

Advancing Asthma Care with RRM[™]

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Introduction

The healthcare industry is ever-evolving to address an array of existing and new challenges like chronic disease management, preventive care, access to care, and rising healthcare costs. And with population health management (PHM) always at the forefront, providers are looking for innovative ways to design better health services, identify care gaps, improve their patient's current health, predict future health issues, and reduce overall healthcare costs.

An ongoing industry-wide PHM focus coupled with the recent global pandemic has accelerated the adoption of remote patient monitoring (RPM). But beyond the pandemic, RPM is quickly becoming the new standard of care and an invaluable tool to help with many if not all of the healthcare challenges listed above – especially with chronic disease management which requires frequent monitoring and insight between in-person visits.¹ And with over 260 million people diagnosed with asthma worldwide and \$82 billion in healthcare costs in the US alone, this is a good area to dive in and see how RPM can help.

ASTHMA^{2,3}



260M+ global diagnosed



455k+ global deaths / yr



\$80B+ US healthcare costs / yr

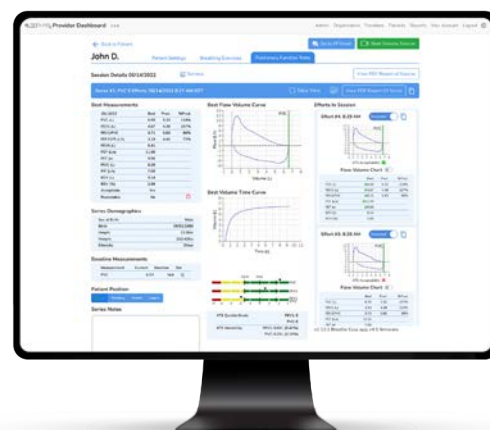


\$3,226 US cost pp / yr

This article will review at a high-level how remote respiratory monitoring (RRM) can be a powerful tool for asthma care management from confirming diagnosis, identifying triggers, measuring medication effectiveness, timely intervention, and monitoring patients over time. My team and I crafted this article to share the information, ideas, and tried practices we've gathered from our most progressive customers from both the clinical and research side.

What is Remote Respiratory Monitoring?

Remote respiratory monitoring (RRM) is an extension of remote patient monitoring that is specific to tracking pulmonary health in chronic respiratory and neurodegenerative conditions. The **ZEPHYRx Remote Respiratory Monitoring™ Solution** combines a cloud-based provider dashboard with real-time video coaching, and MIR's FDA-cleared Spirobank® Smart Spirometer connected with bluetooth to our Breathe Easy patient app – enabling patients to perform a pulmonary function test (PFT) anytime, anywhere with data sent to their provider in real-time. **Providers can obtain their preferred pulmonary function test: FVC, SVC, and/or Peak Flow.**



Is RRM Data Reliable?

This is one of the first questions we hear from providers and researchers – is the data reliable and how does it compare to in-clinic lab spirometry? There are dozens of studies comparing the personal MIR Spirobank® Smart spirometer with in-clinic lab spirometers. These studies show that yes, the data is reliable and equivalent to data from lab spirometers. Here are a few studies that have used the ZEPHYRx RRM platform:

- The PrecISE asthma network just completed a pilot phase of a study to compare video-coached remote spirometry with in-person spirometry in patients with severe asthma – utilizing the ZEPHYRx RRM Solution. The preliminary results show that remote spirometry with real-time video coaching provides a reliable FEV1 measurement which correlates closely with in-person spirometry and is suitable for use in clinical trials.⁴
- “Impact of Portable Spirometers in Delivery of Cystic Fibrosis Care Via Telehealth” – The results showed that home spirometry with ZEPHYRx can be an important part of routine CF care to minimize patients’ visits to the clinic and therefore exposure to pathogens.⁵
- “Feasibility and Acceptability of Home Spirometry in the Adolescent Cystic Fibrosis Population” – The results showed that home spirometry is an accurate, consistent and feasible tool to monitor the pediatric CF population remotely.⁶

Visit zephyrx.com/studies to learn more.

Asthma Care Management

Asthma care management focuses on diagnosis, treatment control symptoms and routine follow-up to ensure adequate control, as well as the provider and patient working together to create an “asthma care plan”. There are two primary focuses of treatment:

- **Reduce impairment** – this includes reducing the severity and frequency of symptoms which will reduce the impact on daily function.
- **Reduce risk** – this is done through reducing the risk of future complications from asthma including asthma attacks and impacts on lung function.³

An effective care plan is essential to managing asthma and by incorporating RRM, it can be more convenient, continuous, and effective. Let’s dive-in and see how an RRM program can take asthma care management to a new level.

