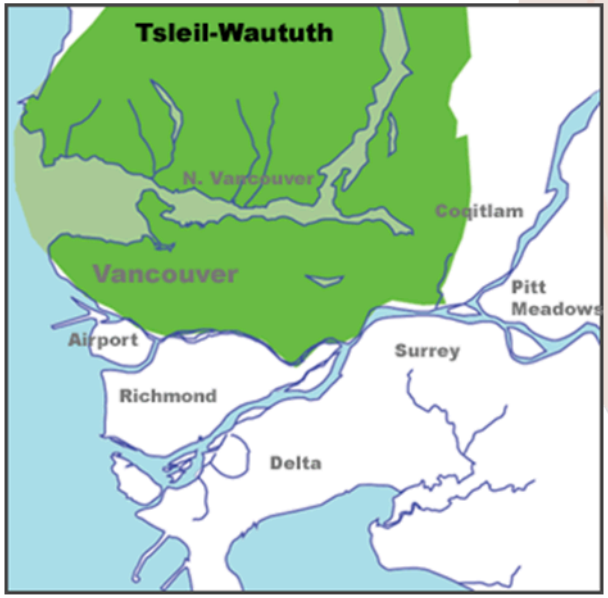
We would like to acknowledge that we are gathered today on the traditional territories of the Musqueam, Squamish and Tsleil-Waututh peoples.

Source: www.johomaps.net/na/canada/bc/vancouver/firstnations/firstnations.html



Obstructive Sleep Apnea in Primary Care Settings

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Preamble

- Sleep is vital for health and daily performance.
- Sleep apnea affects sleep quality and causes interruptions.
- It has two forms: Obstructive Sleep Apnea (OSA) and Central Sleep Apnea (CSA).
- OSA is more prevalent, impacting around 15–20% of adults in the USA and Canada.
- If left untreated, OSA can lead to daytime fatigue, cognitive problems, and organ damage.
- OSA is linked to several comorbid conditions.
- It also raises healthcare expenses, accidents, and hospital visits.
- Treatment can improve symptoms and reduce comorbidities.
- **Primary care providers are key in early detection and management.**

Purpose of This Talk

- Designed for primary care physicians and nurse practitioners
- Provide a brief overview of obstructive sleep apnea (OSA) in adult patients
- Focus on recognition, diagnosis, and management of OSA
- Goal: Build confidence in screening, diagnosing, and managing OSA in primary care

Prevalence of Obstructive Sleep Apnea

- Global prevalence: 1 billion people, with 400 million having moderate to severe OSA
- 6.4% of Canadian adults had been diagnosed with OSA by a health care professional
- OSA is widely underdiagnosed; 86% to 95% of individuals found in population surveys with clinically significant OSA report no prior OSA diagnosis.
- OSA is under-recognized, with many undiagnosed cases

Definitions

Obstructive Sleep Apnea (OSA)

- Caused by **recurrent upper airway collapse** during sleep
  - Commonly involves **tongue, soft palate, supraglottic tissues**
- Leads to **repetitive episodes** of reduced or absent airflow

Definitions

- **Apnea**:
  - Complete cessation of airflow
  - Lasts **≥10 seconds**
- **Hypopnea**:
  - **≥30% reduction** in airflow
  - With either:
    - **Arousal from sleep** (≥3 sec high-frequency EEG activity), or
    - **≥3% drop in oxygen saturation**

Classification of Severity

Apnea-Hypopnea Index (AHI)

- **AHI** = Apneas + Hypopneas per hour of sleep (or recording)
- Used to **quantify OSA severity**

OSA Severity Based on AHI

- **Normal**: AHI < 5 events/hour
- **Mild**: AHI 5–14.9 events/hour
- **Moderate**: AHI 15–29.9 events/hour
- **Severe**: AHI ≥ 30 events/hour

