validity of commercial sleep monitoring devices

Understanding the Validity of Commercial Sleep Monitoring Devices

validity of commercial sleep monitoring devices is a topic of increasing interest as more consumers turn to wearable technology and smart home gadgets to track and improve their sleep. These devices promise valuable insights into sleep patterns, duration, and quality, but discerning their accuracy and reliability is crucial for users seeking meaningful health information. This comprehensive article delves into the scientific underpinnings of sleep monitoring, examines the different types of commercial devices available, and critically evaluates their validity against established sleep science principles. We will explore the technologies employed, the metrics they measure, and the factors that influence their precision, ultimately guiding readers on how to interpret the data they receive and understand the limitations inherent in consumer-grade sleep trackers.

What are Commercial Sleep Monitoring Devices?

Commercial sleep monitoring devices encompass a wide array of consumer-oriented technologies designed to collect data about an individual's sleep. These can range from simple wrist-worn fitness trackers to more sophisticated bedside sensors and even smart mattresses. Their primary aim is to provide users with actionable insights into their sleep habits, helping them identify potential issues and make lifestyle adjustments for better rest. The market for these devices has exploded in recent years, driven by a growing awareness of sleep's importance for overall health and well-being. Understanding the scope of these devices is the first step in evaluating their validity.

These devices often leverage a combination of sensors to gather information. For instance, accelerometers detect movement, while optical heart rate sensors measure pulse. Some devices incorporate microphones to detect snoring or ambient sound, and others utilize infrared or radar technology to monitor breathing patterns. The data collected is typically processed by proprietary algorithms to estimate sleep duration, sleep stages, and other sleep-related metrics. The accessibility and user-friendly nature of these devices have made them popular tools for self-monitoring, but their clinical-grade accuracy is often a subject of debate.

How Do Commercial Sleep Monitors Work?

The underlying mechanisms by which commercial sleep monitors operate vary significantly depending on the device type. Wrist-worn trackers, the most common category, primarily rely on accelerometry to infer sleep. By detecting the absence or reduction of movement over a prolonged period, these devices estimate when a person has fallen asleep and woken up. This method is a proxy for sleep, assuming that stillness correlates with sleep onset and wakefulness. More advanced wristbands also incorporate photoplethysmography (PPG) sensors to measure heart rate and heart rate variability (HRV), which can offer additional clues about the body's physiological state during sleep.

Bedside monitors, such as smart mats or radar-based devices, often employ different technologies. Some detect breathing patterns by sensing subtle movements of the chest or abdomen. Others can infer sleep by analyzing shifts in body temperature or even through non-contact radar waves that measure respiration and heart rate. Smart alarm features, present in many devices, aim to wake users during lighter sleep stages to reduce grogginess. The complexity of the algorithms used to interpret the raw sensor data is a critical factor in the overall functionality and perceived validity of these devices.

Key Metrics Tracked by Sleep Devices

Commercial sleep monitoring devices typically report on several key metrics, each aiming to provide a snapshot of sleep quality and quantity. The most fundamental metric is **sleep duration**, which is the total time a person spends asleep within a given night. This is usually calculated by combining estimated sleep onset and wake-up times. Another crucial metric is **sleep efficiency**, defined as the percentage of time spent asleep while in bed. A higher sleep efficiency generally indicates more consolidated and restorative sleep.

Many devices also attempt to break down sleep into different stages, categorizing it into **light sleep, deep sleep, and REM (Rapid Eye Movement) sleep**. These stages are associated with different physiological processes and are vital for cognitive function and physical restoration. Furthermore, devices may track metrics like **time awake** during the night, **heart rate**, **respiratory rate**, and sometimes even **blood oxygen saturation**. The presence and accuracy of these metrics can significantly influence the perceived value and validity of a sleep monitoring device.

- Sleep Duration
- Sleep Efficiency
- Sleep Stages (Light, Deep, REM)
- Time Awake During the Night
- Heart Rate and Heart Rate Variability (HRV)
- Respiratory Rate
- Blood Oxygen Saturation (SpO2)

Scientific Basis of Sleep Monitoring Technology

The scientific basis for sleep monitoring stems from our understanding of human sleep architecture. Sleep is a complex, cyclical process characterized by distinct stages, each with unique electrophysiological and physiological signatures. These stages are traditionally identified in a laboratory setting using polysomnography (PSG), which involves recording brain waves (EEG), eye movements (EOG), and muscle activity (EMG). This gold-standard method allows for precise differentiation between wakefulness, NREM sleep (stages 1, 2, and 3), and REM sleep.

