

# The economic value of treating OSA with PAP therapy

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**By reducing acute care costs and improving management of high-cost comorbidities, PAP therapy offers a compelling opportunity to reduce total cost of care.**

Obstructive sleep apnea (OSA) affects an estimated 54 million US adults, yet the majority remain undiagnosed or undertreated. Untreated OSA drives substantial and preventable healthcare expenditures through increased hospitalizations, comorbid disease progression, and workplace-related claims. Positive airway pressure (PAP) therapy is the standard of care for OSA and has been shown not only to improve clinical outcomes but also to deliver measurable economic value by reducing healthcare resource utilization, improving productivity, and mitigating long-term risk in high-cost comorbid populations.

## Economic burden of untreated OSA

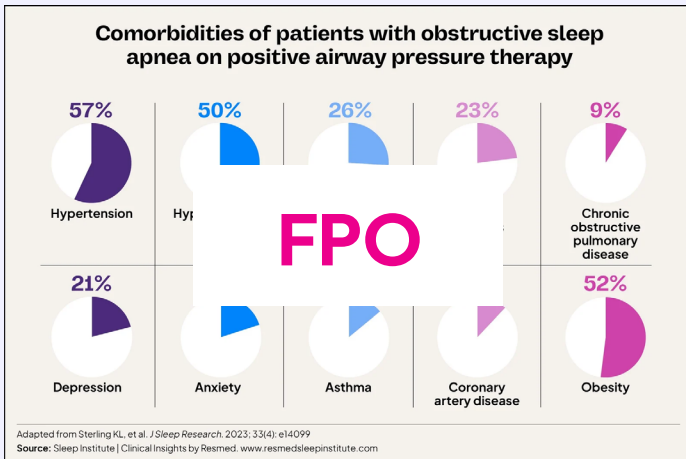
Undiagnosed and untreated OSA imposes a significant and preventable economic burden, estimated at \$202.9 billion\* annually in the US.<sup>1</sup> Despite affecting over 50 million adults, with prevalence projected to rise to 76 million by 2050, up to 80% of cases go undiagnosed, driven by low public awareness and missed screening opportunities in primary care.<sup>1,2,3,4</sup> Untreated OSA leads to higher rates of cardiovascular and metabolic disease, excessive medical costs (\$2,645–\$5,288\* more per year per patient), increased motor vehicle and workplace accidents, and lost productivity.<sup>1,5</sup> Addressing this unmet need offers a strong return on investment.

Treating undiagnosed OSA would cost an estimated \$67.1 billion\*, yielding a 3:1 ROI through reduced healthcare utilization and improved workforce performance.<sup>1,6</sup>

## Cost effectiveness of PAP therapy in treating OSA

PAP therapy is the standard of care for moderate to severe OSA and is well-established as both clinically effective and cost-effective. Multiple health economic analyses demonstrate that PAP therapy delivers high value, with cost-effectiveness ratios frequently falling below \$20,000 per quality-adjusted life year gained, well within accepted thresholds for chronic disease interventions.<sup>7,8</sup> Importantly, these clinical gains translate into real-world cost savings. Within 12 months of initiating and adhering to PAP, all-cause hospitalizations decreased by 31% and emergency services utilization declined by 28%.<sup>9</sup> On average, adherent patients yield at least \$480 in net annual savings per patient compared to non-adherent patients, underscoring the financial benefit of supporting early initiation and long-term adherence.<sup>9,10</sup>

## Impact of PAP therapy on high-cost comorbidities



### Common and costly OSA comorbidities

Many patients with OSA are living with common, and often costly, comorbid conditions.<sup>9</sup> When OSA is untreated in these populations, it can exacerbate the symptoms and negative outcomes associated with those comorbidities, driving up healthcare utilization and costs. As a result, the added healthcare burden is often misattributed to the comorbidity alone, while the underlying OSA remains unrecognized and untreated.

### Cardiovascular disease

In cardiovascular disease, OSA is a known contributor to hypertension, heart failure, atrial fibrillation, and stroke.<sup>11</sup> Adherence to PAP therapy has been shown to reduce major adverse cardiac and cerebrovascular events, enhance blood pressure control, and significantly lower cardiovascular-related hospitalizations.<sup>12,13,14</sup> Among patients with high-cost conditions such as heart failure and atrial fibrillation, PAP adherence is associated with annual hospitalization cost savings of approximately \$2.2k per patient,<sup>15,16</sup> underscoring its economic value in managing cardiometabolic risk.

