Guidelines for Sleep Study During COVID-19 Pandemic

Released 28 May 2020

OVERVIEW

Since the start of Enhanced Community Quarantine (ECQ) last March 16, 2020 due to the increasing number of COVID-19 cases, certain medical activities were restricted. Medical resources, including health care workers (HCW) were streamlined to respond to the immediate needs of the pandemic. Elective procedures such as sleep studies were cancelled.

Plans for the lifting of the ECQ are underway and will be transitioned to a General Community Quarantine (GCQ). This document aims to provide guidance for the following:

1. To gradually and safely reintroduce sleep study services in hospitals and out of center facilities,
2. To implement best practices for infection control and prevention,
3. To minimize patient, healthcare worker and healthcare provider exposure to COVID-19, and
4. To maintain access and continuity of care for sleep while promoting public health and safety

This is a joint statement of the Philippine Society of Sleep Medicine (PSSM), Philippine Neurological Association (PNA), Philippine College of Chest Physicians (PCCP), Philippine Academy of Pediatric Pulmonology and the Philippine Academy of Sleep Surgery (PASS) of the Philippine Society of Otolaryngology – Head and Neck Surgery (PSO-HNS).

INTRODUCTION

COVID-19 is a new strain of coronavirus that originated in Wuhan, China\(^1\). It is a highly contagious respiratory tract infection that is primarily transmitted through droplets\(^2\). However, certain procedures like suctioning, nebulization, intubation, and non-invasive ventilation (NIV) are aerosol generating which may render the virus airborne. As of today, there is still no specific treatment for this disease and no vaccine is currently available. As of this writing, there are 15,049 COVID-19 cases nationwide (https://www.doh.gov.ph/covid19tracker), with a mortality rate of 6.65\(^%\). It is assumed that 80\% of individuals infected with COVID-19 remain asymptomatic\(^4\), and unless mass COVID-19 testing is available, it would be difficult to assess which individuals have the disease. Currently, infection control measures are the mainstay of preventing this disease\(^5\).

Ideally, the COVID -19 status of the patient should be disclosed as per the Department of Health (DOH) guidelines (Unified COVID-19 Algorithms. Section 1. Guidelines for Primary Care)\(^6\). This approach should be applied to all patients to minimize the risk of virus transmission from a patient that is asymptomatic.
DISCLAIMER

The statements in this guideline are recommendations based on the most recent data available. The application of the guideline should also be adapted to the current capacity of the sleep laboratory and should adhere to existing regulations of the hospital or facility setting. Information on COVID-19 infection is still evolving and if there are circumstances not covered by this guideline, decisions should be weighed on the side of safety for both the staff and patient.

GENERAL CONSIDERATIONS


1. COVID SUSPECT – Persons under investigation (PUI) with mild, severe or critical symptoms who has not undergone any test.
2. COVID PROBABLE – PUI with mild, severe or critical symptoms who had undergone test but no results yet that showed positive for COVID-19.
3. COVID CONFIRMED – Positive for COVID-19 test

The WHO and DOH recommend the use of RT-PCR for testing of COVID-198,9. Based on the “Revised Interim Guidelines on Expanded Testing for COVID-19” of the DOH, the following conditions define a person at risk and would warrant a RT-PCR test: (1) suspect cases, or (2) individuals with relevant history of travel and exposure (or contact), whether symptomatic or asymptomatic, and (3) health care workers with possible exposure, whether symptomatic or asymptomatic. The exposure should have had occurred within 2 to 14 days from the onset of symptoms of a confirmed or probable case with the following scenarios: (1) Face-to-face contact with a confirmed case within 1 meter and for more than 15 minutes, (2) Direct physical contact with a confirmed case (3) Direct care for a patient with probable or confirmed COVID-19 disease without using proper personal protective equipment. The use of Rapid Antibody Test kits should not be used alone to diagnose COVID-19.

