

Valuation of Remote Therapeutic Monitoring: Competitive Environment

With Medicare’s recent decision to cover remote therapeutic monitoring (RTM),¹ it is anticipated that the number of providers utilizing RTM with their patient panels will significantly increase, which growth (as of now) is limited only by the supply of RTM devices (which will be discussed further in the forthcoming fifth installment in this series) and the conditions that RTM may monitor. Currently, the use of RTM is limited to musculoskeletal and respiratory conditions. Consequently, RTM demand is driven by those with chronic musculoskeletal and respiratory conditions who may benefit from the services.

Musculoskeletal conditions, also known as musculoskeletal disorders (MSDs), are diseases or injuries of the skeletal and muscular systems that may cause acute or chronic pain and interfere with daily activities.² MSDs occur in all major body areas, such as hands, arms, feet, and legs, and include a wide variety of conditions of the muscles, bones, and joints.³ MSDs affect more than 50% of U.S. adults, approximately 75% of whom are 65 and older.⁴ A 2017 Global Burden of Disease study indicated that MSDs were the second highest contributor to global disability, with 20-33% of people living with an MSD.⁵ In 2015, more than 124 million adults (approximately 50.1 per 100 persons in the U.S.) reported having an MSD, an increase from 2005 (48.3 per 100 persons in the U.S.).⁶ MSDs remain the most often reported medical condition in the U.S., exceeding the prevalence for both circulatory and respiratory diseases.⁷

MSDs can also result from chronic overuse of a particular muscle or joint, which can cause repeated *micro-traumas*, i.e., repetitive and more subtle events occurring over time, to the musculoskeletal system.⁸ Such “*overuse injuries*” are generally more subtle than acute injuries, which are usually a result of *macro-trauma*, i.e., a single, traumatic event.⁹ Overuse injuries are often treated with rest, ice, physical therapy (PT), and anti-inflammatory medicine;¹⁰ however, in some cases, reconstructive surgery may be necessary in order to stabilize the joints or replace the torn ligament if the injury is severe enough.¹¹

Other factors such as obesity can create additional erosion of the musculoskeletal system, not unlike the micro-trauma associated with overuse injuries. Similar to obesity, arthritis is a chronic condition that can cause significant damage to a patient’s musculoskeletal system.

Arthritis is one of the most common forms of MSD, and the disease is the leading cause of disability in the U.S., with approximately 91.2 million individuals in 2015 either having physician-diagnosed arthritis and/or reporting symptoms consistent with an arthritis diagnosis.¹² By 2040, it is expected that 25.9% of the U.S. adult population (78.4 million people) will have physician-diagnosed arthritis.¹³ The most common form of arthritis is *osteoarthritis* (affecting 30.8 million American adults), a degenerative or “*wear and tear*” disease that erodes the cartilage in the body’s joints, such as the hands, knees, and hips, and causes pain, swelling, loss of motion, and disability.¹⁴ As osteoarthritis worsens, bones may break down, develop growths, or chip off, causing inflammation and pain.¹⁵ Specifically, individuals with sports injuries (both acute and overuse) are more likely to develop osteoarthritis.¹⁶

From 2012 to 2014, the U.S. spent over \$882 billion on medical services related to MSDs.¹⁷ Additionally, MSDs create significant indirect economic burdens on patients and the healthcare industry, accounting for nearly one-third of the injuries involving days away from work.¹⁸ A 2013 study investigating the indirect economic costs of MSDs found that people who have “*increasing levels of difficulty [in] performing physical activities*” due to an MSD are more likely to miss work.¹⁹ These indirect costs, e.g., lost productivity and product defects, can amount to up to five times the direct costs.²⁰ Another study found that the indirect cost due to earnings losses for U.S. adults with MSDs from 2012 to 2014 totaled \$1,490 per person on average, or \$97.5 billion in total.²¹ Both direct and indirect costs due to MSDs in the U.S. represented an estimated 5.76% of the *gross domestic product* (GDP) between 2012 and 2014.²² These figures illustrate both the loss of productivity for individuals, as well as the increased burden on government programs, caused by MSDs. It is hoped that RTM can help effectively manage these conditions, which will not just result in reduced healthcare costs, but also reduced indirect costs resulting in increased productivity.

Respiratory conditions, also known as respiratory diseases, are some of the most common non-communicable diseases in the world.²³ These conditions include, but are not limited to, chronic obstructive pulmonary disease (COPD), asthma, interstitial lung disease, silicosis, and asbestosis.²⁴ In 2019, respiratory

disease accounted for 39.10 deaths per 100,000 in the U.S.²⁵

It is estimated that over 25 million Americans have asthma; although the prevalence of asthma has increased since the 1980s, the death rate has been decreasing for the past 25 years.²⁶ Risk factors for asthma include family history, childhood respiratory infections, and being overweight. In 2017-2018, over 42% of Americans were classified as obese (up from 30.5% in 1999-2000),²⁷ which may partially explain the rise in asthma prevalence over the past four decades. While asthma affects all sexes, races, and ages, asthma morbidity and mortality rates are higher among African Americans, Puerto Ricans, Americans living below the federal poverty level, and Americans with certain workplace exposures.²⁸

Further, approximately 14.8 million American adults have been diagnosed with COPD, although an additional 12 million are estimated to have COPD but have not yet been diagnosed; COPD is the 4th leading cause of death

in the U.S.²⁹ COPD is largely caused by exposure to cigarette smoke.³⁰ As of 2019, approximately 34.1 million adults smoked cigarettes (14% of all American adults), a decrease from 2005 rates (20.9% of all American adults).³¹ Although the use of traditional cigarettes has decreased, electronic cigarette usage has increased. In 2018, approximately 8.1 million American adults were active e-cigarette smokers,³² and in 2022, 2.5 million middle and high school students (approximately 1 in 10 students) were current e-cigarette smokers.³³

The market for RTM may experience increasing demand in the coming years, due to an aging U.S. population and the growing prevalence of musculoskeletal and respiratory conditions. These factors may augment the number of individuals that are candidates for RTM. However, RTM's requisite reliance on one or more FDA-approved devices may serve as a ceiling on the swiftness with which providers can adopt and bill for RTM.

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