Commercial devices attempt to infer these stages and other sleep parameters using less invasive technologies. For instance, movement detected by accelerometers is used to estimate sleep and wakefulness. Changes in heart rate and HRV are correlated with different sleep stages, as the autonomic nervous system activity fluctuates throughout the sleep cycle. Respiratory rate variations also provide clues. While these correlations are scientifically established, translating these indirect measurements into accurate sleep stage classifications without the comprehensive data from PSG presents a significant challenge, impacting the direct validity of the consumer-level data.

The Validity of Sleep Stage Tracking

One of the most ambitious features of commercial sleep monitoring devices is their ability to track sleep stages. The validity of this feature is a key point of contention and research. Sleep stages are defined by specific patterns of brain activity, muscle tone, and eye movements, which are best captured by polysomnography (PSG). Consumer devices, particularly wrist-worn trackers, primarily rely on movement and heart rate data to infer these stages. Algorithms are trained on large datasets, correlating patterns of reduced movement and heart rate variability with known sleep stages from PSG studies.

However, studies have shown that while commercial devices can be reasonably good at distinguishing between wakefulness and sleep, their accuracy in differentiating between sleep stages, especially light, deep, and REM sleep, is often less reliable. Factors such as subtle movements, which might not fully interrupt sleep, can be misinterpreted by accelerometers. Similarly, heart rate can be influenced by various factors unrelated to sleep stage. Consequently, while the data may offer a general trend or estimate, it should not be considered a definitive diagnostic tool for sleep architecture. The validity of sleep stage tracking is therefore considered moderate at best for most consumer devices.

Accuracy of Heart Rate and Respiratory Rate Monitoring

The accuracy of heart rate and respiratory rate monitoring in commercial devices is generally more robust than sleep stage tracking. Optical heart rate sensors (PPG) have become quite sophisticated and, when worn correctly, can provide reasonably accurate readings of resting heart rate and heart rate during sleep. Numerous studies have demonstrated a good correlation between PPG readings from wearables and electrocardiogram (ECG) measurements, especially during periods of stable heart rate. This allows for valuable insights into cardiovascular health during sleep and can help identify

potential issues like nocturnal bradycardia or tachycardia.

Respiratory rate monitoring, however, is a more varied landscape. Some devices infer breathing by analyzing subtle movements detected by accelerometers or by sensing changes in the pulsatile nature of the blood flow measured by PPG. Others may use dedicated microphones to detect breathing sounds. The accuracy of these methods can vary. While some advanced devices demonstrate promising correlations with medical-grade respiratory rate monitoring, others can be more prone to error, particularly in environments with ambient noise or for individuals with irregular breathing patterns. Nonetheless, the trend and general patterns of heart rate and respiration can still offer useful, albeit not always perfectly precise, information.

Environmental Factors and Sleep Monitoring Validity

The validity of data collected by commercial sleep monitoring devices can be significantly influenced by environmental factors. For instance, ambient light and noise levels in the bedroom can affect sleep quality and, consequently, the data recorded. Some devices incorporate microphones to detect snoring or ambient noise, but their ability to precisely quantify the impact of these disturbances on sleep architecture can be limited. Similarly, if a device is worn loosely or too tightly, it can affect the accuracy of heart rate readings. Even temperature fluctuations in the sleep environment can play a role in sleep physiology and, indirectly, in the data captured by sensors.

Furthermore, the presence of a sleeping partner, pets, or even significant movement of bedsheets can lead to motion artifacts that are misinterpreted by the device. For devices that rely on sound detection, external noises like a passing siren or a partner's snoring could be misclassified as user-generated sleep events. Users should be aware that these external influences can introduce noise and potential inaccuracies into the collected sleep data, thus impacting the overall validity of the reported metrics. Optimizing the sleep environment is not only beneficial for sleep itself but also for ensuring more reliable data from monitoring devices.

Comparing Consumer Devices to Polysomnography (PSG)

Comparing the data from commercial sleep monitoring devices to polysomnography (PSG) provides a crucial benchmark for assessing their validity. PSG is the current gold standard for diagnosing sleep disorders and

analyzing sleep architecture. It employs a comprehensive suite of sensors that directly measure brain electrical activity (EEG), eye movements (EOG), muscle activity (EMG), airflow, oxygen saturation, and heart activity. This direct measurement allows for highly accurate identification of sleep stages, respiratory events, and other physiological phenomena.