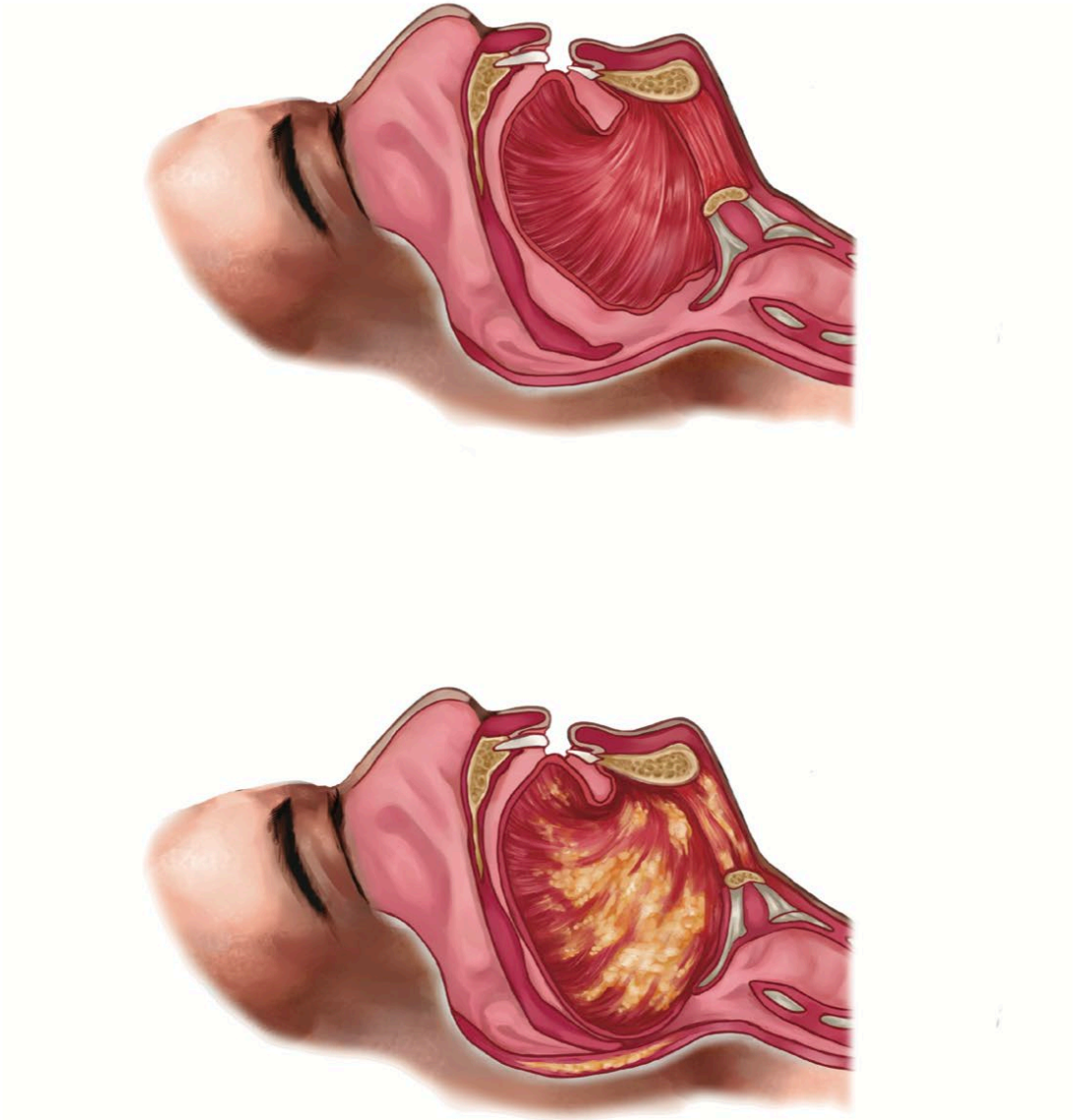

Figure 1: Anatomical Basis of Obstructive Sleep Apnea.

