiness **and** two of the following: snoring, witnessed apnea, gasping, choking, or diagnosed hypertension. The diagnosis is made with either in-laboratory polysomnography (PSG) or home sleep apnea testing (HSAT), depending on the patients presenting complaints and related comorbidities.¹²

Treatment: For patients with OSA, behavior modification is recommended, including weight loss (if obese), exercising, changing sleep position, and abstaining from alcohol. However, the gold standard in initial treatment for patients with severe OSA is positive airway pressure, the most common being continuous positive airway pressure (CPAP). For patients who fail CPAP as initial therapy, other options available including an oral appliance, hypoglossal nerve stimulation, or surgical therapy in those whom neither option was effective. The only curative treatment for OSA is substantial weight loss or successful corrective surgery.^{4,7,8}

2.2 The Problem with OSA

OSA requires periodic follow-up by a clinician to confirm adequate treatment, assess symptom resolution, and promote adherence to treatment. In fact, the most important time to closely monitor a patient is in the beginning, as adherence over the first few days of starting treatment is the best predictor of long-term adherence.⁶ Typically, patients should be followed-up frequently in the first few weeks to months after initiating CPAP to promote adherence and assess response, until they have sustained resolution of symptoms, at which point they should

be followed-up annually. This is the best-case scenario, as one of the biggest problems with OSA treatment continues to be adherence.^{7,8}

Today, the overall CPAP non-adherence rate is estimated to be 34% (i.e., meaning that 34% of all patients who are prescribed a CPAP do not use their CPAP for at least 4 hours a night on at least 21 out of 30 nights per month). The rate of non-adherence has remained persistently low over the last twenty years, and no significant improvement in adherence has been noted since then despite increased efforts towards behavioral modification.¹⁴ Among the most common factors listed by patients for non-adherence, patients report socio-economic factors, disease severity, psychological factors, and side effects including dry nose and mouth, mask leak, and nasal congestion.⁶

Currently, several studies have looked at ways to increase adherence among patients who use CPAP. These have included increasing education and behavioral therapy (though as the above paper would suggest, adherence has not changed in two decades despite increased efforts) as well as technological interventions and telemedicine, which is where MonitAir is focusing.¹⁴

3. Solution:

Remote patient monitoring is an adequate solution to increase adherence rates among patients who use CPAP; however, existing monitoring systems are difficult, require significant time, and are perceived to not be sufficiently reimbursed.

3.1 Remote Patient Monitoring Improves Patient Outcomes

Remote patient monitoring is a tool whereby qualified health care professionals can remotely monitor patient's physiologic data with the end-goal of reducing clinic visits and providing early detection of patients' problems. It works in conjunction with FDA-approved devices that generate data (e.g., CPAPs, blood pressure cuffs, glucometers, weight scales, etc.) and that can be accessed by health care professionals for review.

In November 2018, The Center for Medicare and Medicaid Services (CMS) released the 2019 Physician Fee Schedule and Quality Payment Program, which paved the way for connected services that enable providers to manage chronic care at their patient's home. Essentially, CMS released three new common procedural technology (CPT) codes which allow doctors to bill for RPM services. These codes are part of an effort to incentivize providers to do

closer monitoring of their patients and to separate PRM from telehealth, which is more restricted.

The three new CPT codes are: 1) CPT 99453 (for “initial set-up and patient education on the use of equipment for remote monitoring of physiologic parameters”), 2) CPT 99454 (for “initial device supply with recording or programmed alert transmission, each 30 days”), and 3) CPT 99457 (for “remote physiologic monitoring treatment management services, 20 minutes or more of clinical staff/physician/other qualified health care professional time in a calendar month requiring interactive communication with the patient during that month”).¹³

In practice, remote patient monitoring works via a four-step process. The first step is for the health care provider to enroll the patient in RPM, upon the patient’s approval that they will be monitored remotely and that the health care provider has permission to call the patient periodically to see how they are doing and to propose changes in management as needed. The second step is to set the patient up with a device, in this case a CPAP. The third step is for the device to collect data and to transmit it to a cloud where it can be accessed by a physician. For this to happen, the device must be FDA-approved, and the site must be HIPPA-compliant. Finally, the fourth step is for a health care professional (note: it could be any qualified professional, either a physician, nurse, or other clinical staff) to review this data remotely every month for at least 20 minutes and to make any interventions as needed.