TRIAGE AND SCREENING

1. It is recommended that face to face consultation be avoided whenever possible during the pre-sleep test preparation of the patient10. A review of clinical, epidemiological and travel history of patient should be mandatory. Pursuant to REPUBLIC ACT No. 11332 “Mandatory Reporting of Notifiable Diseases and Health Events of Public Health Concern Act”, patients are required to provide truthful information about their health condition and possible exposure11.
   a. Pre-screening prior to appointment - Use phone calls, online portals, telemedicine, or online assessment tools12.
      i. Review COVID-19 symptoms. (see Appendix 1)
         1. Fever (T≥37.8°C)
         2. Respiratory symptoms
a. Cough  
b. Shortness of breath  
c. Colds  
d. Throat pain  
e. Other respiratory symptoms  

3. Influenza-like symptoms (headache, muscle and joint pains, diarrhea and lack/changes in taste and smell)  

ii. Review COVID-19 exposure status (see Appendix 1)  
   1. Contact with person having COVID-19 symptoms for the past 2 weeks.  
   2. Travel outside the Philippines.  
   3. Travel to any area in the NCR and other regions confirmed to have COVID-19 cases.  

iii. Reschedule patients with symptoms, history of exposure to COVID-19, pending COVID-19 tests or if COVID CONFIRMED.  

b. Re-assess patient (via phone call, SMS, email, messaging app, etc.) one (1) day before the scheduled sleep study, if the patient develop symptoms related to COVID-19 or had exposure to COVID-19. Reschedule patients if COVID-19 infection is suspected.  

c. Screening upon arrival at the sleep center.  
   i. Check temperature and screen patients for COVID-19 symptoms and exposure status upon arrival at the facility.  
   ii. Reschedule patients with symptoms, history of exposure to COVID-19, pending COVID-19 test, or CONFIRMED COVID-19 positive test.  
   iii. Refer for diagnostic testing or clinical care as appropriate.  

2. Screening of sleep laboratory staff  
   a. Health care personnel or staff must be routinely screened for COVID-19 symptoms and exposure. Temperature check must be done prior to the start of their duty. If a staff develops fever or other symptoms related to COVID-19, they will be immediately sent to the hospital employees’ clinic, emergency room, or Regional Epidemiology and Surveillance Unit (RESU), whichever is applicable at the location of the sleep laboratory.  
   b. Implement a flexible or reduced scheduling to account for staff needing to be off due to illness or quarantine.  
   c. Depending on the availability of COVID-19 tests, staff should be regularly tested with an adequate interval to ensure the COVID-19 status among the members of the sleep laboratory, which includes sleep technicians, cleaning staff and other personnel.  

INFECTION CONTROL  

1. Patient  
   a. Promote physical distancing in the sleep laboratories. Chairs in the waiting area should be spaced one (1) meter apart to avoid crowding. Minimize time filling up forms by sending them ahead of time via email. Instructions may be given ahead of time via phone call or teleconsult to minimize face to face encounters.
b. Patient should wear a face mask at all times until advised by the sleep technician during hook-up and sleep study proper.

c. Companions are discouraged unless necessary for the care of the patient (i.e. children, elderly, certain medical and mental incapacities) but only limited to one (1) person. Accompanying person should also be screened for Covid-19 symptoms and exposure prior to getting an appointment, one day prior and on the day of scheduled appointment. Reschedule procedure if COVID-19 infection is suspected.

d. Sanitation supplies, such as paper towels, hand soap, waste container and alcohol-based sanitizers, should be readily accessible in the sleep laboratory.

e. Showering after the sleep study is encouraged before heading home.