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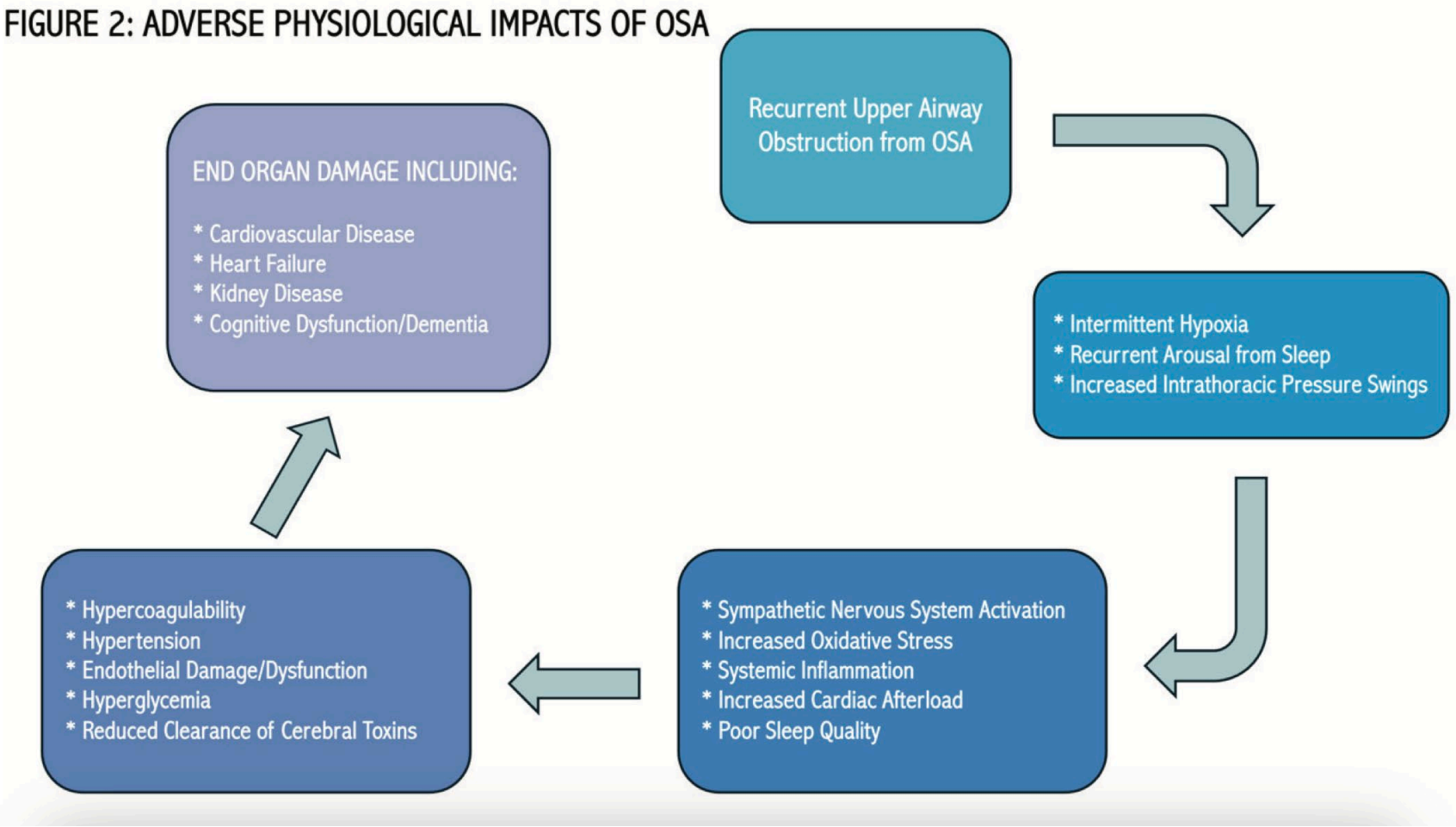
Brief Pathophysiology



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Health and Safety Consequences of Untreated OSA

- Cardio and Cerebro vascular impacts
  - Mod-severe OSA is associated with an increased risk of, resulting in hypertension, coronary disease, stroke, heart failure, and atrial fibrillation
- Respiratory impacts
- Metabolic and endocrine impacts
  - Insulin Resistance intolerance and obesity
- Sexual dysfunction
- Gastrointestinal impacts
- Cancer associations
- Pregnancy outcomes
- Perioperative complications
- Safety: accidents and injuries
  - MVA and workplace
- Neuro-psychiatric problems