Essentially, this new proposal gave way to tremendous potential for enabling rural and urban areas to use connected health, giving patients more locations to access care, including in their own homes. This marks a historic change in regard to increasing access to care, especially for those patients who are unable to visit health care facilities as prescribed.^{5,16}

In the world of OSA, remote monitoring of CPAP has been studied, showing that RPM allows monitoring of disease progression as well as the detection of acute events. More importantly, it has shown that adherence to treatment of CPAP can be increased as a result of more monitoring and reassurance for the patient, while simultaneously reducing the number of follow-up visits.^{5,11}

3.2 The Problems with Remote Patient Monitoring Today

Despite its proven ability to increase adherence for CPAP treatment, remote patient monitoring comes with its set of difficulties. I interviewed 11 sleep medicine specialists in the Harvard system (i.e., across the Massachusetts General Hospital, Beth Israel Deaconess Medical Center, and Brigham and Women’s Hospital) as well as private practice practitioners to

better understand their experiences, including the promises and pitfalls, with remote patient monitoring.

Pros: When asked about the benefits of RPM, the sleep medicine specialists unanimously agreed that RPM is extremely useful in helping them track their patients' response to treatment and to make any changes in management before the patient is even seen in clinic. To highlight two common threads, the doctors stated, "RPM lets me **know** how my patients are doing" and "RPM lets me see my patients **earlier** in clinic if they need my help." Awareness and timely intervention are seen as two key benefits of RPM, which translate to increased perceived adherence for their patients on CPAP.

Cons: On the contrary, the sleep medicine specialists noted far more difficulties with RPM, which is the reason why only 2 out of the 10 specialists we interviewed even bill for RPM. Among these, doctors noted five common pain points: 1) "RPM is not worth the **effort**," 2) "I do not have **time** to monitor all of my patients," 3) "It is **difficult** to know who is doing well and who is not," 4) "I cannot keep **track** of patients I monitored or contacted," and 5) "I did not **know** you could bill for RPM." As commonly reported by these specialists, they are extremely busy seeing patients on a regular basis and the added 20 minutes per patient per month for monitoring does not fit into their schedule.

4. Product:

MonitAir aims to improve the remote patient monitoring experience for physicians who treat patients with sleep apnea, with the end-goal of improving patient outcomes (i.e., increasing adherence rates for patients on CPAP).

4.1 MonitAir

Currently, there are two major manufacturers of CPAP machines (ResMed and Philips Respironics). Together, these constitute over 80% of CPAPs prescribed by sleep medicine specialists. Both ResMed and Phillips have online user interfaces for providers, ResMed AirView and Phillips Care Orchestrator respectively, which allow providers to monitor their patients' adherence and response to treatment remotely. However, there are problems with these existing systems, chiefly that they are not easy-to-use and do not display information in a manner that is clinically-relevant to physicians who want to know which patients are doing well and which are doing poorly, or how much time they have spent reviewing each chart.

Thus, MonitAir seeks to change that by providing a remote patient monitoring platform that targets the two main pain points described by clinicians: difficulty and time. To address the difficulty component, MonitAir is an online platform that connects with CPAP devices (i.e., will be able to collect data from ResMed and Phillips machines) and displays it in a clinically-relevant way, allowing doctors to easily identify which patients are in the mild, moderate, and severe categories. These decisions are based on a set of parameters, notably adherence by the patient, AHI, breathing patterns, etc. Additionally, the platform will allow the provider to track how much time has been spent monitoring each patient and whether any interventions have been made (e.g., communications with the patients, changes in therapy, requests to come to clinic earlier, etc.).