### Respiratory disease

The coexistence of OSA and COPD (referred to as overlap syndrome) is associated with significantly

worse outcomes and a higher burden of comorbidities than either condition alone.<sup>17</sup> Untreated overlap syndrome is linked to lower survival rates compared to patients with COPD alone or treated overlap syndrome.<sup>18,19</sup> Evidence shows that treatment with PAP not only improves survival but also reduces hospitalizations related to COPD exacerbations.<sup>18,19</sup> For patients with COPD, adherence to PAP has been associated with annual savings of approximately \$2.7k per patient,<sup>20</sup> highlighting a meaningful opportunity for cost containment within a high-risk, high-cost population.

### Metabolic disorders

Studies consistently demonstrate that the prevalence of OSA is up to 60% in patients with type 2 diabetes and even higher in those with coexisting obesity.<sup>21,22</sup> PAP therapy has been shown to improve insulin sensitivity and glycemic control, making it a valuable adjunct to diabetes management programs.<sup>23,24</sup> Adherence to PAP therapy in patients with type 2 diabetes is associated with annual healthcare savings of approximately \$675 per patient,<sup>25</sup> offering scalable savings potential across large diabetic populations where comorbidity burden and utilization rates are high.

### Mental health conditions

Symptoms of anxiety and depression are increasingly prevalent in the US, with recent estimates indicating that one in five adults has experienced symptoms in the past 2 weeks.<sup>26</sup> The bidirectional relationship between disturbed sleep and mental health conditions is well-documented, as each can exacerbate the severity and reduce the treatment efficacy of the other. In depressed patients with coexisting OSA, PAP therapy has been associated with improvements in mental health outcomes, including reductions in depression symptoms and decreased use of antidepressant medications.<sup>27,28,29</sup> These clinical benefits translate into economic value, with PAP adherence linked to lower mental health-related care utilization and annual hospitalization cost savings of approximately \$1k per patient.<sup>30</sup>

## Impact of positive airway pressure (PAP) on high cost comorbidities in patients with obstructive sleep apnea

PAP adherence has been associated with substantial annual hospitalization savings across common high cost comorbidities

Chronic comorbidity	FPO		1 year average ER & hosp cost savings per adherent patient atrial fibrillation
Atrial fibrillation <sup>1</sup>			ER: ↓\$192 Hosp: ↓\$2,283
Heart failure (rEF) <sup>2</sup>			ER or hosp: ↓\$2,379
Heart failure (pEF) <sup>3</sup>	Hosp or ER ↓34%	↓\$2,878	ER: ↓\$291 Hosp: ↓\$2,381
Chronic obstructive pulmonary disease <sup>4</sup>	Hosp ↓48%, ER ↓32%	↓\$2,734	ER: ↓\$307 Hosp: ↓\$2,687
Type 2 diabetes <sup>5</sup>	Hosp ↓27%, ER ↓27%	↓\$675	Not published
Depression <sup>6</sup>	Hosp ↓26%, ER ↓26%	↓\$801	ER: ↓\$324 Hosp: ↓\$1,000

1. Sterling KL, et al. *J Am Heart Assoc*. 2024;13(9):e030679. 2. Malhotra A, et al. *J Am Heart Assoc*. 2023;12(10):e028732. 3. Cistulli PA, et al. *J Am Heart Assoc*. 2023;12(14):e028733. 4. Sterling KL, et al. *Am J Respir Crit Care Med*. 2022;206(21):197–205. 5. Sterling KL, et al. *J Clin Sleep Med*. 2023;19(3):563–571. 6. Wickwire DJ, et al. *J Affect Disord*. 2024;349:254–261.

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to optimize acceptance and regular use of PAP therapy.<sup>32</sup> Moreover, inconsistent coverage policies, burdensome documentation requirements, and fragmented reimbursement pathways discourage both initiation and continuation of therapy. To fully realize the economic and clinical benefits of PAP, targeted actions such as promoting and expanding the use of home-based diagnostic options, incentivizing adherence with value-based benefit designs, and embedding OSA management into broader chronic care frameworks should be taken.

## Conclusion

Treating OSA with PAP therapy is not only clinically effective, but a fiscally responsible investment. By reducing acute care costs and improving management of high-cost comorbidities, PAP therapy offers a compelling opportunity to reduce total cost of care. Strategic engagement in screening, access, and adherence optimization is critical to unlocking this value.