2. Sleep technologist
   a. Use appropriate Personal Protective Equipment (PPE) at all times. Follow CDC (Appendix 2) or seek hospital/facility guideline for PPE use. Detailed examples of PPE classification systems have been described (Appendix 3) and may be applied similarly. For diagnostic sleep studies, a minimum PPE consisting of a fit tested N95 mask (or equivalent), goggles and/or face shield is recommended. Clean non-sterile gloves if with contact with blood, body fluids, mucous membranes, non-intact skin or contaminated equipment is anticipated. Gloves should be changed after every contact with the patient. (See Appendix 7 for self-fit testing of N95 mask.)
   i. For titration or split night studies, a N95 mask (or equivalent) that is fit tested should be used instead of a surgical mask.
   ii. Proper donning and doffing procedures is strictly followed at all times (see CDC recommended procedure in Appendix 4).

b. Physical distancing of sleep staff to co-worker, patient’s companion and patient is to be observed at all times especially inside the control room.

c. Showering after shift is encouraged before heading home.

3. Facility
   a. The application of positive airway pressure (PAP) therapy will result in aerosolization of the virus during the sleep study. If the patient is for PAP titration, it should ideally be performed in a negative pressure room. If a negative pressure room is not available, the room should be fitted with a high-efficiency particulate air (HEPA) filter at the very least (see Appendix 5 for the ideal clean air delivery rate of HEPA filter units in cubic meters per hour).

SLEEP STUDIES

1. The quarantine level set by the Interagency Task Force for Emerging Infectious Disease (IATF-EID) should guide the sleep laboratory on its operation. These recommendations apply for both Level 1 and Level 2 Sleep Studies.
a. Enhanced Community Quarantine (ECQ)
   i. Only diagnostic sleep studies may be performed.
   ii. If PAP titration is necessary for urgent cases, the patient should have a negative COVID-19 PCR test and had practiced self-quarantine for at least a week prior to the study.
   iii. PAP titration should be performed in a negative pressure room. If a negative pressure room is not available, the room should be fitted with a High Efficiency Particulate Air or High Efficiency Particulate Arrestance (HEPA) filter at the very least.

   - An air change per hour (ACH) rate of ≥12 is recommended. The hospital engineering department should be contacted to provide ACH information in the event that a portable HEPA filter unit is necessary to augment the existing fixed heating, ventilation, and air-conditioning (HVAC) system for air cleaning 18.
   iv. Sleep technicians must wear level 3 PPE which consist of the following: cap, goggles/face shield, N95 respirator, gloves, shoe covers and surgical gown.
   v. Defer sleep studies for children, pregnant, and elderly patients, unless there is an urgent medical reason.
   vi. Patients with co-morbidities (i.e. hypertension, diabetes, obese, etc.) should be cleared by the sleep doctor or referring physician prior to the sleep study.
   vii. Do not operate PAP devices in a clinic setting.

b. Modified Enhanced Community Quarantine (MECQ) – same recommendations as ECQ
c. General Community Quarantine (GCQ)
   i. COVID-19 status of patient may be determined using appropriate screening questionnaires prior to scheduling and re-evaluation on the day of the sleep study.
   ii. Positive airway pressure titration may be done based on the clinical judgement of the sleep physician. It should be performed in a negative pressure room. If a negative pressure room is not available, the room should be fitted with a HEPA filter at the very least.
      - An air change per hour (ACH) rate of $>12$ is recommended. The hospital engineering department should be contacted to provide ACH information in the event that a portable HEPA filter unit is necessary to augment the existing fixed heating, ventilation, and air-conditioning (HVAC) system for air cleaning$^{18}$. 

Figure 1: Decision tree for polysomnography (PSG) during Enhanced Community Quarantine (ECQ) and Modified Enhanced Community Quarantine (MECQ).
iii. Sleep technician should wear level 3 PPE during a PAP titration. A level 3 PPE must consist of the following: cap, goggles, face shield, N95 respirator, gloves, shoe covers and surgical gown

iv. Children, pregnant, elderly and those with co-morbidities (diabetes mellitus, hypertension, etc.) can be scheduled based on the clinical judgement of the sleep doctor or referring physician.

v. A COVID-19 RT-PCR test could be requested based on the clinical judgement of the sleep doctor prior to a titration or split-night study.

vi. Do not operate PAP devices in a clinic setting without appropriate PPE.