Commercial devices, in contrast, rely on indirect measurements and algorithms. While they have made significant strides, they generally cannot replicate the diagnostic precision of PSG. For instance, while a wearable might classify time spent in bed as sleep, PSG can precisely differentiate between light, deep, and REM sleep. Similarly, a wearable might detect a lower oxygen saturation, but PSG is essential for diagnosing conditions like sleep apnea by analyzing specific breathing patterns and desaturation events. Therefore, consumer devices are best viewed as tools for general sleep tracking and trend analysis, not as substitutes for medical-grade diagnostic testing.

Factors Influencing the Validity of Commercial Devices

Several factors can influence the validity of data obtained from commercial sleep monitoring devices. The most significant is the underlying technology and the sophistication of the algorithms used to interpret sensor data. Different manufacturers employ proprietary algorithms, and their accuracy can vary. The quality and placement of sensors also play a crucial role; a poorly fitted wristband, for example, can lead to inaccurate heart rate readings.

Individual physiological differences are another critical factor. A person's unique heart rate patterns, movement habits during sleep, and even body composition can affect how the device interprets data. For instance, individuals with very little movement during sleep might be misclassified as being in a deeper sleep stage by accelerometers. Finally, the context of use is important; a device used during periods of illness, stress, or travel might produce data that deviates from a person's typical sleep patterns, and the device's algorithms may not always accurately account for these variations, impacting the perceived validity of the readings.

In summary, the validity of commercial sleep monitoring devices is a multifaceted issue influenced by:

- Technological sophistication and algorithmic design.
- Sensor quality and proper device fit.
- Individual physiological characteristics.

- The user's sleep environment and habits.
- The specific sleep metric being measured.

Interpreting Sleep Data and Its Limitations

Interpreting the data provided by commercial sleep monitors requires a nuanced understanding of their capabilities and limitations. While these devices can offer valuable insights into sleep duration, consistency, and general trends, they are not diagnostic tools. For example, a device might report a low percentage of deep sleep. While this could indicate a potential area for improvement, it does not automatically signify a sleep disorder. The algorithms are estimations, and the reported numbers should be viewed as approximations rather than precise measurements.

Users should focus on longitudinal trends rather than single-night data. Observing patterns over weeks or months can reveal more meaningful insights into the impact of lifestyle changes on sleep quality. It is also important to correlate device data with subjective feelings of restfulness. If a device reports "good" sleep but the user feels fatigued, their subjective experience should be prioritized. Over-reliance on potentially inaccurate metrics can lead to unnecessary anxiety or misguided self-treatment. Therefore, a healthy skepticism and a balanced approach to data interpretation are essential for maximizing the benefits of these devices.

When to Consult a Professional for Sleep Concerns

While commercial sleep monitoring devices can be useful for tracking general sleep patterns, they are not a substitute for professional medical advice. If you are experiencing persistent sleep problems such as chronic insomnia, excessive daytime sleepiness, loud snoring, or pauses in breathing during sleep, it is crucial to consult a healthcare professional. These symptoms could be indicative of underlying sleep disorders like sleep apnea, restless legs syndrome, or narcolepsy, which require proper diagnosis and treatment.

A doctor or a sleep specialist can perform a clinical evaluation and, if necessary, order a formal polysomnography (PSG) study. This medical-grade assessment provides a comprehensive picture of sleep architecture and physiological functions during sleep, enabling accurate diagnosis. Data from a commercial sleep monitor might provide a starting point for discussion with your doctor, but it should not be used to self-diagnose or manage complex sleep conditions. Prioritizing professional medical guidance ensures that any

sleep concerns are addressed effectively and safely.

FAQ: Validity of Commercial Sleep Monitoring Devices

Q: Can commercial sleep monitoring devices accurately measure sleep stages?

A: Commercial sleep monitoring devices can provide an estimation of sleep stages (light, deep, REM sleep), but their accuracy is generally lower than medical-grade polysomnography (PSG). They primarily rely on movement and heart rate data, which can be less precise than the brain wave and muscle activity measurements used in PSG. While they can distinguish between wakefulness and sleep reasonably well, differentiating between sleep stages is often less reliable.

Q: How accurate are fitness trackers for measuring sleep duration?

