

Details Regarding Polysomnography Collection at Visit 8

In-home sleep studies using unattended polysomnography (Siesta Unit, Compumedics, Inc., Melbourne, Australia) were performed in a convenience subset at 2 clinical centers (Minnesota and Pittsburgh). The recording montage consisted of 2 central electroencephalograms (C3/A2 and C4/A1), bilateral electrooculograms, chin electromyogram, thoracic and abdominal respiratory inductance lethysmography, airflow (using nasal-oral thermocouple and nasal pressure cannula), finger pulse oximetry, electrocardiogram, body position (mercury switch sensor), and bilateral leg movements (piezoelectric sensors). Data were collected in 30-second epochs.

Clinic staff responsible for collecting polysomnogram data were required to undergo formal, centralized training and pass a certification test prior to performing participant electrode application and supervision of data collection. Staff members performed home visits for setup of the sleep study units. After sensors were placed and calibrated, signal quality and impedance were checked, and sensors were repositioned as needed to improve signal quality, replacing electrodes if impedances were greater than 5 k Ω , using approaches similar to those in the Sleep Health Heart Study (SHHS).¹ After studies were downloaded, they were transferred to the Case Reading Center (Cleveland, OH) for centralized scoring by a trained technician.

Sleep stages and arousals were scored using standard criteria.^{2, 3}

Apneas were identified as a complete or almost complete cessation of airflow (by thermocouple) for more than 10 seconds associated with a specific oxygen desaturation ($\geq 3\%$, $\geq 4\%$, etc). Obstructive apneas were scored if effort was observed on either abdominal or thoracic effort channels, and central apneas were scored if there was no effort on either of these channels. Hypopneas were scored using SHHS criteria noted as a clearly discernible, at least 30%, reduction in respiratory channels for more than 10 seconds associated with a specific oxygen desaturation ($\geq 3\%$, $\geq 4\%$, etc). Inter- and intra-scorer reliability for scoring of respiratory events by the same scoring group is excellent (ICC range of 0.76-0.99).⁴ The respiratory disturbance index (RDI) was defined as the number of apneas and hypopneas per hour of sleep. RDI is also referred to as the apnea-hypopnea index (AHI).

Leg movements were scored according to American Academy of Sleep Medicine criteria (>4 consecutive 0.5 to 5 second movements, each separated by 5-90 seconds).⁵ Leg movements that occurred at the termination of respiratory events were not considered in the calculation of periodic limb movements in sleep unless they were part of a cluster of 4 or more leg movements in which at least 2 leg movements occurred independently of respiratory event termination.

References:

1. Redline S, Sanders MH, Lind BK et al. Methods for obtaining and analyzing unattended polysomnography data for a multicenter study. Sleep heart health research group. *Sleep* 1998;21:759–767.
2. Rechtschaffen A, Kales A, eds: A Manual of Standardized Terminology, Techniques, and Scoring System for Sleep Stages of Human Subjects. Washington DC: National Institutes of Health; 1968. NIH publication 204.
3. American Sleep Disorders Association. EEG arousals: scoring rules and examples: a preliminary report from the Sleep Disorders Atlas Task Force of the American Sleep Disorders Association. *Sleep* 1992;15(2):173-84.
4. Whitney CW, Gottlieb DJ, Redline S, et al. Reliability of scoring respiratory disturbance indices and sleep staging. *Sleep* 1998;21(7):749-57.
5. ASDA Atlas Task Force. Recording and scoring leg movements. The Atlas Task Force. *Sleep* 1993;16(8):748-59.

