Continuous Positive Airway Pressure (CPAP)

Data Specification

This specification is for analytic teams conducting a population cost study comparing adherent and non-adherent OSA patients. This document defines the study population, inclusion and exclusion criteria, and codes required to capture all costs associated with OSA diagnoses and CPAP use.

OSA patients who are non-adherent to CPAP therapy carry materially higher rates of cardiovascular events, emergency department utilization, inpatient admissions, and comorbidity-related spending.

The resulting data pull allows for comparison of expenditures between two groups of patients with obstructive sleep apnea (OSA): confirmed device new starts that were adherent to CPAP therapy (intervention group) and those were non-adherent to CPAP therapy (control group). Adherence is defined as at least 4 hours per night on 70% of nights in a 30-day period within the first 90 days (standard Medicare definition used to support ongoing monthly reimbursement). The goal is to build a cost-of-healthcare (COHC) narrative as a data-supported case that demonstrates the financial impact of adherence on OSA-related medical and pharmacy spend. This evidence base is the foundation of a value-based program conversation between the at-risk organization and CPAP provider.

Definitions and measurement parameters

Parameter	Definition
Study Type	Retrospective cohort study using paid claims data
Population	Insured members with confirmed OSA diagnosis and paid CPAP device claim
Adherence	≥4 hours/night on ≥70% of nights in a 30-day period within the first 90 days (standard Medicare definition)
Measurement Window	12 months with a minimum 3-month runout
Index Date	Date of initial paid CPAP device claim
Prior Enrollment	Minimum 6 months continuous enrollment prior to index date

Inclusion Criteria

Criterion	Definition/Rationale
OSA Diagnosis	At least one paid medical claim with a qualifying OSA ICD-10 diagnosis code
CPAP Paid Device Claim	At least one paid HCPCS claim for a CPAP device or qualifying supply during the study window (POS 12)
Continuous Enrollment	No gap in eligibility/coverage during the measurement period

Exclusion Criteria

Criterion	Definition/Rationale
Prior Device Claims	No CPAP device claims within the preceeding 6 months of the Index Date
Pediatric members (age <18)	OSA adherence benchmarks and cost patterns differ materially in pediatric populations
Denied claims only	Members whose CPAP claims were entirely denied are not confirmed device recipients

Diagnosis, procedure, and device codes

OSA Diagnosis Codes - ICD-10-CM

ICD-10 Code	Description
G47.30	Sleep apnea, unspecified
G47.31	Primary central sleep apnea

ICD-10 Code	Description
G47.33	Obstructive sleep apnea (adult/pediatric)
G47.34	Idiopathic sleep related nonobstructive alveolar hypoventilation
G47.35	Congenital central alveolar hypoventilation syndrome
G47.36	Sleep-related hypoventilation in conditions classified elsewhere
G47.37	Central sleep apnea in conditions classified elsewhere
G47.39	Other sleep apnea
G47.310	Primary central sleep apnea, unspecified
G47.319	Primary central sleep apnea, other
G47.330	OSA, adult, unspecified
G47.339	OSA, other and unspecified

Sleep Study Confirmation - CPT

CPT Code	Description
G0398	Home sleep test, type II portable monitor, unattended, minimum 7 channels
G0399	Home sleep test, type III portable monitor unattended, minimum 4 channels
G0400	Home sleep test, type IV portable monitor, unattended, minimum 3 channels
95800	Sleep study, unattended; heart rate, oxygen saturation, respiratory analysis, and sleep time
95801	Sleep study, unattended; minimum of heart rate, oxygen saturation, and respiratory analysis
95806	Sleep study, unattended, minimum 6 channels
95807	Sleep study, attended, minimum 6 channels
95808	Polysomnography, 1–3 additional parameters
95810	Polysomnography, 4+ additional parameters
95811	Polysomnography with CPAP titration

CPAP Device & Supply Codes - HCPCS

HCPCS Code	Description
E0601	Continuous positive airway pressure (CPAP) device
E0470	Respiratory assist device, bi-level pressure capability, without backup rate feature, used with noninvasive interface
E0471	Respiratory assist device, bi-level pressure capability, with backup rate feature, used with noninvasive interface
E0472	Respiratory assist device, bi-level pressure capability, with backup rate feature, used with invasive interface
E0561	Humidifier, non-heated, used with positive airway pressure device
E0562	Heated humidifier for use with positive airway pressure device
A4604	Tubing with integrated heating element for use with positive airway pressure device
A7030	Full face mask used with positive airway pressure device
A7031	Face mask interface, replacement for full face mask
A7032	Cushion for use on nasal mask interface
A7033	Pillow for use on nasal cannula type interface
A7034	Nasal interface (mask or cannula type)
A7035	Headgear used with positive airway pressure device
A7036	Chinstrap used with positive airway pressure device