**d. Normal – same recommendations as GCQ until further notice.**

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![Decision tree for polysomnography (PSG) during General Community Quarantine (GCQ)](image)

**Figure 2: Decision tree for polysomnography (PSG) during General Community Quarantine (GCQ)**

2. Home Sleep Apnea Testing (HSAT) – Level 3 sleep study.
a. Patients must be evaluated before recommending a HSAT based on the PSSM guideline for Home Sleep Study\textsuperscript{19} (Appendix 6). This should be done via teleconsultation (phone call or video conference), whichever is available.
b. Use of delivery system or pick-up for HSAT is preferred.
c. Demonstration of HSAT device installation and operation should be done by video call or video tutorial. Provider must be available to answer inquiries and troubleshoot for the duration of the HSAT testing.
d. Disinfection of the HSAT based on the recommended manufacturer guidelines is done every after use. Use of disposable over re-usable materials is preferred, if available.
e. The HSAT must be read and interpreted by a PSSM fellow.
f. The above recommendations apply to any quarantine level until further notice.
REFERENCES


APPENDIX

Appendix 1. Samples of Covid-19 Health Declaration Form.

<table>
<thead>
<tr>
<th>PSO-HNS COVID-19 SCREENING AND TRIAGING TOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
</tr>
<tr>
<td>Address:</td>
</tr>
<tr>
<td>Guardian/Accompanying Person:</td>
</tr>
</tbody>
</table>

We would like to ask for your cooperation to fill up this form truthfully.

Questions: Please place a check (✓) in the appropriate column

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In the past 14 days, do you have or have had any of the following symptoms?</td>
<td></td>
</tr>
<tr>
<td>Fever (temp &gt;38°C)</td>
<td>✓</td>
</tr>
<tr>
<td>Cough</td>
<td></td>
</tr>
<tr>
<td>New onset or worsening shortness of breath</td>
<td>✓</td>
</tr>
<tr>
<td>Cold (nasal congestion/discharge)</td>
<td></td>
</tr>
<tr>
<td>Sore throat</td>
<td>✓</td>
</tr>
<tr>
<td>Body ache/muscle pain</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
</tr>
<tr>
<td>New onset loss or decreased sense of smell and/or taste</td>
<td></td>
</tr>
</tbody>
</table>

2. In the past 14 days, did you have close contact with any COVID-19 positive/suspected/probable cases or people with the previously mentioned symptoms, while not wearing proper protective equipment (ex. face mask)?

3. In the past 14 days, did you travel to or reside in a country with community transmission (e.g. USA, Italy, Germany, Iran, Indonesia) or in local hot zones/areas under enhanced community quarantine (e.g. Metro Manila, Central Luzon, CALABARZON)?

*Refer to the following websites for updates on community transmission:
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/
https://ncovtracker.doh.gov.ph/

Patient’s/Guardian’s/Accompanying Person’s Signature:

➢ If the answer is YES to ANY of the questions, refer to the nearest COVID-19 testing facility for further screening, possible testing and appropriate management. Consider offering telemedicine for other ENT concerns.

➢ If the answer is NO to ALL questions, may proceed with consultation either through telemedicine or face-to-face.

From the Philippines Society of Otolaryngology – Head and Neck Surgery.

PSO-HNS C-19A Appendix B

www.pso-hns.org  psohns@pso-hns.org  www.facebook.com/PSOHNSS

28 May 2020
**OPD Patient Screening Form**

<table>
<thead>
<tr>
<th>In the past two weeks did the patient have any of the following:</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Respiratory symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Cough</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Shortness of breath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Colds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Throat pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Other respiratory symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Influenza-like symptoms (headache, muscle and joint pains, diarrhea, lack of smell or taste)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fever more than 38°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. History of COVID-19 infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Household member diagnosed with COVID-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Travel or Residence in an area reporting local transmission of COVID-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Contact or exposure to someone with recent travel to an area with local transmission of COVID-19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If a patient answers YES to ANY of the questions, refer to the Emergency Department or the designated COVID-19 area in your facility for COVID-19 screening.