SOF Visit 8 PSG Dataset
Data Dictionary from Reading Center

CATEGORY	SOURCE	VARIABLE	VARIABLE LABEL	Description	Event
Study Quality	gs	V8QUEEG1	Acceptable EEG signal quality during sleep	quality of EEG 1	Quality Grade
Study Quality	gs	V8QUEEG2	Acceptable EEG (secondary) signal quality	quality of EEG 2	Quality Grade
Study Quality	qs	V8QUEOGL	Acceptable EOG-L signal quality	quality of EOG L	Quality Grade
Study Quality	qs	V8QUEOGR	Acceptable EOG-R signal quality	quality of EOG R	Quality Grade
Study Quality	qs	V8QUJCHIN	Acceptable EMG signal quality	quality of chin	Quality Grade
Study Quality	qs	V8QUCHIR	Acceptable EMG (secondary) signal quality		Quality Grade
Study Quality	qs	V8QUHR	Acceptable ECG signal quality	quality of hr	Quality Grade
Study Quality	qs	V8QUAIR	Acceptable Airflow signal quality	quality of airflow	Quality Grade
Study Quality	qs	V8QUCHES	Acceptable Thoracic signal quality	quality of chest effort	Quality Grade
Study Quality	qs	V8QUABDO	Acceptable Abdomen signal quality	quality of abdomen effort	Quality Grade
Study Quality	qs	V8QUOXIM	Acceptable Oximetry signal quality	quality of oximetry	Quality Grade
Study Quality	qs	V8QUCAN	Acceptable Cannula signal quality	quality of cannula	Quality Grade
Study Quality	qs	V8QULEGL	Acceptable Left leg signal quality	quality of L Leg	Quality Grade
Study Quality	qs	V8OVERAL	Overall PSG Quality Grade	Overall PSG study grade	Quality Grade
Study Quality	qs	V8POSN	Position signal changing(sensor working)	1=Position sensor working	Usable Signal
Study Quality	qs	V8MALERT	Medical Alert	1=Medical Alert	Medical Alert
Study Quality	qs	V8HR0150	HeartRate >150bpm for >2min	1=Medical Alert for HR over 150	Medical Alert
Study Quality	qs	V8HRUN30	HeartRate <30 bpm for >2min	1=Medical Alert for HR under 30	Medical Alert
Study Quality	qs	V8OXYU70	Ox Sat <70% for >10% TST	1=Medical Alert for Oximetry under 70	Medical Alert
Study Quality	qs	V8AHI050	RDI>50	1=Medical Alert for AHI over 50	Medical Alert
Study Quality	qs	V8RECAF5	Recording Started after sleep onset	1=Data Lost - Recording began after sleep	Data Lost
Study Quality	qs	V8UNUOCC	Unusual occurrences-physiologic	1=Unusual Occurrences	Unusual Occurrences
Study Quality	qs	V8ABNEEG	Abnormal Awake EEG	1=Unusual Occurrences - Abnormal EEG	Unusual Occurrences
Study Quality	qs	V8ABNEVE	Abnormal Eye Movement	1=Unusual Occurrences - Abnormal eye movements	Unusual Occurrences
Study Quality	qs	V8PERBRE	Periodic Breathing	1=Unusual Occurrences - Periodic breathing > 5 min	Unusual Occurrences
Study Quality	qs	V8ALPDEL	Alpha Intrusion	1=Unusual Occurrences - Alpha intrusion	Unusual Occurrences
Study Quality	qs	V8CSBRE	CSB type breathing	1=Unusual Occurrences - Periodic breathing > 10 min	Unusual Occurrences
Study Quality	qs	V8LAGBRE	Periodic Large Breaths	1=Unusual Occurrences - Periodic large breaths	Unusual Occurrences
Study Quality	qs	V8SLEWAO	Scored Sleep-Wake only or Full scoring	1=Outlier - scored sleep wake	Outliers
Study Quality	qs	V8PLMDEL	50% PLMs deleted due to post resp. event	1=50% of PLMs deleted	PLMs
Respiratory Stats	report	V8LONGAP	Longest Apnea (sec)	Longest Apnea (entire recording)	Apnea
Respiratory Stats	report	V8LONGHY	Longest hypopnea (sec)	Longest Hypopnea (entire recording)	Hypopnea
Respiratory Stats	report	V8CAVGDU	Avg. Duration of Cent. Apnea (sec)	Average duration of Central Apnea (entire recording)	Central Apnea
Respiratory Stats	report	V8OAVGDU	Avg. Duration of Obstr. Apnea (sec)	Average duration of Obstructive Apnea (entire recording)	Obstructive Apnea
Respiratory Stats	report	V8PAPVGD	Avg. Duration all apneas (sec)	Average duration of Apnea (entire recording)	Apnea
Respiratory Stats	report	V8HAVGDU	Avg. Duration of hypopneas (sec)	Average duration of Hypopnea (entire recording)	Hypopnea
Respiratory Stats	report	V8CTDUR	# of minutes of Central Apnea	Total duration of Central Apnea (entire recording)	Central Apnea
Respiratory Stats	report	V8PCSTAP	% Sleep time in Ap.	% Sleep time in Apnea	Sleep Time
Respiratory Stats	report	V8PCSTHY	% Sleep time in Hypop.	% Sleep time in Hypopnea	Sleep Time
Respiratory Stats	report	V8PCSTAA	% Sleep time in Ap.+Hypop. w/Arousal	% Sleep time in Apnea+Hypopnea with Arousal	Sleep Time