The second, and more important, part of MonitAir is its outsourced monitoring service. MonitAir will provide clinical staff (i.e., nurses to start and medical assistants later on) who will be reviewing the data for physicians. As we learned, physicians do not have time to do the remote patient monitoring themselves, but fortunately, CMS has realized this and now allows for monitoring to be done by other “qualified health care professionals,” which includes clinical staff. This is a win-win situation, as doctors who do not have time will still be able to keep track of their patients and intervene as needed, while at a cheaper cost to us since nurses and medical assistants, though incredibly hard-working, do not command as high of a salary as their physician counterparts.

To summarize, MonitAir does three jobs: 1) collects data for doctors, 2) provides nurses/medical assistants who analyze that data for doctors, and 3) intervenes as needed and provides monthly reports to doctors to let them know how their patients are doing.

4.2 Our Customers

Our customers are sleep medicine specialists. Sleep medicine is a board-certified specialty practiced by a variety of sub-specialists, including internists, neurologists, pulmonologists, and otolaryngologists. There are over 2,500 American Academy of Sleep Medicine (AASM)-accredited sleep centers in the United States, each of which has a board-certified sleep medicine physician and an expertly trained team of health care professionals. Membership to AASM is a strong indicator of adherence to quality patient care and safety. Presently, there are approximately 7,500 board-certified sleep medicine physicians in the country.¹⁰ This means that the majority of patients with sleep apnea who are on CPAP are managed by one of these physicians. From a sales perspective, this is ideal because it means

that sales efforts would only be targeted towards the physicians where most users of CPAP are concentrated. Additionally, these physicians practice in two different settings: private practice and academic teaching hospitals. At least in the beginning, private practice will be the easiest to penetrate given less bureaucratic hurdles and ease of working directly with the physician rather than larger health system organizations.

5. Market Opportunity:

The market size for sleep apnea is substantial, at around 4.5 million and expected to grow as awareness of sleep apnea grows, but sleep apnea is only the beginning, the vision is to dominate the respiratory space.

5.1 Market Size

According to the National Healthy Sleep Awareness Project, there are at least 25 million adults in the United States with obstructive sleep apnea. Of these, about 4.5 million are currently being treated with CPAP.^{2,9} This number is expected to continue growing as awareness for the disease continues to grow and more patients undergo diagnostic testing.

Though the total addressable market is the 25 million patients with sleep apnea, MonitAir's target market is the 4.5 million who are currently being treated. Assuming 34% are non-adherent, that means around 1.5 million U.S. adults are not using their CPAP machines appropriately.

5.2 Our Vision

Sleep apnea is just the beginning; our vision is respiratory. For MonitAir, the objective is to dominate remote patient monitoring for chronic respiratory care. In addition to OSA, this includes other highly prevalent diseases like chronic obstructive pulmonary disease (COPD) which is estimated to affect 25 million U.S. adults and asthma which is estimated to affect 24 million U.S. adults. Going after the respiratory care market is ideal and feasible given that many of the doctors who treat OSA (i.e., pulmonologists with sleep medicine training) also treat patients with COPD and asthma. The market is currently untapped and entering a smaller demographic of patients with sleep apnea will allow us to optimize our processes that we plan to leverage to be able to enter the COPD and asthma spaces.

6. Competition:

Given the recency of the CMS billing codes, the market for remote patient monitoring is still ripe, let alone the respiratory care segment, which is currently untapped.

6.1 Existing Competition

The timing for remote patient monitoring could not be any more perfect given the release of the new CPT codes by CMS in early 2019. Since then, a few startups have sprung up, though mostly focusing on RPM for the treatment of hypertension, one of the most prevalent diseases. Hypertension is an easy target not only given the prevalence of disease, but also the ubiquity of devices used to measure hypertension that collect data and the wide range of physicians that treat hypertension. Not to mention, the business case for RPM in hypertension is undisputed, especially given the importance of early detection in hypertension for the prevention of strokes and other serious medical conditions. Thus, the rise of RPM gave way to a few startups focused on this chronic disease, some of which include QARDIO, Sentinel Healthcare, Vivify Health, and Myia. These startups have done remarkably well since their launch, like for example, Sentinel Healthcare who has already raised over \$2M in a round led by PSL Ventures.¹⁵

What this means is that the respiratory segment has been left completely untapped, which presents a unique opportunity for MonitAir which is focused on OSA, and later COPD and Asthma. We are uniquely positioned to take full advantage of this market white space, while coming in at a later time where we are able to benefit from the learnings of the startups tackling the hypertension space.