*From the Infection Prevention and Control Guidelines for Outpatient Clinic Resumption in the Context of Covid-19 (ver. 1.0, 17 May 2020) by the Philippines Society for Microbiology and Infectious Disease, Philippine Hospital Infection Control Society and the Philippine College of Physicians.*
Appendix 2. CDC Guidelines. Covid-19 Personal Protective Equipment (PPE) for Healthcare Personnel
Appendix 3. Levels of personal protective equipment for healthcare workers

<table>
<thead>
<tr>
<th>Philippine General Hospital – Hospital Infection Control Unit</th>
<th>National Health Service, United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels</td>
<td>PPE</td>
</tr>
<tr>
<td>Level 1</td>
<td>Goggles</td>
</tr>
<tr>
<td></td>
<td>Surgical mask or face shield</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2 CONTACT DIRECT or INDIRECT CONTACT PRECAUTIONS</td>
<td>Disposable apron</td>
</tr>
<tr>
<td></td>
<td>Fluid-resistant disposable gown</td>
</tr>
<tr>
<td></td>
<td>Disposable gloves</td>
</tr>
<tr>
<td></td>
<td>Consider (if risk of spraying or splashing):</td>
</tr>
<tr>
<td></td>
<td>• Fluid-resistant Type IIR surgical face mask</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>Cap</td>
</tr>
<tr>
<td></td>
<td>Goggles</td>
</tr>
<tr>
<td></td>
<td>N95 respirator</td>
</tr>
<tr>
<td></td>
<td>Gloves</td>
</tr>
<tr>
<td></td>
<td>Gown or coverall</td>
</tr>
<tr>
<td>Level 2 DROPLET DROPLET PRECAUTIONS</td>
<td>Disposable apron</td>
</tr>
<tr>
<td></td>
<td>Consider fluid-resistant disposable gown if apron provides inadequate cover for the procedure/task being performed</td>
</tr>
<tr>
<td></td>
<td>Disposable gloves</td>
</tr>
<tr>
<td></td>
<td>Fluid-resistant Type IIR surgical face mask and goggles OR fluid resistant type IIR surgical face mask and full face visor</td>
</tr>
<tr>
<td>Level 3</td>
<td>Cap</td>
</tr>
<tr>
<td></td>
<td>Goggles and Face shield</td>
</tr>
<tr>
<td></td>
<td>N95 respirator</td>
</tr>
<tr>
<td></td>
<td>Gloves</td>
</tr>
<tr>
<td></td>
<td>Shoe covers</td>
</tr>
<tr>
<td></td>
<td>Surgical gown</td>
</tr>
<tr>
<td></td>
<td>Scrub suits</td>
</tr>
<tr>
<td>Level 2 AIRBORNE AIRBORNE PRECAUTION</td>
<td>Disposable apron</td>
</tr>
<tr>
<td></td>
<td>Consider fluid-resistant disposable gown if apron provides inadequate cover for the procedure/task being performed</td>
</tr>
</tbody>
</table>
| Level 4 | Coveralls  
Goggles/face shield  
N95 respirator  
PAPR (powered air purifying respiratory)  
Double gloves  
Shoe covers  
Dedicated shoes  
Scrub suits | • Disposable gloves  
• Filtering face piece 3  
• (FFP3) respirator and eye protection or a powered hood respirator |
| Level 3 **ENHANCED** | • Reinforced fluid-resistant long-sleeve surgical gown  
• Disposable fluid-resistant hood (if wearing a gown without an attached hood)  
• Full length disposable plastic apron  
• FFP3 respirator or powered hood respirator  
• Disposable full face visor  
• 2 sets of long or extended cuff non-sterile, non-latex disposable gloves  
• Surgical wellington boots or closed shoes  
• Disposable boot covers |

Note: The blank cells in rows indicate that the corresponding levels of the two PPE level classifications are not equivalent due to differences in levels of skin and respiratory protection.
Appendix 4. CDC Guidelines on Proper Donning and Doffing

How to Put On (Don) PPE Gear

More than one donning method may be acceptable. Training and practice using your healthcare facility’s procedure is critical. Below is one example of donning.