A: Most modern fitness trackers are quite good at estimating sleep duration. They typically use accelerometers to detect movement. A prolonged period of little to no movement is generally interpreted as sleep. While they may not pinpoint the exact moment of sleep onset or wakefulness with clinical precision, the overall sleep duration reported by reputable brands is usually within an acceptable range for general tracking purposes.

Q: Can I rely on my commercial sleep monitor to diagnose sleep apnea?

A: No, you cannot rely on commercial sleep monitoring devices to diagnose sleep apnea. While some devices can detect potential signs such as a lowered blood oxygen saturation or irregular breathing patterns, a formal diagnosis requires a sleep study (polysomnography) conducted by a medical professional. These consumer devices are not designed for medical diagnosis and lack the comprehensive sensor suite and diagnostic capabilities needed for sleep apnea detection.

Q: What is the difference in accuracy between wrist-worn trackers and bedside sleep monitors?

A: The accuracy can vary significantly between different brands and models of both wrist-worn trackers and bedside monitors. Wrist-worn devices primarily rely on accelerometry and PPG. Bedside monitors might use radar, sound, or other non-contact sensors. While some advanced bedside devices may offer slightly more stable readings by avoiding motion artifacts from the body,

neither category consistently matches the accuracy of PSG for detailed sleep analysis, especially for sleep staging.

Q: How do environmental factors affect the validity of sleep tracker data?

A: Environmental factors like ambient light, noise, and room temperature can influence both sleep quality and the accuracy of data collected by sleep monitors. For instance, external noises might be misidentified as snoring, or significant room temperature changes could affect heart rate readings. The presence of a partner or pets can also introduce motion that may be misinterpreted. These external influences can introduce inaccuracies into the collected sleep data.

Q: Are there specific sleep metrics from commercial devices that are more reliable than others?

A: Generally, metrics related to overall sleep duration and consistency tend to be more reliable than sleep stage breakdowns. Heart rate monitoring, when performed by a well-calibrated sensor and worn correctly, can also be reasonably accurate. However, the accuracy of respiratory rate monitoring can vary widely between devices. Sleep stage classification remains the least reliable metric across most commercial sleep monitoring devices.

Q: When should I consult a doctor about my sleep based on data from a sleep tracker?

A: You should consult a doctor if your sleep tracker data reveals persistent issues that concern you, or if you experience symptoms like chronic fatigue, difficulty falling asleep or staying asleep, loud snoring, observed breathing pauses during sleep, or excessive daytime sleepiness, regardless of what your tracker shows. Data from a tracker can be a useful starting point for discussion, but it is not a diagnostic tool.

Q: Do sleep monitoring apps offer similar validity to wearable devices?

A: Sleep monitoring apps that rely solely on a smartphone's microphone or accelerometer typically have lower validity compared to dedicated wearable devices. They are more susceptible to external noise interference and may not capture the subtle physiological cues that wearables can detect. While they can offer very basic estimations of sleep duration and movement, their accuracy for detailed sleep analysis is limited.

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of sleep deprivation, and public policy implications of poor sleep - Contains accessible reviews that point to relevant literature in often-overlooked areas, serving as a helpful guide to all relevant information on this broad topic area

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validity of commercial sleep monitoring devices: Psychiatric Illness Across the Menstrual Cycle Leah Susser, Liisa Hantsoo, Lauren M. Osborne, 2025-02-25 Menstrual cycle-related exacerbations of psychiatric illnesses and premenstrual disorders are prevalent and associated with significant morbidity. While menstrual cycle-related exacerbations are common and for certain disorders have been associated with severity and with poorer treatment response, the field remains largely understudied. We currently know little about the specific patterns of exacerbation for most psychiatric illnesses and how to treat them. Premenstrual disorders have gained more attention in research; however, many women do not respond to the currently available treatments, and novel pharmacotherapies are needed. This Research Topic aims to further our knowledge and recognition of both menstrual cycle-related exacerbations and of psychiatric illnesses limited to certain phases of the menstrual cycle. Research is needed on prevalence, patterns across the menstrual cycle, and the characteristics, pathophysiology, and treatment of these menstrual cycle-related conditions.