## Barriers to realizing economic value

Despite its strong value proposition, the economic potential of PAP therapy is constrained by system-level barriers. Underdiagnosis remains a critical challenge, driven by low awareness among both patients and providers, worsened by limited sleep assessments in routine care.<sup>1</sup> PAP adherence can be another limiting factor; tools like telemonitoring and patient engagement apps should be utilized

\* 2015 US \$ is converted to 2025 US \$. The dollar had an average inflation rate of 3.09% per year between 2015 and today, producing a cumulative price increase of 35.63%.

## References

- <sup>1</sup> Frost & Sullivan for American Academy of Sleep Medicine, "Hidden Health Crisis Costing America Billions," American Academy of Sleep Medicine, 2016. [Online]. Available: <https://aasm.org/wp-content/uploads/2017/10/sleep-apnea-economic-crisis.pdf>.
- <sup>2</sup> A. V. Benjafield, N. T. Ayas, P. R. Eastwood, R. Heinzer, M. S. Ip, M. J. Morrell, C. M. Nunez, S. R. Patel, T. Penzel, J.-L. Pepin, P. E. Peppard, S. Sinha, S. Tufik, K. Valentine and A. Malhotra, "Estimation of the global prevalence and burden of obstructive sleep apnoea: a literature-based analysis," *Lancet Respir Med*, vol. 7, no. 8, pp. 687–698, 2019. doi:10.1016/s2213-2600(19)30198-5.
- <sup>3</sup> T. Young, L. Evans, L. Finn and M. Palta, "Estimation of the Clinically Diagnosed Proportion of Sleep Apnea Syndrome in Middle-aged Men and Women," *Sleep*, vol. 20, no. 9, pp. 705–706, September 1997.
- <sup>4</sup> E. Boers, A. Allen, M. Barrett, A. Benjafield, L. Kaye, P. A. Cistulli, J.-L. Pepin, J. Armitstead and A. Malhotra, "An Estimate of the Prevalence of Obstructive Sleep Apnea in the United States into 2050," *Am J Resp Crit Care Med*, vol. 209, p. A3895, 2024.
- <sup>5</sup> M. Knauer, S. Naik, M. B. Gillespie and M. Kryger, "Clinical consequences and economic costs of untreated sleep apnea syndrome," *World J Otorhinolaryngol Head Neck Surg*, vol. 1, no. 1, pp. 17–27, 2015. doi:10.1016/j.wjorl.2015.08.001.
- <sup>6</sup> Frost & Sullivan, "In an Age of Constant Activity, the Solution to Improving the Nation's Health May Lie in Helping it Sleep Better," 2016 (1).
- <sup>7</sup> J. A. Weingarten, "Cost-Effectiveness of Continuous Positive Airway Pressure Therapy Versus Other Treatments of Obstructive Sleep Apnea," *Sleep Med Clin*, vol. 17, no. 4, pp. 559–567, 2022. doi:10.1016/j.jjsmc.2022.07.003.
- <sup>8</sup> S. R. Pendharkar, B. Kaambwa and V. K. Kapur, "The Cost-Effectiveness of Sleep Apnea Management – A Critical Evaluation of the Impact of Therapy on Health Care Costs," *Chest*, vol. 166, no. 3, pp. 612–621, 2024. doi:10.1016/j.chest.2024.04.024.