1. **Identify and gather the proper PPE to don.** Ensure choice of gown size is correct (based on training).
2. **Perform hand hygiene using hand sanitizer.**
3. **Put on isolation gown.** Tie all of the ties on the gown. Assistance may be needed by other healthcare personnel.
4. **Put on NIOSH-approved N95 filtering facepiece respirator or higher (use a facemask if a respirator is not available).** If the respirator has a nosepiece, it should be fitted to the nose with both hands, not bent or tented. Do not pinch the nosepiece with one hand. Respirator/facemask should be extended under chin. Both your mouth and nose should be protected. Do not wear respirator/facemask under your chin or store in scrubs pocket between patients.*
   - Respirator: Respirator straps should be placed on crown of head (top strap) and base of neck (bottom strap). Perform a user seal check each time you put on the respirator.
   - Facemask: Mask ties should be secured on crown of head (top tie) and base of neck (bottom tie). If mask has loops, hook them appropriately around your ears.
5. **Put on face shield or goggles.** Face shields provide full face coverage. Goggles also provide excellent protection for eyes, but fogging is common.
6. **Perform hand hygiene before putting on gloves.** Gloves should cover the cuff (wrist) of gown.
7. **Healthcare personnel may now enter patient room.**

*Facilities implementing reuse or extended use of PPE will need to adjust their donning and doffing procedures to accommodate those practices.

How to Take Off (Doff) PPE Gear

More than one doffing method may be acceptable. Training and practice using your healthcare facility’s procedure is critical. Below is one example of doffing.

1. **Remove gloves.** Ensure glove removal does not cause additional contamination of hands. Gloves can be removed using more than one technique (e.g., glove-in-glove or bird beak).
2. **Remove gown.** Untie all ties (or unsnap all buttons). Some gown ties can be broken rather than untied. Do so in gentle manner, avoiding a forceful movement. Reach up to the shoulders and carefully pull gown down and away from the body. Rolling the gown down is an acceptable approach. Dispose in trash receptacle. *
3. **Healthcare personnel may now exit patient room.**
4. **Perform hand hygiene.**
5. **Remove face shield or goggles.** Carefully remove face shield or goggles by grabbing the strap and pulling upwards and away from head. Do not touch the front of face shield or goggles.
6. **Remove and discard respirator (or facemask if used instead of respirator).** Do not touch the front of the respirator or facemask.*
   - Respirator: Remove the bottom strap by touching only the strap and bring it carefully over the head. Grasp the top strap and bring it carefully over the head, and then pull the respirator away from the face without touching the front of the respirator.
   - Facemask: Carefully untie (or unhook from the ears) and pull away from face without touching the front.

7. **Perform hand hygiene after removing the respirator/facemask and before putting it on again if your workplace is practicing reuse.** *

*Facilities implementing reuse or extended use of PPE will need to adjust their donning and doffing procedures to accommodate those practices.
### Appendix 5: Ideal Clean Air Delivery Rate (CADR) in Cubic Meters per Hour of HEPA filters

<table>
<thead>
<tr>
<th>Floor Area in m²</th>
<th>CADR (m³/hour)</th>
<th>CADR (ft³/minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>259.20</td>
<td>152.56</td>
</tr>
<tr>
<td>12</td>
<td>345.60</td>
<td>203.41</td>
</tr>
<tr>
<td>15</td>
<td>432.00</td>
<td>254.27</td>
</tr>
<tr>
<td>18</td>
<td>518.40</td>
<td>305.12</td>
</tr>
<tr>
<td>21</td>
<td>604.80</td>
<td>355.97</td>
</tr>
<tr>
<td>24</td>
<td>691.20</td>
<td>406.82</td>
</tr>
</tbody>
</table>
Appendix 6: Philippine Society of Sleep Medicine (PSSM) Guideline for HSAT

Question 5: Can portable monitors or other diagnostic tests be used as an alternative to PSG in the diagnosis of OSA?

