Sleep in Primary Care

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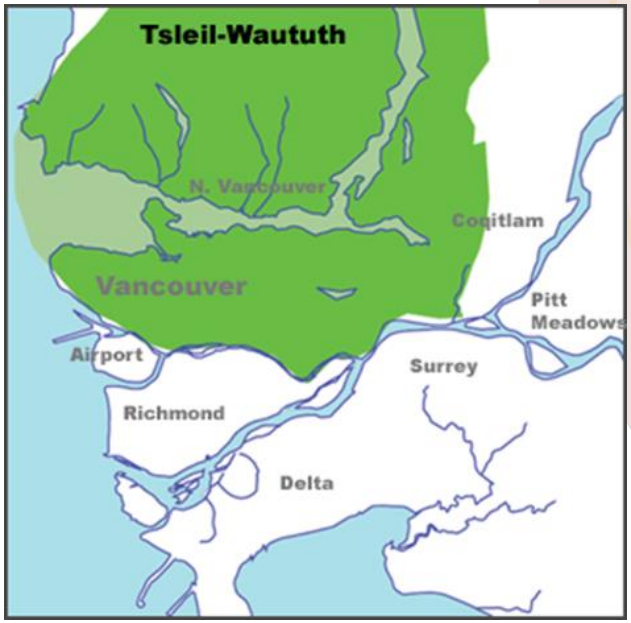
We would like to acknowledge that we are gathered today on the traditional territories of the Musqueam, Squamish and Tsleil-Waututh peoples.

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



Harvey Moldofsky, M.D.

Musculoskeletal Symptoms and Non-REM Sleep Disturbance in Patients with “Fibrositis Syndrome” and Healthy subjects. *Psychosomatic Medicine 1976;37:341-351.*

- discovered alpha wave intrusion in their deep, slow wave (stage III/IV) sleep
- also found alpha intrusion in patients with chronic fatigue syndrome, rheumatoid arthritis and chronic pain
- reproduced symptoms of fatigue, sore/tender tissues, and dysphoria in healthy subjects after 3 nights of no slow wave sleep
- symptoms resolved after 2 nights of recovery sleep

Health requires a balance between wake and sleep

Hormones of Wake

Primarily Catabolic Hormones:

- Adrenalin
- Noradrenalin
- Cortisol

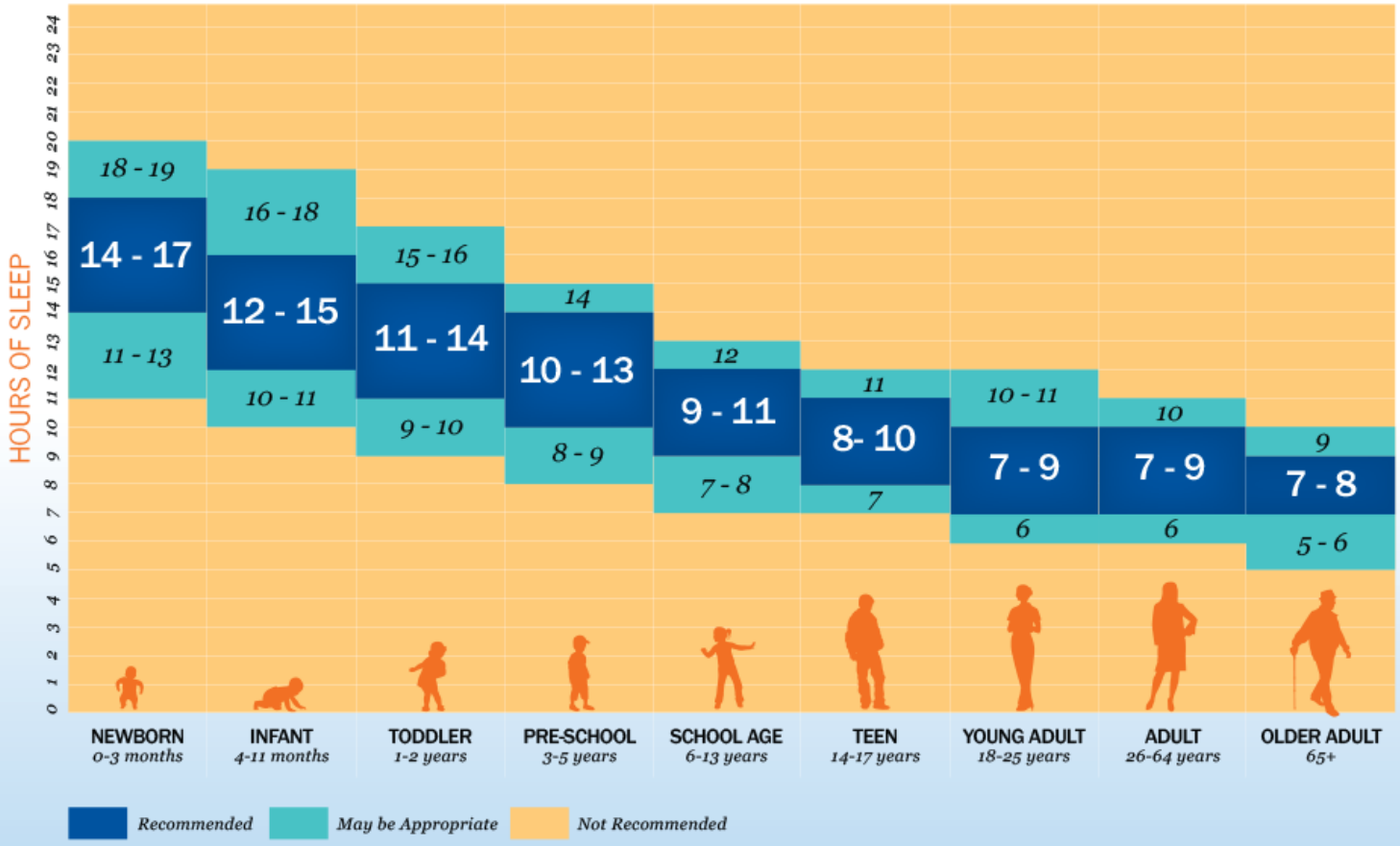
Hormones of Sleep

Primarily Anabolic Hormones:

- Growth hormone
- Testosterone
- Erythropoietin
- Leptin

NATIONAL SLEEP FOUNDATION

SLEEP DURATION RECOMMENDATIONS



SLEEPFOUNDATION.ORG | SLEEP.ORG

Hirshkowitz M, The National Sleep Foundation's sleep time duration recommendations: methodology and results summary, Sleep Health (2015), http://dx.doi.org/10.1016/j.sleh.2014.12.010

National Sleep Foundation

Omnibus Sleep In America Poll

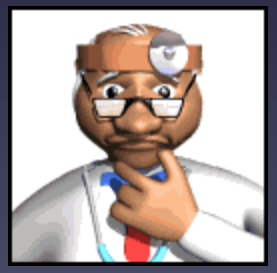
(OSAP 2000)

- 58% of the general population suffer from sleep disorders at least 3 days per week
- 66% get less than 8 hours sleep
- 33% get less than 6.5 hours sleep
- 20% find sleepiness interferes with daily activities a few days/week
- 51% drowsy while driving in past year
- 17% dozed off while driving in past year

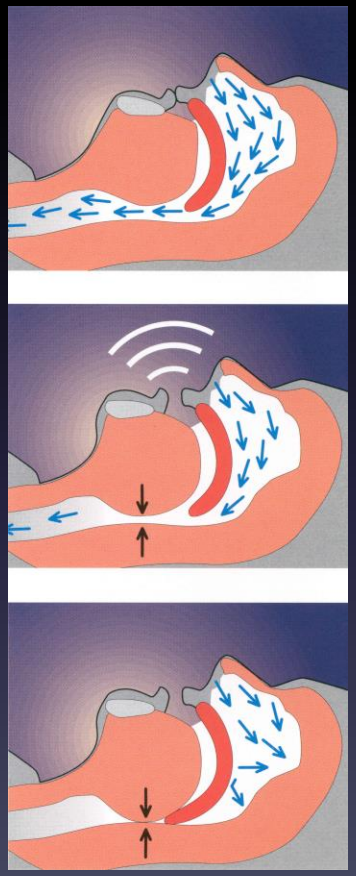
Sleep in Primary Care

- Up to 69% of primary care patients suffer from sleep disorders.[1]
- Primary care physicians may identify as few as 0.15%.[2]
- Doctors trained in sleep disorders are 6x's more likely to ask patients about sleep.[3]

1. Shochat et al. ***SLEEP*** 1999; 22:S359-65
2. Rosen. ***Sleep Medicine*** 2001; 2:47-55
3. Haponik. ***J Gen Intern Med*** 1996; 11:759-62



Snoring and Obstructive Sleep Apnea



Normal breathing

Snoring

Sleep Apnea

Medical Disease Associated With Obstructive Sleep Apnea

- 38% of hypertensives have OSA
- 78% with resistant hypertension
- 40 - 60% of CVD patients
- 50-70% of heart failure patients
- 32-39% of atrial fibrillation patients

Tietjens, JR *JAMA* 2019; 8:1-17

Type 2 Diabetes and OSA

- 80% of type 2 diabetics are overweight and in particular have central obesity
- Central obesity increases the risk of OSA
- 12% of type 2 diabetics had moderate to severe OSA
- 70% of moderately obese diabetics who snored or were sleepy had OSA