CATEGORY	SOURCE	VARIABLE	VARIABLE LABEL	Description	Event
Respiratory Stats	report	V8PCSTA3	% Sleep time in Ap.+Hypop. w/ > 3% desat	% Sleep time in Apnea+Hypopnea with >3% desat	Sleep Time
Respiratory Stats	report	V8PCSTAD	% Sleep time Ap.+Hypop w/ >3% desat/arou	% Sleep time in Apnea+Hypopnea with > 3% desat or Arousal	Sleep Time
Respiratory Stats	calculated	V8RDI0P	Overall RDI at 0% desat	(Total number of apneas and hypopneas associated with all desats) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI2P	Overall RDI at 2% desat	(Total number of apneas and hypopneas associated with >= 2% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI3P	Overall RDI at 3% desat	(Total number of apneas and hypopneas associated with >= 3% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI4P	Overall RDI at 4% desat	(Total number of apneas and hypopneas associated with >= 4% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI5P	Overall RDI at 5% desat	(Total number of apneas and hypopneas associated with >= 5% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI0PA	Overall RDI at 0% desat or arousal	(Total number of apneas and hypopneas with arousal associated with all desats) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI2PA	Overall RDI at 2% desat or arousal	(Total number of apneas and hypopneas with arousal associated with >= 2% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI3PA	Overall RDI at 3% desat or arousal	(Total number of apneas and hypopneas with arousal associated with >= 3% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI4PA	Overall RDI at 4% desat or arousal	(Total number of apneas and hypopneas with arousal associated with >= 4% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8RDI5PA	Overall RDI at 5% desat or arousal	(Total number of apneas and hypopneas with arousal associated with >= 5% desat) / (hrs sleep)	Apnea and Hypopnea
Respiratory Stats	calculated	V8OAI0P	Obstructive Apnea Index all desats	(Total number of obstructive apneas associated with all desats) / (hrs sleep)	Obstructive Apnea
Respiratory Stats	calculated	V8OAI4P	Obstructive Apnea Index 4% desats	(Total number of obstructive apneas associated with >= 4% desat) / (hrs sleep)	Obstructive Apnea
Respiratory Stats	calculated	V8OAI4PA	Obstructive Apnea Index 4% or arousal	(Total number of obstructive apneas with arousals associated with >= 4% desat) / (hrs sleep)	Obstructive Apnea
Respiratory Stats	calculated	V8ORDI	Obstructive Apnea Hypopnea Index	(# obstructive apneas all desats + # hypopneas with >=3% desat) / (hrs sleep)	Obstructive Apnea
Respiratory Stats	calculated	V8CAI0P	Central Apnea Index all desats	(Total number of central apneas associated with all desats) / (hrs sleep)	Central Apnea
Respiratory Stats	calculated	V8CAI4P	Central Apnea Index 4% desats	(Total number of central apneas associated with >= 4% desat) / (hrs sleep)	Central Apnea
Respiratory Stats	calculated	V8CAI4PA	Central Apnea Index 4% or arousal	(Total number of central apneas with arousals associated with >= 4% desat) / (hrs sleep)	Central Apnea
Limb Movements	report	V8AVGPLM	# PLM/hr of sleep	Number of PLM per hour of sleep: 60*(V8PLMSLPIV8SLPRDP)	PLMs
Limb Movements	report	V8PLMSLP	PLMs in All Sleep	Total PLMs in All Sleep	PLMs
Limb Movements	report	V8PLMNRE	PLMs in NREM	Total PLMs in NREM sleep	PLMs
Limb Movements	report	V8PLMDLT	PLMs in Delta sleep	Total PLMs in Delta sleep	PLMs
Limb Movements	report	V8PLMREM	PLMs in REM	Total PLMs in REM sleep	PLMs
Limb Movements	report	V8AVPLMA	# PLM w/ arousal/hr of sleep	Number of PLM with arousal per hour of sleep: 60*(V8PLMASLIV8SLPRDP)	PLMs
Limb Movements	report	V8PLMASL	PLMs w/ arousal in All Sleep	Total PLMs with arousal in All Sleep	PLMs
Limb Movements	report	V8PLMANR	PLMs w/ arousal in NREM	Total PLMs with arousal in NREM sleep	PLMs
Limb Movements	report	V8PLMARE	PLMs w/ arousal in REM	Total PLMs with arousal in REM sleep	PLMs
Limb Movements	report	V8PLMCSL	PLM clusters in All Sleep	Total PLM clusters in All Sleep	PLM clusters
Limb Movements	report	V8PLMCNR	PLM clusters in NREM	Total PLM clusters in NREM sleep	PLM clusters
Limb Movements	report	V8PLMCDE	PLM clusters in Delta sleep	Total PLM clusters in Delta sleep	PLM clusters
Limb Movements	report	V8PLMCRE	PLM clusters in REM	Total PLM clusters in REM sleep	PLM clusters
Limb Movements	report	V8PLMCAS	PLM clusters w/ arousal in All Sleep	Total PLM clusters with arousal in All Sleep	PLM clusters
Limb Movements	report	V8PLMCAN	PLM clusters w/ arousal in NREM	Total PLM clusters with arousal in NREM sleep	PLM clusters
Limb Movements	report	V8PLMCAD	PLM clusters w/ arousal in Delta sleep	Total PLM clusters with arousal in Delta sleep	PLM clusters
Limb Movements	report	V8PLMCAR	PLM clusters w/ arousal in REM	Total PLM clusters with arousal in REM sleep	PLM clusters
Oximetry	report	V8DES2PH	# of desat.s (>= 2%)	Number of desats with desaturation >= 2% during sleep	Desaturation
Oximetry	report	V8DES3PH	# of desat.s (>= 3%)	Number of desats with desaturation >= 3% during sleep	Desaturation
Oximetry	report	V8DES4PH	# of desat.s (>= 4%)	Number of desats with desaturation >= 4% during sleep	Desaturation
Oximetry	report	V8SAO2R	Max. SaO2% in REM sleep	Highest SaO2% during REM sleep	SaO2