Risk Factors I

- Upper body obesity with a large neck size
- Older age
- Male
- East Asian origin
- Family history of OSA
- Mandibular hypoplasia (retrognathia, micrognathia)
- Low-lying soft palate (i.e., high Mallampati Score)
- Large tongue
- Tonsillar hypertrophy
- Nasal and nasopharyngeal obstruction
- Neuromuscular disease
- Polycystic ovarian disease
- Marfan syndrome
- Parkinson's disease
- Traumatic brain injury
- Down syndrome
- Craniofacial anatomical factors

Risk Factors II

- **Those at particular risk include:**
  - Older adults (60 to 79 years, 3 times more likely)
  - Males (2 times more likely to be diagnosed compared to females)
  - Males reporting snoring, trouble breathing or high neck circumference (≥17 inches)
  - Females reporting fatigue, insomnia, or high body mass index (>35kg/m^2)

OBSTRUCTIVE SLEEP APNEA IN PRIMARY CARE SETTINGS

Table 2: Patient History and Screening Tools	
OSA Symptoms	Snoring, choking, gasping, nocturia, fatigue, and morning headaches.
Validated Screening Surveys	* STOP-BANG
	* Sleep apnea clinical score (SACS)
	* Berlin Questionnaire
Measures of sleepiness and quality of life impacts	* Epworth Sleepiness Scale (ESS) for assessing daytime sleepiness severity.
	* Pittsburgh Sleep Quality Index (PSQI) for measurement of overall sleep quality, including aspects like latency, duration, and disturbances.
	* Functional Outcomes of Sleep Questionnaire (FOSQ) Assesses the impact of sleep disorders on daily functioning.
Comorbid Conditions Affected by OSA	Motor vehicle crashes (MVC), occupational injuries, cardiovascular diseases (e.g., hypertension, arrhythmias, heart failure, stroke), renal disease, gastroesophageal reflux disease (GERD), type 2 diabetes, metabolic syndrome, depression, anxiety, cognitive impairment, erectile dysfunction, chronic fatigue, non-alcoholic fatty liver disease (NAFLD), and nocturnal asthma exacerbations.
Lifestyle Questions	Substance use, Smoking and ETOH intake.
Occupational Implications	Occupational hazards, work patterns, shift changes, jet lag, and caregiving duties, drivind duties.
Detailed Sleep Schedule History	Collect data on bedtime, wake time, shift work, naps, and overall sleep duration.
Other Causes of Sleepiness	Medication side effects (e.g., beta blockers, anti-depressants, anti-epileptics, steroids, narcotics), psychiatric conditions, and other medical causes.

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Table 3: Risk Factors and Clinical Features of Obstructive Sleep Apnea (Gottlieb, 2020)	
Risk Factors	**Odds Ratio**
Weight	
Overweight vs normal weight	2.3-3.4
Obese vs normal weight	4.0-10.5
Male sex (vs female)	1.7-3.0
Age (per 10-y increment)	1.4-3.2
Postmenopausal state in women	2.8-4.3
Clinical symptoms and signs	**Prevalence, %**
Excessive sleepiness, fatique, or unrefreshing sleep	73-90
Snoring most nights	50-60
Witnessed breathing pauses, choking, or gasping during sleep	10-15
Nocturia (2 or more times per night)	30
Nocturnal gastroesophageal reflux	50-75
Morning headache	12-18

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History

- If OSA is suspected, conduct a detailed history
- The STOP-Bang questionnaire can be used to help determine if a patient is at increased risk of moderate to severe OSA.
- While the most common symptom of OSA is excessive daytime sleepiness, the clinical presentation can vary. Completion of the Epworth Sleepiness Scale is recommended.
- Patients with untreated OSA may have increased perioperative morbidity. Consider appropriate screening when referring patients for potential surgery (e.g. STOP-Bang Questionnaire).