Brooks, B et al. ***Journal of Clinical Endocrinology & Metabolism*** 1994;79:1681-5

Impact of sleep debt on metabolic and endocrine function

4 hours of sleep loss/night for 6 days:

- 40% reduction in rate of glucose clearance
- 30% reduction in insulin response to glucose
- Decreased thyroid hormone
- Increased evening cortisol
- Increased sympathetic nervous system activity (similar changes to that seen in obesity & aging)

Spiegel K, Leproult R, Van Cauter E. ***Lancet*** 1999; 354:1435-9

Impact of Short Sleep Duration on Sleepiness, Performance, Mood and Glucose Metabolism

Chronically short sleepers (306 vs 486 min/nt)

- Secreted 65% more insulin
- Insulin sensitivity 40% less than normal
- Significantly decreased reaction times
- Lower scores on the Global Affect scale

Colecchia EF, Spiegel K, Kim R, et al. ***SLEEP*** 2000; 23:A253

Sleep in Type II Diabetes

- Weekday self reported sleep 6.1 hours
- Prefer to get 1.83 more hours of sleep
- 71% report poor sleep quality (>5 on PSQI)
- ↑ HbA1c with sleep debt and worsening sleep quality

Ryden AM, Knutsin KL, Mander BA, Van Cauter E. ***SLEEP*** 2002; 25:A105-6

Acute Sleep Loss Increases Hunger

After restriction to 4 hours in bed/night for two nights:

- 18% less leptin
- 28% more ghrelin
- 24% higher hunger ratings
- 23% higher global appetite ratings (33% for high fat, high carbohydrate foods)

Spiegle et al. ***Ann Intern Med*** 2004; 141:846-50

Chronically Short Sleepers Have Increased BMI

Study of 1024 subjects with chronic sleep restriction showed an association with reduced leptin, increased ghrelin and elevated BMI.

Taheri S, et al. ***SLEEP*** 2004; 27:A146-7

Sleep Deprivation & Hypertension

- Acutely causes increased sympathetic tone, heart rate, blood pressure and salt retention
- Chronic sleep restriction <5 hours/night leads to 2 fold increase incidence in hypertension

Gangwisch JE, et al. ***Hypertension*** 2006; 47:833–839

Sleep deprivation and Hypertension

- 2813 men & 3097 woman in the Sleep Heart Health Study
- Compared to those getting 7 – 8 hours of sleep, prevalence of hypertension increased:
  - 19% in those sleeping 6 – 7 hours
  - 66% in those sleeping less than 6 hours

Gottlieb DJ et al. ***SLEEP*** 2006; 29:1009-14

Sleep Deprivation & Stroke

- 10 year follow-up of 7844 adults in the NHANES
- Compared to those sleeping 8 or more hours per night, risk of stroke increased:

  - 50% in those sleeping 6 – 8 hours
  - 90% in those sleeping 6 – 8 hours who also had daytime sleepiness.

Qureshi A et al. ***Neurology*** 1997; 48:904-10

Insomnia as a Risk Factor for Psychiatric Disorders

For people with insomnia longer than 1 year:

- 40 times increased risk for developing major depression.
- 25 times increased risk for developing new-onset phobia, obsessive compulsive disorder or panic disorder.

Ford et al, *JAMA* 262:1479-84, 1989

Insomnia as a Risk Factor for Psychiatric Disorders

Soldiers with insomnia prior to deployment in Iraq and Afghanistan were 2 times as likely to develop PTSD after experiencing combat

Gehman, P et al. *SLEEP* 2013; 36(7):1009 - 1018

Impact of Sleep Disturbances on the Course and Treatment of Depression

- Sleep difficulties fail to resolve in 20 – 44%.
- Residual insomnia increased the risk of relapse of depression as well as decreased concentration, sleepiness and diminished performance capacity.
- Over 32 studies linking sleep disturbance to suicidal ideation or completed suicide. Insomnia is overlooked as a suicide risk.
- Sleep disorders lead to slower treatment response, lower remission rates and poorer quality of life
- CBTi doubled the remission rate compared to controls.

Krystal, A *Neural Clin.* 2012; 30(4): 1389 - 1413

Impact of Sleep Disturbances on the Course and Treatment of Alcoholism

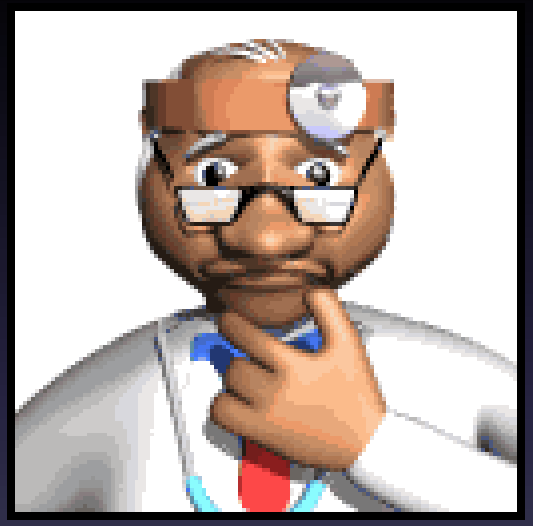
- Prolonged sleep latency at one month and one year increase risk of relapse.