Confirm Asthma Diagnoses with RRM

Asthma can be difficult to diagnose for a few reasons:

- there is no “gold standard” test
- a diagnosis is based on evidence of recurring respiratory symptoms, which means a patient should be tested multiple times over a period of time
- episodic symptoms include chest tightness, shortness of breath or cough, and wheezing, but a reliable diagnosis cannot be based on symptoms alone
- asthma shares symptoms with many other conditions which leads to potential misdiagnosis

- and most importantly – the most widely available tests (peak flow and spirometry) may be normal when performed in-clinic unless the patient is experiencing an exacerbation at time of testing⁷

In addition, a third of asthma patients may be misdiagnosed, according to a study published in JAMA. This study also found that over 49% of the participants were not subjected to objective testing procedures, such as serial peak flow testing, bronchial challenge testing, or spirometry.⁸ Treating asthma prior to performing these objective tests decreases the patient's sensitivity and can make confirmation of the diagnosis even more difficult. Both over and under diagnosis are associated with inappropriate treatment and may be potentially harmful to the patient.⁹

Importance of Spirometry in Asthma Diagnosis

Objective assessments of pulmonary function are necessary for the diagnosis of asthma because medical history and physical examination are not reliable means of excluding other diagnoses or of characterizing the status of lung impairment. Although physicians generally seem able to identify a lung abnormality as obstructive, they have a poor ability to assess the degree of airflow obstruction or to predict whether the obstruction is reversible. Furthermore, pulmonary function measures often do not correlate directly with symptoms. For diagnostic purposes, spirometry is generally recommended over measurements by a peak flow meter in the clinician's office because there is wide variability even in the published predicted peak expiratory flow (PEF) reference values.¹⁰

So, all the evidence is pointing to a positive asthma diagnosis for your patient but you want confirmation before prescribing medication and creating a care plan...

Enroll your patient into an RRM program to monitor the patient in real-time and very close to the incident, rather than waiting for a clinic visit which may be very far removed from the episode. ZEPHYRx ships a spirometer directly to your patient. Our customer support team onboards the patient remotely – because we handle that for you. The patient is able to perform an independent PFT during an exacerbation (after a few live coaching sessions from your clinical team). The results are sent to the ZEPHYRx Provider Dashboard in real-time for you to review and confirm diagnosis.

Identify Triggers to Avoid Future Exacerbations with RRM

Current questionnaire-based assessments of breathing symptoms focus on disease severity and control, not on the risk of exacerbation. Although it may seem intuitive that patients who have the most severe disease are at highest risk of exacerbations, many patients with “mild” disease and “good” control experience exacerbations that require expensive emergency department visits. Nearly half of all the money spent on direct medical care for asthma is for urgent outpatient clinic and emergency department visits and hospitalizations.¹⁰

You've confirmed your patient has asthma and need to identify triggers in order to predict and hopefully prevent future exacerbations...

Since triggers may not always develop symptoms, having the ability to collect objective data will help determine if there is any sort of bronchoconstriction or airway inflammation occurring. Here's an example of how RRM can be used to identify potential triggers:

- You request the patient to perform an independent PFT once per day for two weeks – or more frequently if they're symptomatic.
- The patient receives notifications on their mobile device for every PFT to support adherence - patient performs PFTs as scheduled.
- You receive results in real-time and determine if there's a correlation between potential triggers and lung function decline.

→ You identify triggers and develop a care plan; when the patient should take their bronchodilator and what maintenance meds to take to avoid future exacerbations.

Measuring Medication Effectiveness with RRM

You've identified the triggers – now you need to find the right medication plan...

Here's an example of how RRM can better enable you to measure the effectiveness of your patient's medication and proactively adjust their care plan as needed:

A patient is prescribed an inhaled steroid due to decline in lung-function and asthma related symptoms during in-clinic visit. Respiratory Therapist (RT) schedules a remote follow-up appointment using the ZEPHYRx RRM solution.



- 1 RT performs remote 2-week follow-up PFT** via real-time video coaching call. Patient symptoms persist and lung function has not improved.



- 2 RT exports PDF results for physician to review in EMR.** Physician prescribes new inhaled steroid and requests follow-up remote PFT in 2 weeks.



- 3 RT performs remote 2-week follow-up PFT** via real-time video coaching call. Patient symptoms and lung-function have improved.



- 4 RT exports PDF results for physician to review in EMR** – requests patient to perform independent PFTs once a month for 3 months.

Timely Intervention for Improved Patient Outcomes with RRM

“I have used the ZEPHYRx solution twice in the last 10 days with a teenager who has severe asthma, and have been able to keep my patient out of the Emergency Department both times. Having home spirometry for her has helped with my decision making and helped to reassure her and her mother that she is safe to stay at home.”