- <sup>9</sup> K. L. Sterling, N. Alpert, P. A. Cistulli, J.-L. Pepin, S. More, K. V. Cole and A. Malhotra, "Healthcare resource utilisation and costs in patients with treated obstructive sleep apnea," *J Sleep Research*, vol. 33, no. 4, p. e14099, 2023. doi: 10.1111/jsr.14099.
- <sup>10</sup> J. An, H. A. Glick, A. M. Sawyer, J. Arguelles, C. J. Bae, B. T. Keenan, S. T. Kuna, G. Maislin, D. R. Mazzotti, A. I. Pack, J. M. Shi, A. J. Watach and D. Hwang, "Association Between Positive Airway Pressure Adherence and Health Care Costs Among Individuals With OSA," *Chest*, vol. 163, no. 6, pp. 1543–1554, 2023. doi: 10.1016/j.chest.2023.01.025.
- <sup>11</sup> Y. Yeghiazarians, H. Jneid, J. R. Tietjens, S. Redline, D. L. Brown, N. El-Sherif, R. Mehra, B. Bozkurt, C. Ericson Ndumele and V. K. Somers, "Obstructive Sleep Apnea and Cardiovascular Disease: A Scientific Statement from the American Heart Association," *Circulation*, vol. 144, no. 3, pp. e56–e67, 2021.
- <sup>12</sup> M. Sanchez-de-la-Torre, E. Gracia-Lavedan, I. D. Benitez, A. Sanchez-de-la-Torre, A. Moncusi-Moix, G. Torres, K. Löffler, R. Woodman, R. Adams, G. Labarca, J. Dreyse, C. Eulenburg, E. Thunstrom, H. Glantz, Y. Peker, C. Anderson, R. D. McEvoy and F. Barbe, "Adherence to CPAP Treatment and the Risk of Recurrent Cardiovascular Events: A Meta-Analysis," *JAMA*, vol. 330, no. 13, pp. 1255–1265, 2023. doi: 10.1001/jama.2023.17465.
- <sup>13</sup> X. Hu, J. Fan, S. Chen, Y. Yin and B. Zrenner, "The role of continuous positive airway pressure in blood pressure control for patients with obstructive sleep apnea and hypertension: a meta-analysis of randomized controlled trials," *J Clin Hypertens*, vol. 17, no. 3, pp. 215–222, 2015. doi: 10.1111/jch.12472.
- <sup>14</sup> F. Sert-Kuniyoshi, K. Cole, A. Malik, C. Woodford, N. Alpert, W. McConnell and K. Sterling, "Positive Airway Pressure (PAP) Therapy Adherence and Cardiovascular-Related Healthcare Utilization (CVRHU) in 1 Year," *Sleep*, vol. 48, no. Supplement\_1, p. A318, 2025. doi: 10.1093/sleep/zsaf090.0731.
- <sup>15</sup> K. L. Sterling, N. Alpert, A. S. Malik, J.-L. Pepin, A. V. Benjafield, A. Malhotra, J. P. Piccini and P. A. Cistulli, "Association Between Sleep Apnea Treatment and Health Care Resource Use in Patients With Atrial Fibrillation," *J Am Heart Assoc*, vol. 13, no. 9, p. e030679, 2024. doi: 10.1161/JAHA.123.030679.
- <sup>16</sup> P. A. Cistulli, A. Malhotra, K. V. Cole, A. S. Malik, J.-L. Pepin, F. H. Sert Kuniyoshi, A. V. Benjafield and V. K. Somers, "Positive Airway Pressure Therapy Adherence and Health Care Resource Use in Patients With Obstructive Sleep Apnea and Heart Failure With Preserved Ejection Fraction," *J Am Heart Assoc*, vol. 12, no. 14, p. e028733, 2023. doi: 10.1161/JAHA.122.028733.
- <sup>17</sup> D. Adler, S. Bailly, M. Benmerad, M. Joyeux-Faure, I. Jullian-Desayes, P. Marina Soccia, J. P. Janssens, M. Sapene, Y. Grillet, B. Stach, R. Tamisier and J.-L. Pepin, "Clinical presentation and comorbidities of obstructive sleep apnea-COPD overlap syndrome," *PLoS One*, vol. 15, no. 7, p. e0235331, 2020.
- <sup>18</sup> J. M. Marin, C. G. Cote, O. Diaz, C. Lisboa, C. Casanova, M. V. Lopez, S. J. Carrizo, V. Pinto-Plata, L. J. Dordelly, H. Nekach and B. R. Celli, "Prognostic assessment in COPD: health related quality of life and the BODE index," *Respir Med*, vol. 105, no. 6, pp. 916–921, 2011.
- <sup>19</sup> J. M. Marin, J. B. Soriano, S. J. Carrizo, A. Boldova and B. R. Celli, "Outcomes in patients with chronic obstructive pulmonary disease and obstructive sleep apnea: the overlap syndrome," *Am J Respir Crit Care Med*, vol. 182, no. 3, pp. 325–331, 2010. doi: 10.1164/rccm.200912-1869OC.
- <sup>20</sup> K. L. Sterling, J.-L. Pepin, W. Linde-Zwirble, J. Chen, A. V. Benjafield, P. A. Cistulli, K. V. Cole, H. Emami, C. Woodford, J. P. Armitstead, C. M. Nunez, J. A. Wedzicha and A. Malhotra, "Impact of Positive Airway Pressure Therapy Adherence on Outcomes in Patients with Obstructive Sleep Apnea and Chronic Obstructive Pulmonary Disease," *Am J Respir Crit Care Med*, vol. 206, no. 2, pp. 197–205, 2022. doi: 10.1164/rccm.202109-2035OC.
