**Welcome to the World Sleep 2025 Abstract Submission System**  
Please review the guidelines below before completing your submission:

* Maximum 500 words
* Required sections: Introduction, Materials and Methods, Results, Conclusions
* No figures, tables, or references within the abstract
* Submission deadline: July 1, 2025
* For assistance, contact abstracts@worldsleep.org

**Title:** Descriptive Analysis of Post-Apneic Blood Pressure Surges in Sleep Apnea Events

**Authors:** Aneesh K Sajan

**Affiliations:** Independent

**Contact Author:**

**Introduction (Background):** Transient systolic blood pressure (SBP) surges, peripheral oxygen desaturations (SpO₂), and heart rate (HR) changes following obstructive apnea and hypopnea contribute to nocturnal hypertension and cardiovascular risk. While SBP rebound patterns have been characterized, post-event SpO₂ and HR recovery profiles across different baseline conditions remain under-explored.

**Materials and Methods:** Prospective analysis of 3,164 apnea/hypopnea events recorded in 24 adults. We excluded events missing both SpO₂ and SBP measurements and also removed apnea events occurring less than 10 seconds apart, leaving 2,086 apnea events for analysis. Events were categorized by type (obstructive apnea vs. hypopnea), pre-event SpO₂ band (≥ 95 %, 90–95 %, < 90 %), duration (< 10 s, 10–20 s, ≥ 20 s), sleep stage, and body position. SBP change was defined as the difference between mean SBP 10 s before event onset and peak SBP during event plus first 10 s post-event. Changes were binned as drop (≤ –1 mmHg), modest rise (1–10 mmHg), or large rise (> 10 mmHg). Descriptive statistics and subgroup comparisons were performed.

**Results:**  
**SBP:** Drop ≤0 mmHg; Modest rise 0–10 mmHg; Large rise >10 mmHg  
**SpO₂:** Large drop ≥20 units; Modest drop 10–20 units; Rise  
**Heart Rate (HR):** Any rise ≥0 bpm; Modest rise ≥10 bpm; Large rise ≥20 bpm

**Overall SBP Response**

**Overall SBP Response (n = 2,086)**

* Drop: 336 events (16.1 %)
* Modest rise: 1,315 events (63.1 %)
* Large rise: 435 events (20.8 %)

**SBP by Event Type (n = 2,086)**

* Hypopneas (n = 802): drop 125 (15.6 %), modest rise 503 (62.7 %), large rise 174 (21.7 %)
* Obstructive apneas (n = 1 284): drop 211 (16.4 %), modest rise 812 (63.3 %), large rise 261 (20.3 %)

**SBP by Pre-event SpO₂ (n = 2,086)**

* ≥ 95 % (n = 358): drop 44 (12.3 %), modest rise 225 (62.9 %), large rise 89 (24.9 %)
* 90–95 % (n = 1 146): drop 152 (13.3 %), modest rise 734 (64.1 %), large rise 260 (22.7 %)
* < 90 % (n = 582): drop 140 (24.1 %), modest rise 356 (61.2 %), large rise 86 (14.8 %)

**SBP by Apnea Event Duration (n = 2,086)**

* 10–20 s (n = 705): drop 125 (17.7 %), modest rise 444 (63.0 %), large rise 136 (19.3 %)
* ≥ 20 s (n = 1 381): drop 211 (15.3 %), modest rise 871 (63.1 %), large rise 299 (21.6 %)

**SBP by Sleep Stage (n = 2,086)**

* Movement (n = 2): drop 2 (100.0 %), modest rise 0 (0.0 %), large rise 0 (0.0 %)
* REM (n = 105): drop 21 (20.0 %), modest rise 63 (60.0 %), large rise 21 (20.0 %)
* Stage 1 (n = 128): drop 15 (11.7 %), modest rise 87 (67.9 %), large rise 26 (20.3 %)
* Stage 2 (n = 1 310): drop 215 (16.4 %), modest rise 819 (62.5 %), large rise 276 (21.1 %)
* Stage 3 (n = 128): drop 19 (14.8 %), modest rise 82 (64.1 %), large rise 27 (21.1 %)
* Stage 4 (n = 178): drop 32 (18.0 %), modest rise 108 (60.7 %), large rise 38 (21.3 %)
* Wake (n = 235): drop 34 (14.5 %), modest rise 154 (65.5 %), large rise 47 (20.0 %)