Krystal, A *Neural Clin.* 2012; 30(4): 1389 – 1413

Sleep Disorders:

- are very commonly associated with psychiatric disorders
- increase the risk of developing psychiatric disorders.
- reduce the effectiveness of psychiatric disorder treatment
- may prevent the remission of psychiatric disorder
- increase the risk of relapse
- increase the risk of suicide

So… if sleep restriction is harmful, is sleep extension helpful?



Antihypertensive & Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT)

33,357 randomized hypertensives treated with medication

- Typical 1st year SBP change 6.4 - 9.3 mmHg
- Typical 1st year DBP change 4.2 - 4.7 mmHg

Drug		Baseline mmHg	1st year	Change	5nd year	Change
Chlorthalidone	SBP	146.2	136.9	9.3	133.9	12.3
	DBP	84.0	79.3	4.7	75.4	8.6
Amlodipine	SBP	146.2	138.5	7.7	134.7	11.5
	DBP	83.9	78.7	5.2	74.6	9.3
Lisinopril	SBP	146.4	140.0	6.4	135.9	10.5
	DBP	84.1	79.9	4.2	75.4	8.7

JAMA 2002; 288:2981-2997

Increasing Sleep Duration Lowers BP

- 22 subjects with prehypertension[1] or stage 1 hypertension[2] on no or stable medication, habitually sleeping less than 7 hours per night increased their sleep time an average of 35 minutes (actigraphy) over a 6 week intervention study.
- Subjects with an AHI > 15 and PLM index of > 10 events per hour based on PSG were excluded
- Systolic BP dropped 14 mmHg
- Diastolic BP dropped 7 mmHg