STOP		
Do you **S**NORE loudly (louder than talking or loud enough to be heard through closed doors)?	Yes	No
Do you often feel **T**IRED, fatigued, or sleepy during daytime?	Yes	No
Has anyone **O**BSERVED you stop breathing during your sleep?	Yes	No
Do you have or are you being treated for high blood **P**RESSURE?	Yes	No

BANG		
BMI more than 35kg/m2?	Yes	No
AGE over 50 years old?	Yes	No
NECK circumference > 16 inches (40cm)?	Yes	No
GENDER: Male?	Yes	No

TOTAL SCORE		

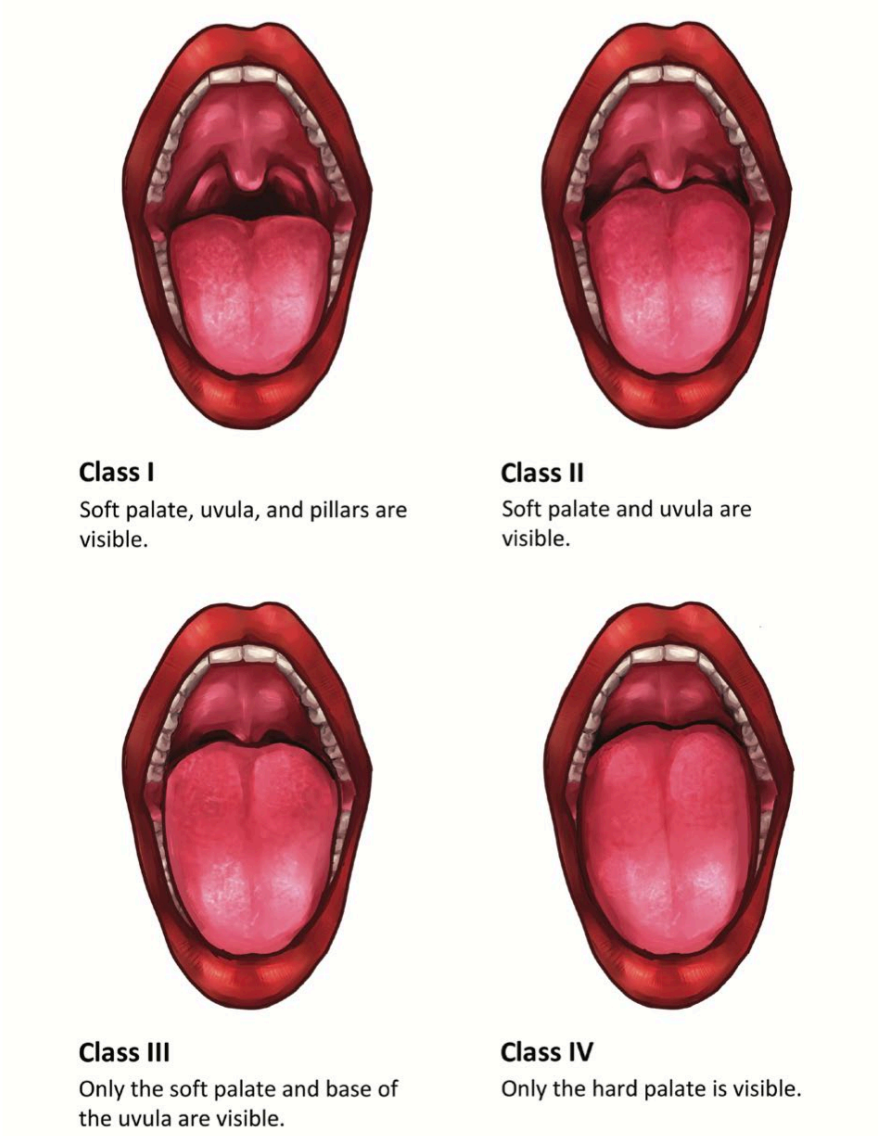
High risk of OSA: Yes 5 - 8

Intermediate risk of OSA: Yes 3 - 4

Low risk of OSA: Yes 0 - 2

Physical exam

- Conduct a physical examination, focused on the upper airway.
- Measure neck circumference
- Measure BMI
- Measure BP
- Calculate Mallampati Score