**SBP by Body Position (n = 2,086)**

* Left (n = 278): drop 45 (16.2 %), modest rise 184 (66.2 %), large rise 49 (17.6 %)
* Prone (n = 3): drop 1 (33.3 %), modest rise 2 (66.7 %), large rise 0 (0.0 %)
* Right (n = 232): drop 38 (16.4 %), modest rise 134 (57.8 %), large rise 60 (25.9 %)
* Supine (n = 1,543): drop 250 (16.2 %), modest rise 969 (62.8 %), large rise 324 (21.0 %)
* Upright (n = 30): drop 2 (6.7 %), modest rise 26 (86.7 %), large rise 2 (6.7 %)

**Post-event SpO₂ Drop by Baseline Saturation (n = 2,086)**

* Baseline SpO₂ < 90 (n = 582): ≥20 % drop in 14 (2.4 %), 0–20 % drop in 387 (66.5 %), increase in 181 (31.1 %)
* Baseline SpO₂ 95–90 (n = 1,146): ≥20 % drop in 18 (1.6 %), 0–20 % drop in 867 (75.7 %), increase in 259 (22.6 %), unspecified in 2 (0.2 %)
* Baseline SpO₂ ≥ 95 (n = 358): ≥20 % drop in 3 (0.8 %), 0–20 % drop in 304 (84.9 %), increase in 51 (14.2 %)

**Post-event SBP Response by Pre-event SBP Category (n = 2,086)**

* Hypertension (≥140 mmHg) (n = 560): drop 100 (17.9 %), modest rise 318 (56.8 %), large rise 142 (25.4 %)
* Hypotension (<90 mmHg) (n = 112): drop 0 (0.0 %), modest rise 20 (17.9 %), large rise 92 (82.1 %)
* Normal (90–139 mmHg) (n = 1,396): drop 234 (16.8 %), modest rise 966 (69.2 %), large rise 196 (14.0 %)
* Others (n = 18): drop 2 (11.1 %), modest rise 11 (61.1 %), large rise 5 (27.8 %)

**Post-event Heart Rate Increase by Baseline Category (n = 2,086)**

* Bradycardia (< 60 bpm) (n = 404): increase ≥ 0 bpm in 180 (44.6 %), ≥ 10 bpm in 149 (36.9 %), ≥ 20 bpm in 75 (18.6 %)
* High Normal (80–100 bpm) (n = 327): increase ≥ 0 bpm in 178 (54.4 %), ≥ 10 bpm in 134 (41.0 %), ≥ 20 bpm in 15 (4.6 %)
* Low Normal (60–69 bpm) (n = 771): increase ≥ 0 bpm in 408 (52.9 %), ≥ 10 bpm in 316 (41.0 %), ≥ 20 bpm in 47 (6.1 %)
* Mid Normal (70–79 bpm) (n = 447): increase ≥ 0 bpm in 267 (59.7 %), ≥ 10 bpm in 150 (33.6 %), ≥ 20 bpm in 30 (6.7 %)
* Tachycardia (> 100 bpm) (n = 29): increase ≥ 0 bpm in 25 (86.2 %), ≥ 10 bpm in 4 (13.8 %), ≥ 20 bpm in 0 (0.0 %)
* Unknown (n = 108): increase ≥ 0 bpm in 66 (61.1 %), ≥ 10 bpm in 38 (35.2 %), ≥ 20 bpm in 4 (3.7 %)

**Conclusions:** Our findings demonstrate that significant SBP surges persist even when SpO₂ and SBP recovery begin. Notably, right lateral sleep position and Stage 4 deep sleep are associated with the highest rates of post‐apneic SBP surges. These insights underscore the importance of real‐time SBP–SpO₂ monitoring and tailored interventions—particularly during right lateral positioning and deep sleep—to mitigate nocturnal blood pressure excursions and reduce cardiovascular risk in patients with sleep‐disordered breathing.