1. Prehypertension – SBP 120-139 & DBP 80-89 mmHg,
2. Hypertension type 1 – SBP 140-159 & DBP 90-99 mmHg

Haack M et al. ***J Sleep Res.*** 2013; 22:295-304

Increasing Sleep Duration Lowers BP

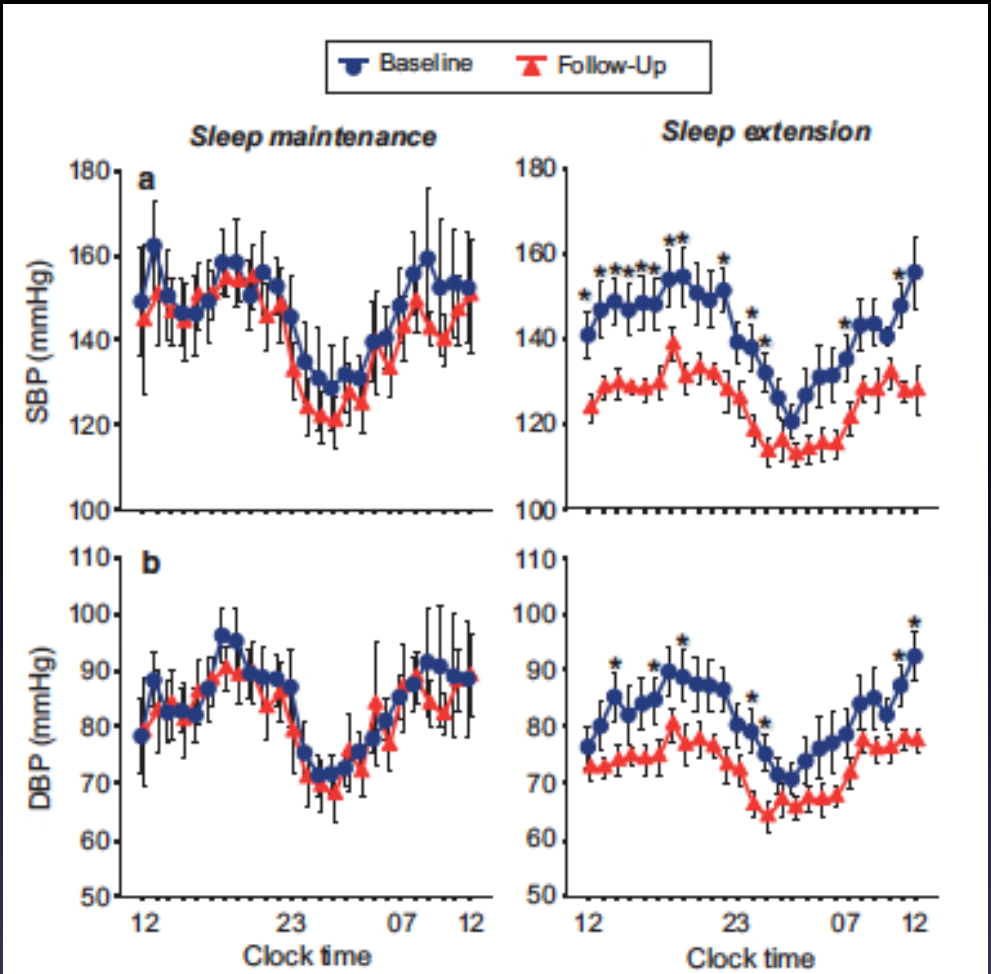


Figure 3. Systolic blood pressure (SBP, a) and diastolic blood pressure (DBP, b) across the 24-h baseline (circles) and follow-up (triangles) period in the sleep maintenance group ($N = 9$) and sleep extension group ($N = 13$). *$P < 0.05$ compared with follow-up measures.

Haack M et al. ***J Sleep Res.*** 2013; 22:295-304

Table 46–2. DIFFERENTIAL DIAGNOSIS OF SLEEP DISORDERS

Insomnia Disorders (Difficulty in Initiating or Maintaining Sleep)

Associated With Behavioral-Psychophysiological Disorders

Adjustment sleep disorder
Psychophysiological insomnia
Inadequate sleep hygiene
Limit-setting sleep disorder
Sleep-onset association disorder
Nocturnal eating (drinking) syndrome
Other

Associated With Psychiatric Disorders

Psychoses
Mood disorders
Anxiety disorders
Panic disorder
Alcoholism
Other

Associated With Environmental Factors

Environmental sleep disorder
Food allergy insomnia
Toxin-induced sleep disorder
Other

Associated With Drug Dependency

Hypnotic-dependent sleep disorder
Stimulant-dependent sleep disorder
Alcohol-dependent sleep disorder
Other

Associated With Sleep-Induced Respiratory Impairment

Obstructive sleep apnea syndrome
Central sleep apnea syndrome
Central alveolar hypoventilation syndrome
Chronic obstructive pulmonary disease
Sleep-related asthma
Altitude insomnia
Other

Associated With Movement Disorders

Sleep starts
Restless legs syndrome
Periodic limb movement disorder
Nocturnal leg cramps
Rhythmic movement disorder
REM sleep behavior disorder
Nocturnal paroxysmal dystonia
Other

Associated With Disorders of the Timing of the Sleep-Wake Pattern

Short sleeper
Time-zone change (jet lag) syndrome
Shift work sleep disorder
Delayed sleep phase syndrome
Advanced sleep phase syndrome
Non–24-h sleep-wake syndrome
Irregular sleep-wake pattern
Other

Associated With Parasomnias (Not Otherwise Classified)

Confusional arousals
Sleep terrors
Nightmares
Sleep hyperhidrosis
Other

Associated With the CNS (Not Otherwise Classified)

Parkinsonism
Dementia
Cerebral degenerative disorders
Sleep-related epilepsy
Fatal familial insomnia
Other

Associated With No Objective Sleep Disturbance

Sleep state misperception
Sleep choking syndrome
Other

Idiopathic Insomnia

Other Causes of Insomnia

Sleep-related gastroesophageal reflux
Fibrositis syndrome
Menstrual-associated sleep disorder
Pregnancy-associated sleep disorder
Terrifying hypnagogic hallucinations
Sleep-related abnormal swallowing syndrome
Sleep-related laryngospasm
Other

Excessive Sleepiness

Associated With Behavioral-Psychophysiological Disorders

Inadequate sleep hygiene
Insufficient sleep syndrome
Limit-setting sleep disorder
Other

Associated With Psychiatric Disorders

Mood disorders
Psychoses
Alcoholism
Other

Associated With Environmental Factors

Environmental sleep disorder
Toxin-induced sleep disorder
Other

Associated With Drug Dependency

Hypnotic-dependent sleep disorder
Stimulant-dependent sleep disorder
Other

Associated With Sleep-Induced Respiratory Impairment

Obstructive sleep apnea syndrome
Central sleep apnea syndrome
Central alveolar hypoventilation syndrome
Sleep-related neurogenic tachypnea
Other

Associated With Movement Disorders

Periodic limb movement disorder
Other

Associated With Disorders of the Timing of the Sleep-Wake Pattern

Long sleeper
Time-zone change (jet lag) syndrome
Shift work sleep disorder
Delayed sleep phase syndrome
Advanced sleep phase syndrome
Non–24-h sleep-wake syndrome
Irregular sleep-wake pattern
Other