6.2 Potential Future Competitors

As RPM becomes more mainstream, we expect the number of businesses to enter the space to continue increasing. RPM as a business model can truly be applied to any chronic disease, ranging from hypertension to sleep apnea and even diabetes. Any chronic disease which involves capture of physiologic data to make management decisions is well-suited for an RPM intervention. This implies that it will not be long before new startups, or even the existing ones, will begin to enter the respiratory segment. Because of this, we are incentivized to move fast to capture as many of the 7,500 board-certified sleep medicine physicians as is possible early on.

7. Business Model:

MonitAir is designed to improve the remote patient monitoring experience for physicians, while engaging in a profit-sharing business model to make it a triple-win scenario: 1) improved outcomes for patients, 2) new and increased revenue streams for physicians, and 3) substantial earning potential for MonitAir.

7.1 Customer Value Proposition

Our customer value proposition is: “For sleep medicine physicians who do not have the time or resources to keep track of their patients’ CPAP data for sleep apnea, our product is a new remote patient monitoring platform that provides a user interface and outsourced monitoring of data by our own clinical staff who will monitor data for them and intervene as needed to promote increased adherence among patients.”

7.4 Profit Formula

MonitAir is built on a profit-sharing model, meaning that we split reimbursements with our customers, the sleep medicine physicians. Based on our interviews with physicians, they reported a 50:50 split would be appropriate for doctors to share their data with us and for us to do the monitoring and analysis of that data.

Currently, Medicare (and other insurers who have seen the benefits of remote patient monitoring in terms of preventing worsening of medical conditions that may lead to hospitalizations and the increased costs associated with that) are reimbursing about \$50 per patient per month for CPT code 99457.¹³ Under this code, a qualified health care professional is required to monitor a patient for at least 20 minutes per month to be able to bill for it. Under a 50:50 split, that means MonitAir would make \$25 per patient per month, and the doctor would also make \$25 per patient per month, essentially for only having to share their data with us.

At this rate, the earning potential is substantial. Given a market size of 4.5 million patients on sleep apnea, capturing just 1% of the market (45K patients) translates to about \$14M in revenue per year to us. At 5% (225K patients), that is about \$68M per year, and at 10% (450K patients), that is about \$135M per year.

This means incredible earning potential for physicians as well. Assuming a typical sleep medicine specialist has 1,000 patients on CPAP and enrolls all those patients in RPM, that

translates to about \$300,000 of additional revenue per year without having to work for it. Because of this, we believe the sales for MonitAir would be relatively effortless.

8. Team:

We have assembled the perfect team to be able to deliver on the objectives of MonitAir. Currently, we are two co-founders: 1) Ricardo De Armas and 2) Edward Mezerhane, MD.

Ricardo De Armas: Ricardo is an MD/MBA candidate at Harvard Medical School and Harvard Business School. Prior to his MD/MBA, Ricardo obtained a Bachelor of Science in Mechanical Engineering at the Massachusetts Institute of Technology (MIT). There, he worked on a variety of research projects and internships in the digital health care space, building a technical skill set which has enabled him to execute projects in collaboration with engineers and physicians.

Edward Mezerhane, MD: Dr. Mezerhane is a board-certified Internist and Sleep Medicine Physician. He is also Physician-Owner of Sleep Medicine Specialists of South Florida, a physician group that treats patients with any sleep disorder, the primary focus being obstructive sleep apnea. Currently, Dr. Mezerhane treats more than 5,000 patients with sleep apnea.