CATEGORY	SOURCE	VARIABLE	VARIABLE LABEL	Description	Event
Oximetry	report	V8XSAO2N	Max. Sao2% in NREM sleep	Highest Sao2 % during NREM sleep	Sao2
Oximetry	report	V8PCSA95	% Sleep time of Sao2 below 95%	[(total time Sao2 is below < 95%) / (total sleep time)] * 100	Sleep Time
Oximetry	report	V8PCSA90	% Sleep time of Sao2 below 90%	[(total time Sao2 is below < 90%) / (total sleep time)] * 100	Sleep Time
Oximetry	report	V8PCSA85	% Sleep time of Sao2 below 85%	[(total time Sao2 is below < 85%) / (total sleep time)] * 100	Sleep Time
Oximetry	report	V8PCSA80	% Sleep time of Sao2 below 80%	[(total time Sao2 is below < 80%) / (total sleep time)] * 100	Sleep Time
Oximetry	report	V8PCSA75	% Sleep time of Sao2 below 75%	[(total time Sao2 is below < 75%) / (total sleep time)] * 100	Sleep Time
Oximetry	report	V8PCSA70	% Sleep time of Sao2 below 70%	[(total time Sao2 is below < 70%) / (total sleep time)] * 100	Sleep Time
Oximetry	calculated	V8SAO2RE	avg sao2 rem %	Mean(all Sao2 value in REM sleep)	Sao2
Oximetry	calculated	V8SAO2NR	avg sao2 nrem %	Mean(all Sao2 value in NREM sleep)	Sao2
Oximetry	calculated	V8LSAO2R	min sao2 rem %	Min(all Sao2 value in REM sleep)	Sao2
Oximetry	calculated	V8LSAO2N	min sao2 nrem %	Min(all Sao2 value in NREM sleep)	Sao2
Sleep Statistics	report	V8SLLATP	Sleep Latency (in minutes)	Time from lights out time to beginning of sleep, rounded to nearest minute	Latency
Sleep Statistics	report	V8REMLI	REM Latency I (in minutes)	Total time from beginning of sleep to first epoch of REM, rounded to nearest minute	Latency
Sleep Statistics	report	V8REMLII	REM Latency II (in minutes)	Total sleep time from beginning of sleep to first epoch of REM (excluding wake)	Latency
Sleep Statistics	report	V8TMBEDP	Time in Bed (in minutes)	Time from lights out to lights on, rounded to nearest minute	Time in Bed
Sleep Statistics	report	V8SLPRDP	Sleep Period (in minutes)	Total time from lights out to lights on that is scored as sleep (rounded to nearest minute)	Sleep Time
Sleep Statistics	report	V8MINS1P	# of minutes in stage 1 sleep	Total time scored as stage 1, rounded to nearest minute	Sleep Time
Sleep Statistics	report	V8MINS2P	# of minutes in stage 2 sleep	Total time scored as stage 2, rounded to nearest minute	Sleep Time
Sleep Statistics	report	V8MINS34P	# of minutes in stage 3 & 4 sleep	Total time scored as stage 3/4, rounded to nearest minute	Sleep Time
Sleep Statistics	report	V8MIREMP	# of minutes in Rem sleep, back and other	Total time scored as REM, rounded to nearest minute	Sleep Time
Sleep Statistics	report	V8REMEBP	# of minutes in REM sleep (Back)	Total time in REM sleep with Supine body position	Sleep Time