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validity of commercial sleep monitoring devices: *Ear-Centered Sensing: From Sensing Principles to Research and Clinical Devices, Volume II* Martin Georg Bleichner, Preben Kidmose, Jérémie Voix, 2023-11-28 This Research Topic is part of the Ear-Centered Sensing: From Sensing Principles to Research and Clinical Devices series: From Sensing Principles to Research and Clinical Devices, Volume I The human ears are an attractive location for bio-signal acquisition. Heart rate, respiratory rate, eye blink and eye motion signals and skin conductance, as well as the electrical activity from muscles and the brain can be recorded from the ear. Moreover, the ears provide a discreet and natural anchoring point for placing the necessary wearable hardware, thereby reducing

the visibility of integrated devices. We define ear-centered sensing as monitoring physiological signals with sensors located in the ear canal, in the pinna, or around the ear. Ear-centered sensing allows data recording over extended periods of time in everyday situations with little disturbance for the users. The combination of physical measurements such as motion, temperature and moisture, and electrophysiological measurements, such as electroencephalography (EEG), electrocardiography (ECG), electromyography (EMG), electrooculography (EOG), and electrodermal activity (EDA), for example, integrated over long time periods, will help to gain a better understanding of psycho-physiological processes. Ear-centered sensing is therefore of interest for scientific, diagnostic and therapeutic purposes and we believe that it will play a significant role in future mobile health applications. As the ear is an unconventional place for monitoring these physiological measures, a common challenge for ear-centered sensing is to gain a better understanding of the signals that are recorded at this location. The questions that need to be answered are: How does the signal (e.g. ECG, or EEG) acquired at the ear relate to the signal as acquired at the classical recording sites? Which signals are ear-centered systems sensitive to, which signals are lost? How can we reliably discriminate in real time signals from artifacts? And finally, how do we interpret data that is acquired over extended periods of time when we have little or no control over the recording environment? For the sensing of physiological signals over extended periods of time dedicated sensor and amplifier technology is needed that is convenient to use, robust and reliable. People wearing these sensors should not be restricted in their activities. Hence, for long-term usage sensor and amplifier technology need to be unobtrusive in every aspect: the materials need to be biocompatible, adjust to the individual's anatomy and be comfortable to wear. They need to be sufficiently robust to allow for continued usage and self-fitting, and they need to be small and inconspicuous. The electronic instrumentation, including bio-signal conditioners and amplifiers, analog-to-digital converters, means for signal processing and wireless transmission need to be sufficiently small and light-weight to be placed at the ear together with the sensors. The power supply has to be secured either by low-power electronics or by smart ways to recharge the battery, or even by harvesting body energy. For the tiny signal changes, as produced for example by brain activity amplifiers need to be sensitive enough to detect them while maintaining robust artifact rejection capabilities.

validity of commercial sleep monitoring devices: Advances in Childhood Sleep Assessment: Tools for Specific Populations Catherine Mary Hill, Carmen M. Schroder, Karen Spruyt, 2021-04-13

validity of commercial sleep monitoring devices: *Wearable Sensor Technology for Monitoring Training Load and Health in the Athletic Population* Billy Sperlich, Hans-Christer Holmberg, Kamiar Aminian, 2020-02-13 Several internal and external factors have been identified to estimate and control the psycho-biological stress of training in order to optimize training responses and to avoid fatigue, overtraining and other undesirable health effects of an athlete. An increasing number of lightweight sensor-based wearable technologies (“wearables”) have entered the sports technology market. Non-invasive sensor-based wearable technologies could transmit physical, physiological and biological data to computing platform and may provide through human-machine interaction (smart watch, smartphone, tablet) bio-feedback of various parameters for training load management and health. However, in theory, several wearable technologies may assist to control training load but the assessment of accuracy, reliability, validity, usability and practical relevance of new upcoming technologies for the management of training load is paramount for optimal adaptation and health.

validity of commercial sleep monitoring devices: Sleep and Sport Michael A. Grandner, Amy B. Athey, 2024-07-07 **Selected for 2025 Doody's Core Titles® in Sports Medicine**The relationship between sleep and both mental and physical performance in athletes has become a key issue over the past several years. Sleep and Sport: Physical Performance, Mental Performance, Injury Prevention, and Competitive Advantage for Athletes, Coaches, and Trainers aims to synthesize the growing scientific evidence in this area to help researchers, clinicians, and others interested in sport to understand the fundamentals of sleep health and how these factors relate to athletes.