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Mallampati classification is useful in determining the pretest likelihood of potential obstructive sleep apnea. Patient should be in the sitting position, with the head in the neutral position, the mouth opened maximally, and the tongue protruded maximally. Examiner should be seated opposite the patient at eye-level. A higher Mallampati score has been associated with OSA diagnosis and increased AHI. For every 1-point increase in the Mallampati score, the odds of having OSA increased by more than 2-fold.[23]

Diagnostic Techniques

- Testing range overview
  - Home Sleep Apnea Testing
  - In-lab Polysomnography (GOLD STANDARD)
- Overnight oximetry

Appendix E: Sleep Study Levels

Sleep Study Level	Test Description
I	**Polysomnogram (PSG)** – Overnight test conducted in a sleep lab. Measures a complete set of biological signals, including airflow, electroencephalography (EEG), electrocardiogram (ECG), electrooculography (EOG), electromyography (EMG), oxygen saturation, thoracic effort, abdominal effort, body position, and limb movement. Often referred to as the gold standard for diagnostic sleep testing as a) EEG is the only way to actually measure sleep; b) PSG test can be used to diagnose all forms of sleep apnea (including OSA) and parasomnias, movement disorders, bruxism, and nocturnal seizures.[2]
II	**Ambulatory polysomnogram** – Overnight, unattended test. Currently not a significant factor in diagnostic sleep testing in B.C.
III	**Home Sleep Apnea Test (HSAT)** – Overnight test conducted by the patient (after instruction) in their home or preferred sleeping location. Used to diagnose only obstructive sleep apnea in patients who present with an increased risk of moderate-to-severe OSA, based on a comprehensive clinical sleep evaluation.[3,26–28] (See Testing and Referral, page 4). HSAT measures two respiratory variables (thoracic effort and airflow), oxygen saturation, and a cardiac variable (e.g., pulse or electrocardiogram). It is not as sensitive as a PSG because without an EEG, sleep cannot be measured.
IV	**Overnight Oximetry** – measures oxygen saturation and pulse rate. It is not an appropriate test to diagnose OSA.[33]

Approach based on symptoms

- Home Sleep Apnea Test (HSAT) should not be used to screen asymptomatic patients. HSAT is only recommended for the diagnosis of OSA in symptomatic patients who are determined to be at an increased risk of moderate-to-severe OSA, and who have no exclusion criteria

- A negative or equivocal HSAT does not exclude OSA. If an HSAT is negative, inconclusive or technically inadequate, and OSA is suspected, polysomnography is recommended.

- BC now has a Standard Requisition for HSAT that referring practitioners are required to use.

- Symptomatic patients for which the HSAT is not the appropriate diagnostic test should be referred for a sleep disorder consultation for polysmnography.2 [Expert Opinion]

DIAGNOSTIC/REFERRAL DECISION PATHWAY

Step 1: Determine if patient is at **increased risk of moderate-to-severe Obstructive Sleep Apnea (OSA).**

Increased risk of moderate-to-severe OSA is indicated by **the presence of excessive daytime sleepiness or fatigue and at least two of the following three criteria:**

- ☐ Witnessed apneas or gasping or choking
- ☐ Habitual loud snoring
- ☐ Diagnosed hypertension

Is patient at increased risk of moderate-to-severe OSA?

- If Yes, patient ***requires a diagnostic test***.
- If No and the patient is symptomatic, they may have another sleep disorder and should be referred for a sleep disorder consultation (FORM B - HLTH 1945).

Step 2: Determine diagnostic test. A patient with an increased risk of moderate-to-severe OSA **should be sent for a Home Sleep Apnea Test (HSAT), *unless one or more of the following HSAT exclusion criteria apply*** (any one item precludes HSAT):

- ☐ Concern for non-respiratory sleep disorder (e.g. chronic insomnia, sleep walking/talking).
- ☐ Risk of hypoventilation (e.g. neuromuscular disease, BMI ≥ 40 kg/m^2).
- ☐ Chronic/regular opiate medication use.
- ☐ Significant cardiopulmonary disease (e.g. history of stroke, heart failure, moderate-to-severe lung disease).
- ☐ Previous negative or equivocal HSAT.
- ☐ Children < 16 years old.
- ☐ Inability to complete necessary steps for self-administered HSAT (e.g. cognitive, physical, or other barriers).