Sleep Statistics	report	V8REMEOP	# of minutes in REM sleep (Other)	Total time in REM sleep with Non-Supine body position	Sleep Time
Sleep Statistics	report	V8NREMBP	# of minutes in NREM sleep (Back)	Total time in NREM sleep with Supine body position	Sleep Time
Sleep Statistics	report	V8NREMOP	# of minutes in NREM sleep (Other)	Total time in NREM sleep with Non-Supine body position	Sleep Time
Sleep Statistics	report	V8SLEFFP	Sleep Efficiency (%) sleep-onset to wake	Sleep efficiency - [(total sleep time) / (time from sleep onset to morning waking)] * 100	Sleep Efficiency
Sleep Statistics	report	V8HS2T1P	# of stage 2 to 1 shifts per hour	Number of stage 2 to stage 1 shifts per hour of sleep	Sleep Stage shift
Sleep Statistics	report	V8HS342P	# of stage 3 / 4 to 2 shifts per hour	Number of stage 3/4 to stage 1/2 shifts per hour of sleep	Sleep Stage shift
Sleep Statistics	report	V8HSTAWP	# of Sleep to Awake shifts per hour	Number of sleep to awake shifts per hour	Sleep Stage shift
Sleep Statistics	report	V8STDURM	Study length (epoch 1 to last epoch) min	Time from recording beginning to end, rounded to nearest minute	Study
Sleep Statistics	calculated	V8SLPEFF	sleep efficiency % time in bed	[(total sleep time) / (total time in bed)] * 100	Sleep Efficiency
Sleep Statistics	calculated	V8TMS1T1P	pct time stage 1	[(Number of minutes scored as stage 1) / (total sleep time)] * 100	Sleep Time
Sleep Statistics	calculated	V8TMS1T2P	pct time stage 2	[(Number of minutes scored as stage 2) / (total sleep time)] * 100	Sleep Time
Sleep Statistics	calculated	V8TMS34P	pct time stage 3/4	[(Number of minutes scored as stage 3/4) / (total sleep time)] * 100	Sleep Time
Sleep Statistics	calculated	V8TMREMP	pct time rem	[(Number of minutes scored as REM) / (total sleep time)] * 100	Sleep Time
Sleep Statistics	calculated	V8AI_ALL	arousal index all	(Total number of arousals) / (hrs sleep)	Arousal
Sleep Statistics	calculated	V8AI_NRE	arousal index non-rem	(Total number of arousals in non-REM sleep) / (hrs sleep)	Arousal
Sleep Statistics	calculated	V8AI_REM	arousal index rem sleep	(Total number of arousals in REM sleep) / (hrs sleep)	Arousal
PSG Hookup	form	V8BPPULS	Baseline heart rate, beats/min	Baseline heart rate from PSG recording during hook-up, before sleep, beats/min	Blood Pressure
PSG Hookup	form	V8BMPULS	Baseline manual heart rate, beats/min	Baseline heart rate from manual reading during hook-up, before sleep, beats/min	Blood Pressure
PSG Hookup	form	V8BSAO2	Baseline Sao2 level, %	Baseline Sao2 reading during hook-up, before sleep, %	Sao2