Methodology

Expert Task Force

The AASM commissioned a task force (TF) of sleep medicine physicians with expertise in the diagnosis of pediatric OSA to develop this position paper. These content experts were required to disclose all potential conflicts of interest (COI) according to the AASM's COI policy prior to being appointed to the TF.

Clinical Questions

In order to define the scope of this paper, clinical questions were developed by the TF after a review of systematic reviews, meta-analyses, and guidelines published on the use of a home sleep apnea test (HSAT) to diagnose children suspected of OSA. The AASM Board of Directors approved the final list of questions, presented in Table S1, before the literature searches were performed.

Table S1– Clinical Questions

Is the use of an HSAT to diagnose OSA feasible in children?
Which HSAT conditions are necessary for reliability? (eg, type, channels, set-up, placement, attendance) And what ancillary evidence is necessary for accurate diagnosis, PAP prescription, or tonsillectomy?
What are the subpopulations of children that should or should not use an HSAT? (eg, age groups, comorbidities)
What are the conditions under which a repeat HSAT would be preferred (eg, sensor failure or improper set-up)? Similarly, are there conditions under which a repeat HSAT would NOT be preferred (eg, OSA cases with hypopneas causing arousal without oxygen desaturation)?

Literature Search

Literature searches were performed by the AASM research staff using the PubMed database for individual questions using the search terms listed in Table S2. The limits of the searches (criteria that all had to be met) were: human subjects, English language, children, and adolescents. The databases were searched from 1966 to September 28, 2016. A total of 254 citations were identified from the PubMed search.

Articles were included for review and possible data extraction if they included children and adolescents suspected of OSA. Articles were excluded if they were not related to OSA, did not address a clinical question, was of the wrong publication type (eg, editorial, study protocol, etc.) and included adult patients. A total of 106 articles were initially accepted for inclusion and 148 articles were rejected. Upon further review of the accepted articles the task force selected 5 validation studies and 4 feasibility studies as supporting evidence for the position statement.

Table S2 – Literature Search Terms

Sleep apnea, sleep-related breathing disorder, sleep apnea syndromes, obstructive sleep apnea, respiratory disturbance index, AHI, hypopnea, home sleep apnea test, home sleep test, home sleep study, home polysomnography, home respiratory polygraphy, portable monitoring device, ambulatory monitoring, oximetry, out of sleep center testing, apnea risk evaluation system.

Table S3 – Summary of Feasibility Studies

Author/ Year	N	Age (yrs)	Setting	HSAT System	HSAT Channels	Criteria	Success rate
Goodwin 2001[14]	157	5-12	Home; Unattended Sensors placed by trained technician	Compumedics PS-2	EEG, EOG, EMG, chest and abdominal effort, airflow (thermistor, nasal pressure) oximetry, ECG, snoring, microphone, body position, ambient light	Successful if >5 hours of interpretable respiratory, EEG, and oximetry signals	91% (single night) 97% (two nights)
Marcus 2014[15]	201	5-12	Home; Unattended Sensors placed by trained technician	Compumedics Siesta 802	EEG, EOG, EMG, chest and abdominal effort, airflow (nasal pressure, 3-prong thermistor), oximetry, ECG, microphone	Unsuccess-ful if <4 hours total recording time or major signal displaced for most of night	91% (single night) 98% (two nights)
Brockmann 2013[16]	101	0-15	Home; Unattended (n=75) In-Lab (n=26) Sensors placed by nurse	Embletta Gold	Airflow (nasal pressure), chest and abdominal effort, oximetry, ECG, body position	Unaccepta-ble if contained either: loss of ≥2 hours of airflow or effort channels, <4 hours of artifact-free time, or <4 hours of SpO2 data	93% (single night)
Poels 2003[17]	24	2-7	Home;Unattended Sensors placed by caregivers	Embletta PDS	Airflow (nasal pressure), chest and abdominal effort, oximetry, ECG, body position	Technically acceptable: 6.5 hours recorded sleep time. Successful: 6.5 hours of artifact-free signal in 3 traces simultan-eously	75% (Technically acceptable) 29% (Successful)

Table S4 – Summary of Validation Studies

Author/Year	N	Age (Yrs)	Setting	HSAT Channels	Comparator	Sensitivity	Specificity
Jacob 1995[18]	21	2-12	Home	Chest and abdominal effort, oximetry, ECG, videotape recording	PSG	92% (AHI>1) 100% (AHI> 3)	100% (AHI>1)
Alonso-Alvarez 2015[19]	50	2-12	Both	Airflow (thermistor, nasal pressure), chest and abdominal effort, oximetry, ECG, body position, snoring	PSG and HSAT in-lab	90.9% (ORDI>5.6)	94.1% (ORDI>5.6)
Zucconi 2003[21]	12	3-6	Lab	Airflow (thermistor), chest and abdominal effort, oximetry, ECG, snoring microphone, body position	PSG	78% (Auto-scored 100% (RDI>10, hand-scored)	57% (RDI>10, hand-scored)
Lesser 2012[20]	25	9-18	Lab	Airflow (thermistor), chest and abdominal efforts, oximetry, ECG, body position	PSG	100% (OAHI > 1.5), 85.7% (OAHI > 5) 100% (OAHI > 10)	46.2% (OAHI > 1.5), 83.3% (OAHI> 5) 90% (OAHI > 10)
Tan 2014[22]	100	2-16	Lab	Respiratory polygraphy (channels not specified)	PSG	82.5% (AHI ≥ 1/h TST); 70.4% (AHI ≥ 3/h TST); 62.5% (AHI ≥5/h TST)	90% (AHI ≥ 1/h TST); 100% (AHI ≥ 3/h TST); 100% (AHI ≥5/h TST)