HCPCS Code	Description
A7037	Tubing used with positive airway pressure device
A7038	Filter, disposable, used with positive airway pressure device
A7039	Filter, non-disposable, used with positive airway pressure device
A7044	Oral interface used with positive airway pressure device
A7045	Exhalation port with or without swivel used with accessories for positive airway devices, replacement only
A7046	Water chamger for humidifier, used with positive airway pressure device, replacement

Comorbidity Flags - ICD-10-CM

Condition	ICD-10 Codes	Clinical relevance
Hypertension	I10, I11.0, I11.9, I12.0, I12.9, I13.0, I13.11, I13.2, I16.0, I16.1, I16.9, I67.4	OSA is a leading secondary cause of hypertension; adherence reduces BP
Atrial Fibrillation	I48.0, I48.11, I48.19, I48.20, I48.21, I48.91, I97.190	Non-adherent OSA patients have significantly higher AFib event rates
Congestive Heart Failure	I50.1, I50.20, I50.21, I50.22, I50.23, I50.30, I50.31, I50.32, I50.33, I50.40, I50.41, I50.42, I50.43, I50.810, I50.811, I50.812, I50.813, I50.814, I50.82, I50.83, I50.84, I50.89, I50.9, I97.130, I97.131	Untreated OSA accelerates CHF progression; high inpatient cost driver
Stroke / Cerebrovascular	I60.00, I60.01, I60.02, I60.10, I60.11, I60.12, I60.20, I60.21, I60.22, I60.2, I60.30, I60.32, I60.4, I60.50, I60.52, I60.6, I60.7, I60.8, I60.9, I61.0, I61.1, I61.2, I61.3, I61.4, I61.5, I61.6, I61.8, I61.9, I62.00, I62.01, I62.02, I62.03, I62.1, I62.9, I63.00, I63.011, I63.012, I63.013, I63.019, I63.02, I63.031, I63.032, I63.033, I63.039, I63.09, I63.10, I63.111, I63.112, I63.113, I63.119, I63.12, I63.131, I63.132, I63.133, I63.139, I63.19, I63.20, I63.211, I63.212, I63.213, I63.219, I63.22, I63.231, I63.232, I63.233, I63.239, I63.29, I63.30, I63.311, I63.312, I63.313, I63.319, I63.321, I63.322, I63.323, I63.329, I63.331, I63.332, I63.333, I63.339, I63.341, I63.342, I63.343, I63.349, I63.39, I63.40, I63.411, I63.412, I63.413, I63.419, I63.421, I63.422, I63.423, I63.429, I63.431, I63.432, I63.433, I63.439, I63.441, I63.442, I63.443, I63.449, I63.49, I63.50, I63.511, I63.512, I63.513, I63.519, I63.521, I63.522, I63.523, I63.529, I63.531, I63.532, I63.533, I63.539, I63.541, I63.542, I63.543, I63.549, I63.59, I63.8, I63.81, I63.89, I63.9, I97.810, I97.811, I97.820, I97.821	Non-adherent OSA patients carry elevated stroke risk; high cost event

Condition	ICD-10 Codes	Clinical relevance
Type 2 diabetes	E11.0, E11.2, E11.21, E11.22, E11.29, E11.3, E11.31, E11.32, E11.33, E11.34, E11.35, E11.36, E11.39, E11.4, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.5, E11.51, E11.52, E11.59, E11.6, E11.61, E11.62, E11.63, E11.64, E11.65, E11.69, E11.8, E11.9	OSA worsens glycemic control; adherence associated improved A1C

Therapeutic Drug Classes

Therapeutic Class	ATC Code	Description
Antihypertensives	C02	Antihypertensives
Antihypertensives	C03	Diuretics; anso used for adema not only hypertension
Antihypertensives	C07	Beta blocking agents
Antihypertensives	C08	Calcium channel blockers
Antihypertensives	C09	Agents acting on the renin-angiotensis system
Diabetic medications	A10	Drugs used in diabetes; includes A10A insulins and analogues, A10B blood glucose lowering drugs (excludes insulins) A10X other.

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