Serving as an important bridge between the sleep and athletics field, this book educates sleep professionals about how their field of expertise relates to various aspects of athletics, while educating sports professionals about the basics of sleep and how it relates to their field of expertise. This is accomplished by explaining some of the basics of sleep health; reviewing the literature on sleep disorders, treatments, and risk factors for athletes; discussing ways that sleep health impacts physical and mental performance; and addressing key specific areas where these fields overlap. In all cases, this text will draw from the existing peer-reviewed literature, in order to provide evidence-based guidance that is objective and well explained. - Highlights the importance of sleep and its relations to various aspects of athletics - Provide useful, actionable, evidence-based suggestions for promoting sleep health in athletes - Contains accessible reviews that point to relevant literature in often-overlooked areas, serving as a helpful guide to all relevant information on this broad topic area

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validity of commercial sleep monitoring devices: Lifestyle Nursing Gia Merlo, Kathy Berra, 2022-08-23 Lifestyle medicine is an evidence-based approach to helping individuals and families adopt and sustain healthy behaviors in preventing, treating, and oftentimes, reversing chronic diseases. This fast-growing specialty operates off six main principles including nutrition, physical activity, stress resilience, cessation or risk reduction of substance use, quality sleep, and social connectivity. Nurses are the primary providers of hospital-based patient care and deliver most of the nation's long-term care. Within healthcare, nurses are often tasked with educating patients and families and are thereby well-positioned to address lifestyle intervention with patients. Lifestyle Nursing examines the concepts of lifestyle medicine and nursing practice, it is specifically designed to help nurses introduce the concepts of lifestyle medicine to readers while also encouraging them to focus on their own wellness. This book features nutritional guidelines and supplemental materials operationalizing this basic nutrition knowledge into personal and patient wellness. It addresses evidence-based findings of chronic diseases including heart diseases and stroke, type 2 diabetes, and cancers, which can often be prevented by lifestyle interventions. Drawing from nursing and medical literature, this volume in the Lifestyle Medicine series encourages incorporation of lifestyle principles into nursing practices professionally and personally which will lead to overall improved patient outcomes and happier, healthier nurses.

validity of commercial sleep monitoring devices: Sleep Apnea Frontiers Ahmed S. BaHammam, Mahadevappa Hunasikatti, 2024-02-19 This book delves into the multifaceted world of sleep apnea, presenting the latest advancements, challenges, and perspectives in the field. The book covers various topics, including neuro-stimulator use, positive airway pressure therapies, non-PAP and non-surgical treatments, surgical interventions, diagnosis and management of various sleep

apnea phenotypes and comorbidities, and special populations such as pediatric and intensive care unit patients. The book discusses the pathophysiology and mechanisms underlying sleep apnea, examining the role of circulating miRNA as a potential biomarker for diagnosis. It also addresses the adverse health consequences associated with sleep apnea, including cardiovascular disease, diabetes, cancer, and hypertension. Furthermore, the book explores the application of telemedicine and wearable technologies in diagnosing and treating sleep apnea, as well as the impact of external factors such as the COVID-19 pandemic and traffic safety concerns related to sleep deprivation and sleep disorders. The book also highlights the importance of perioperative assessment and management of patients with sleep disorders, the role of REM sleep in sleep disorders, recent advances in sleep during pregnancy and postpartum, and the influence of sleep disturbances on hospitalized and intensive care unit patients. With contributions from experts in the field, this book offers valuable insights into the current state of sleep apnea research and practice, serving as a solid foundation for healthcare professionals, researchers, and students interested in understanding and addressing this prevalent sleep disorder. By providing a comprehensive overview of the field, this book aims to inspire further research and innovation in the diagnosis, treatment, and management of sleep apnea and related sleep disorders.

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and healthcare professionals worldwide. This book contains the 110 papers (from 160 submissions) accepted for the 18th annual International Conference on Informatics, Management, and Technology in Healthcare (ICIMTH 2020), held virtually in Athens, Greece, from 3 – 5 July 2020. The conference attracts scientists working in the field of Biomedical and Health Informatics from all continents, and this year it was held as a Virtual Conference, by means of teleconferencing, due to the COVID-19 pandemic and the consequent lockdown in many countries around the world. The call for papers for the conference started in December 2019, when signs of the new virus infection were not yet evident, so early submissions were on the usual topics as announced. But papers submitted after mid-March were mostly focused on the first results of the pandemic analysis with respect to informatics in different countries and with different perspectives of the spread of the virus and its influence on public health across the world. This book therefore includes papers on the topic of the COVID-19 pandemic in relation to informatics reporting from hospitals and institutions from around the world, including South Korea, Europe, and the USA. The book encompasses the field of biomedical and health informatics in a very broad framework, and the timely inclusion of papers on the current pandemic will make it of particular interest to all those involved in the provision of healthcare everywhere.

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