Breaths are characterized by a semi-sinusoidal wave-like pattern. Transitions from inspiration to expiration, and vice versa, are rounded and smooth.

A reduction in airflow of ≥ 50% of baseline with a 3% desaturation OR a reduction in airflow of ≥ 30% with a 4% desaturation AND lasting for at least 10 seconds.*

A reduction in airflow of ≥ 90% of baseline lasting for at least 10 seconds.*
### SLEEP STAGES:

<table>
<thead>
<tr>
<th>Percentage of Total Sleep Time</th>
<th>Characteristics</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| Stages N1 & N2 5-10% 50%      | • Lightest stages of sleep  
  • Easily woken                                                                 | Initial Transition from wake to sleep  
  Transition between sleep stages                                                            |
| NREM (Non-Rapid Eye Movement) | Stage N3 20%  
  • Also known as Slow Wave Sleep (SWS) or deep sleep  
  • Deepest stage of sleep  
  • Very regular breathing pattern and heart rate | Physical Restoration*  
  Thought to contribute to physical restoration of the body  
  • Immune function and repair (e.g. muscle repair after injury or exercise)  
  • Growth – our largest daily surge of growth hormone occurs in Stage N3 |
| REM (Rapid Eye Movement)      | Stage R 20-25%  
  • Light stage of sleep  
  • Most dreaming occurs during this stage  
  • Complete skeletal muscle paralysis – to prevent people acting out their dreams  
  (except for the ocular (eye) muscles)  
  • Erratic breathing patterns and heart rate. This activity is thought to occur in line  
  with dream activity | Memory Consolidation*  
  • In adults, the main function of REM sleep is believed to be the creation and maintenance of  
  memories  
  • In infancy, REM is believed to be crucial to the establishment of neural pathways ('learning').  
  Infants spend 50% of their sleep time (up to 8 hours a day) in REM sleep |

* The function of sleep is the greatest mystery in sleep medicine: Schools of thought range from ‘it’s not necessary’ to ‘we would die without it’.

### AROUSAL vs AWAKE – WHAT IS THE DIFFERENCE?

An arousal is identified by a disturbance to the EEG (Electroencephalogram – brain waves) that lasts at least 3 seconds, and **is followed by at least 5 seconds of stable sleep**. People are unlikely to be aware of the arousal. Arousals are relevant as they may prevent progression into deeper stages of sleep, thereby affecting sleep quality. An arousal is, therefore, not the same as being awake.

### AHI vs RDI – WHAT IS THE DIFFERENCE?

<table>
<thead>
<tr>
<th>Severity</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHI</td>
<td>5-15</td>
<td>15-30</td>
<td>30+</td>
</tr>
<tr>
<td>RDI</td>
<td>15-20</td>
<td>20-40</td>
<td>40+</td>
</tr>
</tbody>
</table>

### WHAT IS A HYPNOGRAM? (SLEEP HISTOGRAM)

A hypnogram is a picture of how sleep progresses throughout the night. Typically we cycle through all stages four to six times per night. Each cycle lasts around 90 minutes. As the night progresses, our periods of Stage N3 sleep shorten and our REM sleep periods lengthen. We therefore do most of our dreaming later in the night. As you can see, we typically arouse or wake after each cycle of sleep and often many more times throughout the night. As we age, the frequency of these arousals increases significantly.

### PSG: POLY (multiple channel) SOMNO (sleep) GRAPHY (recording) – THE SLEEP STUDY

<table>
<thead>
<tr>
<th>Channel</th>
<th>Displays what?</th>
<th>Identifies/Distinguishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electroencephalogram (EEG)</td>
<td>Brain activity</td>
<td>Sleep stages</td>
</tr>
<tr>
<td>Electrooculogram (EOG)</td>
<td>Eye movement</td>
<td>Onset of REM sleep</td>
</tr>
</tbody>
</table>
| Electromyogram (EMG – chin)     | Muscle activity of chin         | Onset of REM sleep  
  Arousal/Wake                                                                       |
| Oximetry                        | Oxygen saturation of the blood  | Desaturation                                                                              |
| Nasal Flow                      | Breathing pattern               | Apnea  
  Hypopnea  
  Flow limitation                                                                  |
| Respiratory Bands               | Breathing effort                | Obstructive from central events                                                         |
| Electrocardiogram               | Heart rate and rhythm           | Safety measure                                                                            |
| Electromyogram (EMG – leg)      | Muscle activity of legs         | Leg movements                                                                             |