If sleep study is for treatment follow-up (e.g. weight loss, oral appliance, or surgery) HSAT is appropriate, unless one or more of the exclusion criteria detailed above applies.

DECISION AND SIGNATURE

***Patient eligible for HSAT?**

◯ Yes ◯ No

- If Yes, forward requisition directly to an **accredited HSAT facility** (see list of Accredited HSAT Facilities at https://www.cpsbc.ca/files/pdf/DAP-Accredited-Facilities-HSAT.pdf.)
- If No, patient should be referred for a sleep disorder consultation (FORM B - HLTH 1945).

A negative or equivocal HSAT does not rule out OSA. Consider referral to a sleep disorders physician (FORM B - HLTH 1945).

Referring Practitioner Signature

Date Signed (YYYY / MM / DD)

Save Print Clear Form

Device							**ApneaLink Air**		Type:	**III**
Recording	Date:	**06/19/2021**		Start:	**9:42pm**		End:	**8:06am**	Duration - hr:	**10:23**
Monitoring time (flow)				Start:	**10:53pm**		End:	**8:04am**	Duration - hr:	**9:10**
Oxygen saturation evaluation				Start:	**9:52pm**		End:	**8:06am**	Duration - hr:	**10:11**

Statistics

Events Index				REI (AHI):	**15.1**		AI:	**0.8**	HI:	**14.4**
Supine	Time - hr	**5:28**	**(59.7%)**	REI (AHI):	**24.3**		AI:	**1.1**	HI:	**23.2**
Non-supine	Time - hr	**3:39**	**(39.9%)**	REI (AHI):	**1.6**		AI:	**0.3**	HI:	**1.4**
Upright	Time - hr	**0:02**	**(0.4%)**	REI (AHI):	**0.0**		AI:	**0.0**	HI:	**0.0**
Events totals							Apneas:	**7**	Hypopneas:	**132**
Apnea index	Obstructive:	**0.8**		Central:	**0.0**		Mixed:	**0.0**	Unclassified:	**0.0**
Cheyne-Stokes respiration							Time - hr:	**0:00**	Percentage:	**0**
Oxygen desaturation							ODI:	**13.7**	Total:	**140**
Oxygen saturation %				Baseline:	**97**		Avg:	**93**	Lowest:	**81**
Oxygen saturation - eval time %				≤90%sat:	**4**		≤85%sat:	**0**	≤80%sat:	**0**
							≤88%sat:	**1**	≤88%Time - hr:	**0:08**
Breaths				Total:	**7195**		Avg/min:	**13.1**	Snores:	**2803**
Pulse - bpm				Min:	**55**		Avg:	**66**	Max:	**93**

Treatment Options Part 1: Lifestyle Modifications

- Weight management
- Alcohol, smoking, sedation avoidance
- Sleep hygiene
- Managing comorbidities
- Driving safety considerations

Treatment Options Part 2: CPAP

- Continuous Positive Airway Pressure (CPAP)
- Contraindications
  - Respiratory arrest
  - Inability to follow commands
  - Reduced LOC
  - Unstable cardiorespiratory status
  - Pneumothorax
  - Facial trauma or surgery