– An asthma doc from a large children's hospital

ASTHMA US³



1 in 10 children



#1 reason kids miss school



\$529 ED visit pp

This is a perfect example of how RRM enables providers to detect declining lung function remotely for timely intervention. Had this patient not been enrolled in an RRM program, they would've made two unnecessary trips to the emergency department within ten days.

Our solution helps care teams to validate symptoms (i.e., a patient is feeling a wheeze, cough, shortness of breath, etc.). Since symptoms can be subjective, it's important for care teams to have objective data. Oftentimes patients will call into a nurse triage line when experiencing

symptoms. If the practice is utilizing an RRM program, they'll notify the care team who can invite the patient to a real-time video coaching session, or advise the patient to perform an independent PFT. Results are sent in real-time and the care team can determine next steps whether that is modifying medications, requesting an in-clinic visit, or sending the patient to the emergency room if needed. In addition, the care team can receive alerts when a patient has a 10% decline in FEV1, for example.

Monitoring Asthma with RRM

Self-monitoring by the patient is a crucial aspect of asthma management. Utilizing an RRM program, you and your patient have a plethora of tools available to encourage care plan adherence. Let's say you want your patient to perform recurring independent PFTs for a specific timeframe to monitor their lung function and communicate care plan progress. Here are some of the tools within our solution that can help:

→ **Real-Time Video Coaching:** The ZEPHYRx Provider Dashboard and Breathe Easy patient app boast a built-in video call feature enabling clinical teams to interact with patients in real-time and coach them on their PFT, review care plan progress, etc.



Watch how an RT coaches an asthma patient through their first PFT
<https://bit.ly/ZXrtvc>

- **PFT Task Notifications:** Assign single or recurring patient PFT tasks and schedule automated reminders. Patients will receive a notification and can instantly launch the Breathe Easy app to view their tasks, ensuring timely completion of their PFTs.
- **Alerts for Changes in Lung-Function:** Set up automated alerts that are triggered when a patient's PFT series falls below the threshold of a selected data trend: baseline, previous, or time.
- **Historical Trends:** Our platform turns your patient's historical PFT data into a trending visualization tool allowing you to monitor your patient's lung function over any selected timeframe.



- **Gamified Breathing Exercises:** The Breathe Easy app boasts 8+ breathing exercise games to encourage patients to better manage their own respiratory health – and have fun doing it! We gamify well-known, medically-proven respiratory exercises that have been shown to help those with asthma.

A New Revenue Stream with RRM Reimbursement

With an RRM program, you can bring a new level of care to your patients AND generate a new revenue stream for your practice. We know how important and challenging reimbursement can be – especially when it's constantly evolving. We've just released our 2022 Remote Spirometry Reimbursement Guide with up-to-date CPT® codes. We have a team dedicated to reimbursement – they work with industry experts to ensure we stay ahead of the curve, which means our customers do too.



Conclusion

Remote respiratory monitoring can be a powerful tool for comprehensive asthma care management – from diagnosis to long-term lung health monitoring. With an RRM program, you can deliver a new level of care to your patients, increase satisfaction, and improve patient outcomes.

Want to test the waters with our RRM Asthma Starter Program?

This program includes everything from complementary spirometers for your patients, reimbursement training, and a quick reference guide for RRM frequency to help you get up and running fast!

Contact Sales for more information by visiting zephyrx.com/contact.



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Baylie (Miller) Spence, RRT, graduated from the respiratory therapy program at Utah Tech University and is currently pursuing her BS in Healthcare Administration/Management. She has 2+ years' experience as a registered respiratory therapist and is passionate about using innovative solutions to improve patient outcomes in the respiratory space, which is one of the reasons she joined ZEPHYRx as National Sales Executive. In her former healthcare role, she was a super user and brand champion of the ZEPHYRx solution, and experienced first-hand the value it brought to the practice and her patients.

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ABOUT ZEPHYRX

ZEPHYRx is a health information technology innovator and leading provider of end-to-end remote respiratory monitoring (RRM) solutions for providers and researchers. Our solutions combine a cloud-based provider dashboard with real-time video coaching, patient mobile app and MIR's FDA-cleared Smart Spirometer, and are a cost-effective alternative to in-person pulmonary function testing. Since our inception in 2019, our solution has helped to transform our customer's practices and clinical trials, enabling them to extend their pulmonary lab beyond its physical walls and into the patient's home. Our mission is to empower patients to actively manage and improve their own respiratory health through leading-edge technology and gamification. We strive to increase RRM adoption and play an integral role in supporting our customer's goals of improved patient outcomes.