9. Lessons Learned:

To date, we have done customer interviews, continuously refined our business model, and began to monitor a set of 10 patients in Dr. Edward Mezerhane's own clinic to prove that this model is reimbursable under Medicare. Our lessons so far include:

1. **Stickiness:** Outsourced monitoring of patient data is necessary to ensure that our product is sticky. Without it, it would be easy for a doctor to start billing for RPM on their own, and it would not solve the key pain point, which is that doctors do not have time to monitor while sustaining a busy clinical practice.
2. **Qualified reviewers:** Under the CMS billing code, the reviewing of data can be done by any qualified health care professional, which is core to our business model. This means that a nurse or a medical assistant could do it, which comes at a lower cost than having a physician do the reviewing. Additionally, we are looking into the possibility of hiring

clinical staff abroad, though the Medicare billing codes do not make any reference to this at the moment.

3. **Scalability:** To achieve scale, our approach is to target the private practice doctors first. We learned this during our customer interviews, having interviewed doctors from both practice settings. While both are interested in RPM as a tool, the academic physicians realize the difficulty in introducing such a system in a large bureaucratic organization where there would be significant hurdles before we would be able to access that data. Because of this, we will start with private practice, gain a foothold, and transition to academia at a later point once we have proven our model.
4. **No need to complicate:** We initially thought the user-interface was critical to our business model. However, this came with its own set of challenges. Notably, given that there are two large manufacturers of CPAP (ResMed and Phillips) with their own user-interfaces, our ability to access their data depends on whether they are willing and able to share their APIs with us. We realized that though this may be important later on, it is certainly not necessary now as we begin to enroll our patients on our own and track patient data within Dr. Edward Mezerhane's own practice.

10. Next Steps:

Our path forward involves beta testing our business model, hiring expert medical device sales staff, and scaling our business.

1. **Beta-testing MVP:** We need to prove that the business model works, and there is no better way to do that than in Dr. Mezerhane's clinic. We have already enrolled 10 patients and are monitoring that data to prove that it is billable over a 2-3-month period. Doing so will allow us to identify the kinks in our design and modify them in a low-cost and quick way.
2. **Hiring the right sales staff:** We have been in contact with mentors in the medical device sales space. Our goal will be to prove the model in our clinic and then begin to expand to other private practice clinics. To do that, we need sales staff in the medical device space who are familiar with CPAPs and with RPM as a technology.
3. **Achieving scale:** To achieve maximal scale, we need our sales staff to capture the 7,500 board-certified sleep medicine specialists with the highest concentration of patients on CPAP. This is where we will require the greatest investment (we expect in

the range of several hundreds of thousands) to be able to hire the right sales staff and nurses to grow the business.

Sample Physician Survey

Survey: Remote Patient Monitoring (RPM) for Sleep Apnea

My name is Ricardo De Armas and I am an MD/MBA student in my final year at Harvard. I am working on a project to facilitate remote patient monitoring (RPM) for doctors who treat patients with sleep apnea. I am most interested in how you monitor your patients outside of the clinical setting and what you perceive to be the benefits and limitations of RPM. Thank you!

1. What is your clinical practice setting?

- Academic
- Private
- Other

2. Do you monitor your patients on CPAP for sleep apnea remotely?

- Yes (if yes, answer 3-6)
- No (if no, answer 7-8)

3. WHY do you monitor your patients remotely?

Your answer

4. HOW do you monitor your patients remotely?

Your answer

5. What software do you use to monitor your patients on CPAP for sleep apnea?

Your answer

6. What would make your remote patient monitoring experience better?

Your answer

7. What is preventing you from monitoring your patients remotely?

Your answer

8. What would have to change to enable you to monitor your patients remotely?

Your answer

9. Is time a constraint in your ability to monitor patients remotely?

Yes

No

10. If yes, would you monitor patients remotely if you had support from your clinical staff (ie, nurse or medical assistant)? What if the support was outsourced?

Your answer

11. Is software a constraint in your ability to monitor patients remotely?

Yes

No

12. If yes, what would you change about the software to enable you to monitor patients remotely?

Your answer _____

13. Are you aware that remote patient monitoring is billable?

Your answer _____

Submit

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