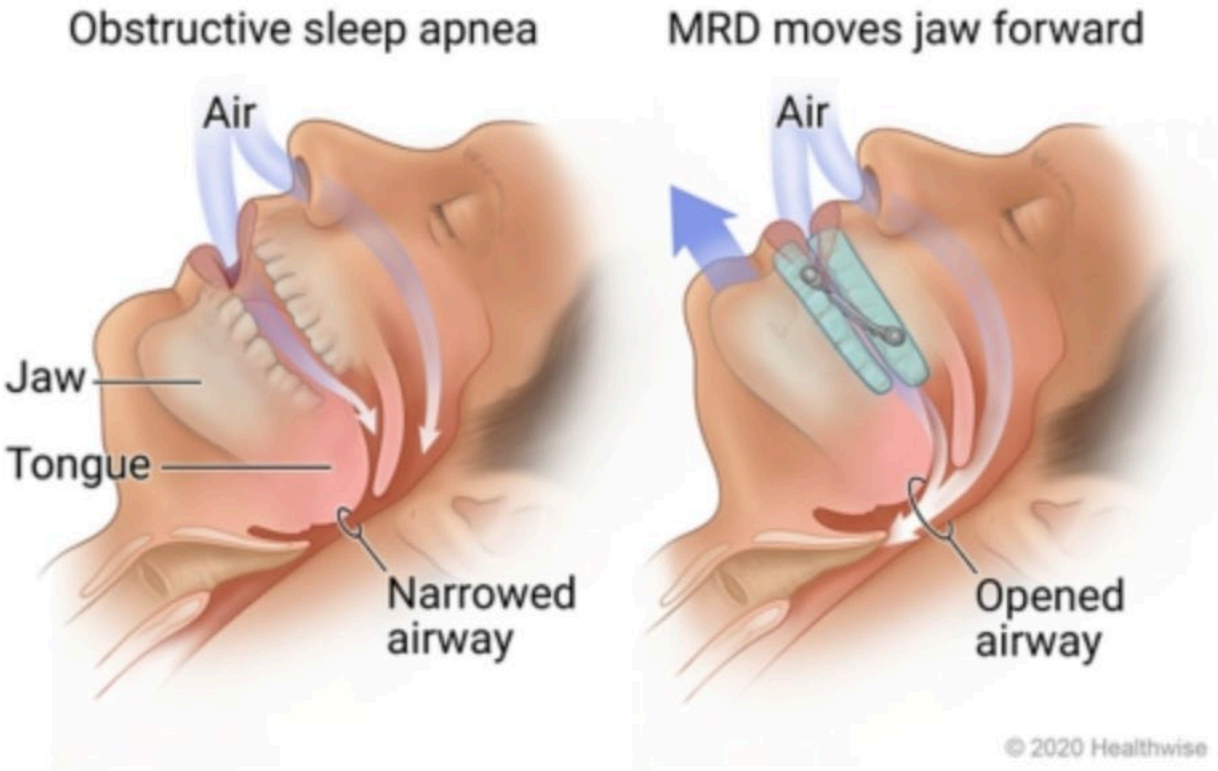
CPAP Intolerance/Problem	Recommended Treatment
Nasal congestion	Saline nasal rinses +/- intranasal steroid, increase humidity, consider full face mask
Difficulty exhaling against pressure	Use Expiratory Pressure Release (EPR) option
Mouth/nasal dryness	Adequate hydration and heated humidity on CPAP machine; chin strap for mouth leak
Claustrophobia	Trial of CPAP while sitting or awake and supine before using during sleep; consider nasal mask or pillows (vs full face mask)
Persistently elevated AHI	Make sure any leak is well controlled, obstructive events generally respond to pressure increase
Persistent fatigue	Ensure CPAP is used for full night (7 hours or more recommended); possible other sleep disorder, refer for consultation

In British Columbia, the guidelines for drivers with OSA are as follows (website reference below):

- Untreated OSA with AHI < 30 and No Daytime Sleepiness: Drivers who have untreated OSA with an AHI less than 30 and do not admit to daytime sleepiness are eligible for license.
- Drivers with Severe OSA (AHI of 30 or more) are disqualified from driving unless the condition is successfully treated, OR a sleep specialist assesses the driver and determines there is a low risk of a sleep-related crash.
- Any driver with OSA, regardless of severity, who has experienced a crash associated with falling asleep or sleepiness while driving within the past five years must provide evidence that the OSA is successfully treated before being eligible for a driver's license.

Treatment Options Part 3: Oral Appliance Therapy

Mandibular repositioning device



Treatment Options Part 4: Other Therapeutic Approaches

- Positional therapy
- Emerging pharmacological research happening
- Upper airway surgeries, refer to ENT

Questions

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Unlimited Care

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