Associated With the CNS (Not Otherwise Classified)

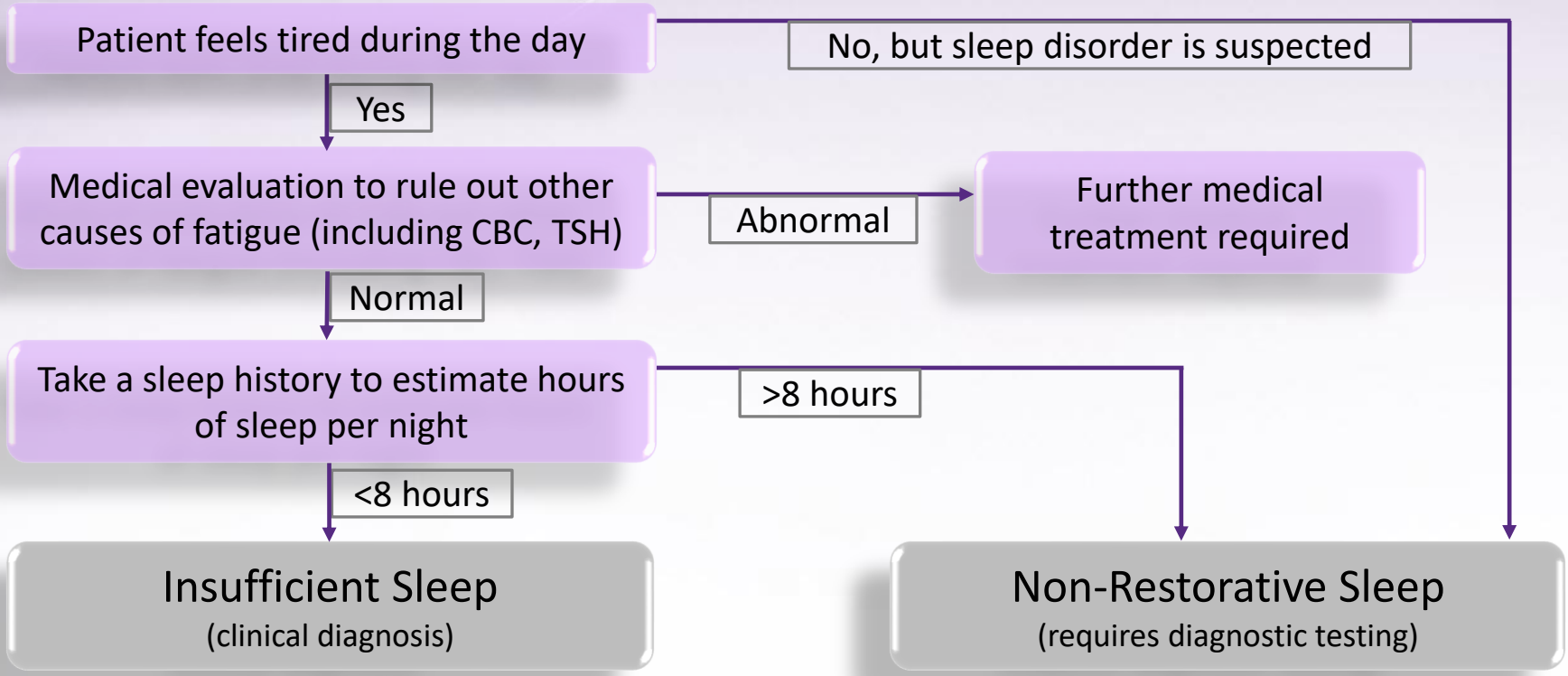
Narcolepsy
Idiopathic hypersomnia
Post-traumatic hypersomnia
Recurrent hypersomnia
Subwakefulness syndrome
Fragmentary myoclonus
Parkinsonism
Dementia
Sleeping sickness
Other

Sleep Disorder Diagnostic Algorithm

- The International Classification of Sleep Disorders (ICSD) 3rd ed lists 65 sleep disorders and 9 normal variants (74 sleep conditions)
- 6 Categories: Insomnias, Hypersomnias, Parasomnias, Breathing Disorders, Circadian Disorders, Movement Disorders
- There are 34 clinically "different" sleep disorders that can be divided into 2 categories (except for snoring and bruxism):
  - Insufficient Sleep (13): clinical diagnoses
  - Non-restorative Sleep (19): requires testing

The "Sleep Disorder Diagnostic Tool" may be used in combination with a "Sleep Questionnaire" (for more information, see BBTi Manual- Appendix B for how to use questionnaire)

Sleep Disorder Diagnostic Algorithm



CBC, complete blood count; TSH, thyroid stimulating hormone.