- <sup>21</sup> S. Reutrakul and B. Mokhlesi, "Obstructive Sleep Apnea and Diabetes: A State of the Art Review," *Chest*, vol. 152, no. 5, pp. 1070–1086, 2017. doi: 10.1016/j.chest.2017.05.009.
- <sup>22</sup> G. D. Foster, M. H. Sanders, R. Millman, G. Zammit, K. E. Borradaile, A. B. Newman, T. A. Wadden, D. Kelley, R. R. Wing, F. X. P. Sunyer, V. Darcey and S. T. Kuna, "Obstructive sleep apnea among obese patients with type 2 diabetes," *Diabetes Care*, vol. 32, no. 6, pp. 1017–1019, 2009. doi: 10.2337/dc08-1776.
- <sup>23</sup> J. Herth, N. A. Sievi, F. Schmidt and M. Kohler, "Effects of continuous positive airway pressure therapy on glucose metabolism in patients with obstructive sleep apnoea and type 2 diabetes: a systematic review and meta-analysis," *Eur Respir Rev*, vol. 32, no. 169, p. 230083, 2023. doi: 10.1183/16000617.0083-2023.
- <sup>24</sup> L. Chen, J.-H. Pei and H.-M. Chen, "Effects of continuous positive airway pressure treatment on glycaemic control and insulin sensitivity in patients with obstructive sleep apnoea and type 2 diabetes: a meta-analysis," *Arch Med Sci*, vol. 10, no. 4, pp. 637–642, 2014. doi: 10.5114/aoms.2014.44854.
- <sup>25</sup> K. L. Sterling, P. A. Cistulli, W. Linde-Zwirble, A. Malik, A. V. Benjafield, A. Malhotra, K. V. Cole, H. Emami, C. Woodford, S. More, J. P. Armitstead, C. M. Nunez, S. Reutrakul and J.-L. Pepin, "Association between positive airway pressure therapy adherence and health care resource utilization in patients with obstructive sleep apnea and type 2 diabetes in the United States," *J Clin Sleep Med*, vol. 19, no. 3, pp. 563–571, 2023. doi: 10.5664/jcsm.10388.
- <sup>26</sup> E. P. Terlizzi and B. Zablotsky, "Symptoms of Anxiety and Depression Among Adults: United States, 2019 and 2022," National Health Statistics Reports, 2024.
- <sup>27</sup> M. L. Jackson, J. Tolson, R. Schembri, D. Bartlett, G. Rayner, V. V. Lee and M. Barnes, "Does continuous positive airways pressure treatment improve clinical depression in obstructive sleep apnea? A randomized wait-list controlled study," *Depress Anxiety*, vol. 38, no. 5, pp. 498–507, 2021. doi: 10.1002/da.23131.
- <sup>28</sup> C. Edwards, S. Mukherjee, L. Simpson, L. J. Palmer, O. P. Almeida and D. R. Hillman, "Depressive Symptoms before and after Treatment of Obstructive Sleep Apnea in Men and Women," *J Clin Sleep Med*, vol. 11, no. 9, pp. 1029–1038, 2015. doi: 10.5664/jcsm.5020.
- <sup>29</sup> A. Walker, M. T. Naughton, L. Shaw, A. T. Jeklin, C. Martin and E. Dabscheck, "Depression scores improve with continuous positive airway pressure in specialized sleep clinics: real-world data," *J Clin Sleep Med*, vol. 17, no. 6, pp. 1201–1209, 2021. doi: 10.5664/jcsm.9164.
- <sup>30</sup> E. M. Wickwire, K. V. Cole, R. B. Dexter, A. Malhotra, P. A. Cistulli, K. L. Sterling and J.-L. Pepin, "Depression and comorbid obstructive sleep apnea: Association between positive airway pressure adherence, occurrence of self-harm events, healthcare resource utilization, and costs," *J Affect Disord*, vol. 349, pp. 254–261, 2024. doi: 10.1016/j.jad.2023.12.055.
- <sup>31</sup> A. Malhotra, K. V. Cole, A. S. Malik, J.-L. Pepin, F. H. Sert Kuniyoshi, P. A. Cistulli, A. V. Benjafield and V. K. Somers, "Positive Airway Pressure Adherence and Health Care Resource Utilization in Patients With Obstructive Sleep Apnea and Heart Failure With Reduced Ejection Fraction," *J Am Heart Assoc*, vol. 12, no. 10, p. e028732, 2023. doi: 10.1161/JAHA.122.028732.
- <sup>32</sup> A. Malhotra, M. E. Crocker, L. Willes, C. Kelly, S. Lynch and A. V. Benjafield, "Patient Engagement Using New Technology to Improve Adherence to Positive Airway Pressure Therapy," *Chest*, vol. 153, no. 4, pp. 843–850, 2017. doi: 10.1016/j.chest.2017.11.005.