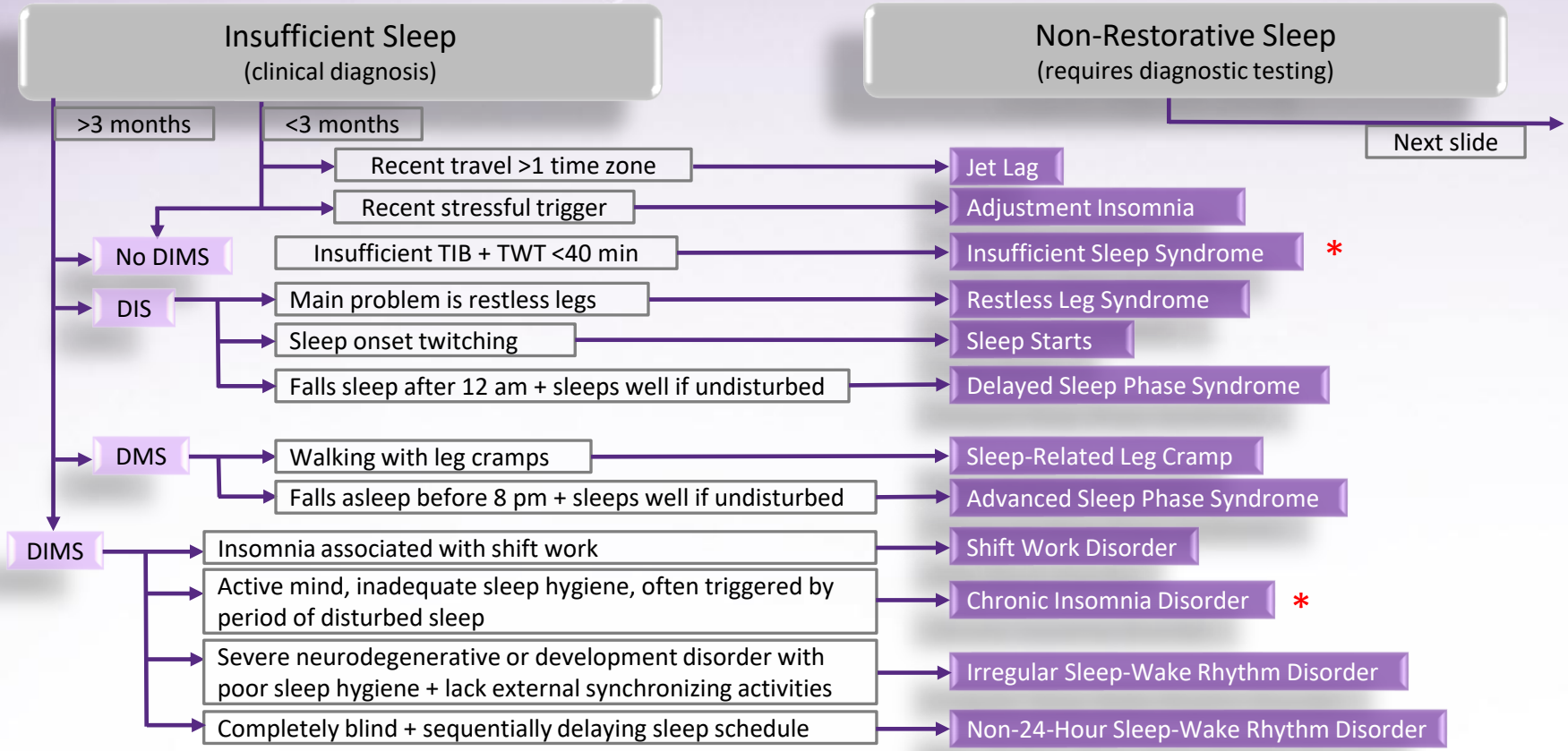
Courtesy of Dr. Ron Cridland. Diagnostic tool available at http://www.goodsleephealth.ca/education/physician_information

Take a Sleep History

- What time do you go to bed?
- How long does it take for you to fall asleep?
- How often do you wake up at night?
- How long does it take to fall back asleep?
- What time do you wake up?

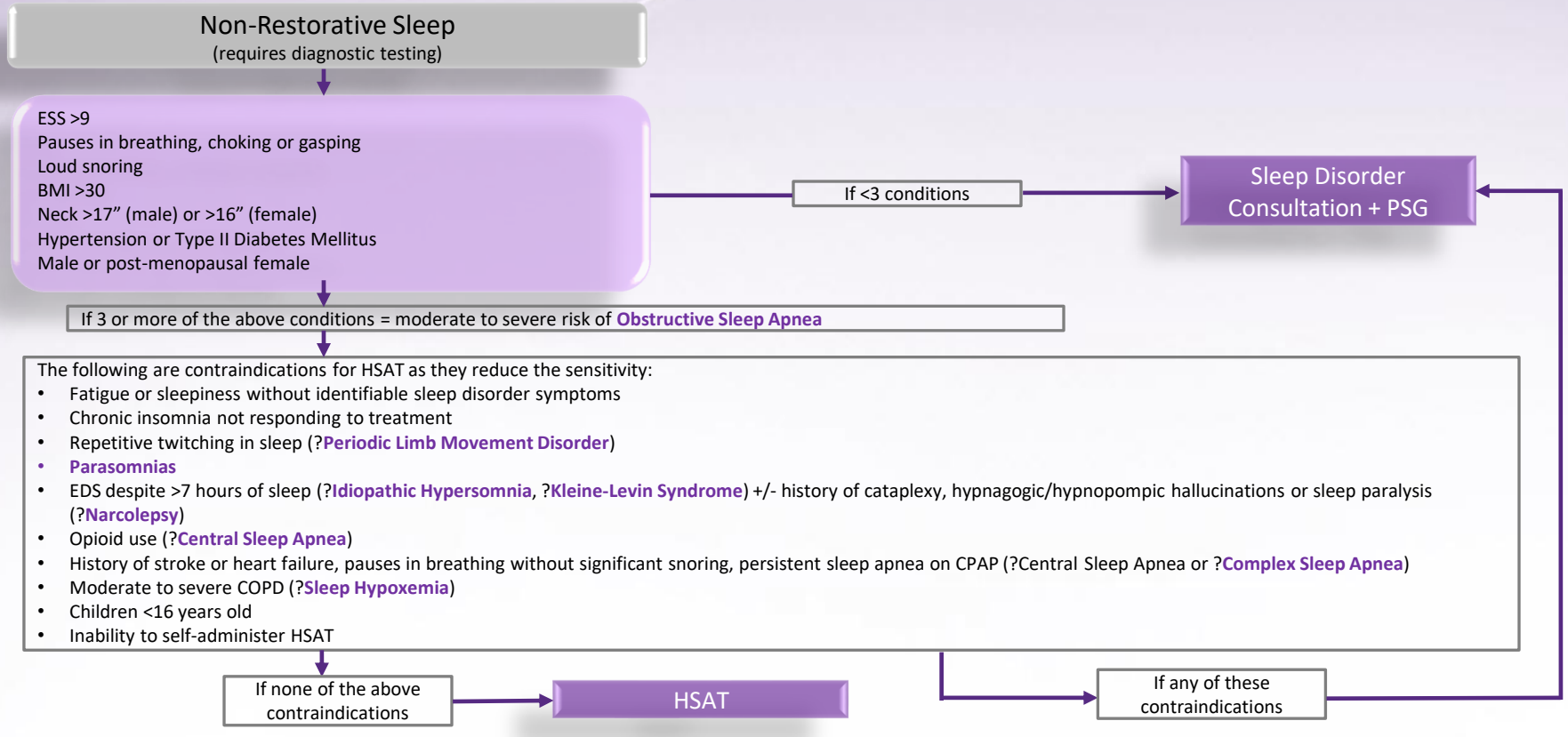
Calculate Estimated # of hours of sleep _____

Diagnostic Algorithm, con't



DIMS, difficulty initiating and/or maintaining sleep; DIS, difficulty initiating sleep, DMS, difficulty maintaining sleep; TIB, time in bed; TWT, total wake time.
Courtesy of Dr. Ron Cridland. Diagnostic tool available at http://www.goodsleephealth.ca/education/physician_information

Diagnostic Algorithm, *cont'd*



BMI, body mass index; CPAP, continuous positive airway pressure; COPD, chronic obstructive pulmonary disease; EDS, excessive daytime sleepiness; ESS, Epworth Sleepiness Scale; HSAT, home sleep apnea test; PSG, polysomnogram.

Courtesy of Dr. Ron Cridland. Diagnostic tool available at http://www.goodsleephealth.ca/education/physician_information

Psychophysiological Insomnia

- Habit of thinking, worrying, planning or problem solving in bed
- Watching the clock, and having anxious, frustrating or angry thoughts about inability to sleep
- Feel nervous or tense in bed
- Light sleeper hearing every little noise

4 Essential Habits

1. Take 1 hour to wind down while avoiding screens
2. Use an alarm so you don’t look at the time
3. Use relaxation to fall asleep and return to sleep
4. Get out of bed if you can’t sleep.

Resources

For information on the “Program for Improved Sleep”, go to:

www.thesleepclinics.ca

www.goodsleephealth.ca


OK, NOW JUST SLEEP NORMALLY...
SLEEP STUDY

Remember...

…good sleep is key to good health.