Answer: The use of Portable Monitors (at least type 3) is RECOMMENDED as an alternative to Polysomnography for diagnostic testing in patients suspected of OSA provided all of the following conditions are met:

- High risk for moderate to severe OSA
- Do not have serious co-morbidities
- Other sleep disorders are not a consideration, and
- With a prior comprehensive sleep evaluation by a sleep specialist.

The following tools are NOT RECOMMENDED to diagnose OSA:

- Type 4 Portable Monitors
- Overnight oximetry
- Auto-titrating Positive Airway Pressure (APAP)
- Multiple Sleep Latency Testing (MSLT), and
- Actigraphy

Summary of Evidence:

No clinical prediction model can reliably predict the severity of obstructive sleep apnea and therefore, objective testing is necessary. There are two accepted methods of objective testing; the in-laboratory polysomnography (PSG) and home testing with portable monitors (PM). PSG is considered the reference standard for diagnosing OSA, but it is expensive, requires specialized facilities and it is not readily accessible.

The American Academy of Sleep Medicine (AASM) classifies sleep studies into 4 types (Table 6). Type 1 monitors are facility-based PSG overseen by a technician. Type 2 monitors are portable, measure most of the same channels (physiologic parameters) as type 1 monitors (including ≥2 respiratory channels), and can differentiate between sleep and awake states but with no technician present. Type 3 monitors also measure at least 2 respiratory channels but cannot reliably distinguish between sleep and awake states. Type 4 monitors are super simplified studies with a 1-2 channel apparatus (oximetry and/or breathing).
The term Respiratory disturbance index (RDI) has been defined differently when used with portable monitors. In the standard PSG, RDI is defined as apnea + hypopnea/total sleep time while the RDI in the PM is the number of apneas + hypopneas/total recording time. As a result, portable monitors are likely to underestimate the severity of respiratory events compared with PSG. The other disadvantages of PM include its inability to evaluate the quality of sleep, and other non-respiratory sleep disorders cannot be evaluated. Home sleep apnea testing or PM has the advantages that the patient sleeps in his/her own bed, thus the sleep pattern may be more representative of everyday sleep. PM reduces health-care costs and waiting times, and makes the diagnosis of OSA accessible to centers that do not have conventional PSG available.

Based largely on the results of the systematic review, the PMs must have not have fewer than three channels and/or at a minimum will record airflow, respiratory effort & blood oxygenation and the result of which could be used by a treating physician to diagnose OSA.

Before doing the diagnostic test, a complete clinical evaluation of the patient should be carried out by a sleep specialist with experience in these disorders in order to decide what type of study would be the most adequate.

Studies done using Type-3 PM interpreted by a sleep specialist, in conjunction with a comprehensive sleep evaluation, can be used for diagnostic testing in patients with a high pre-test probability for moderate to severe OSA who do not have comorbid cardiopulmonary or neuromuscular disorders, or in whom other sleep disorders are not a consideration PM testing may also be used for the diagnosis of OSA in patients for whom in-laboratory PSG is not possible due to immobility, safety or critical illness and to monitor response to non-CPAP therapies (Consensus).

The Australasian Sleep Association & Thoracic Society of Australia and New Zealand (ASA/TSANZ) states that - that if portable, limited channel sleep studies are to be used, this should only be under the supervision of an accredited sleep physician who is familiar with the strengths and weaknesses of these types of studies and who is knowledgeable about the specific device to be used.

Table 6. Comparison of Various Types of Sleep Studies according to AASM

<table>
<thead>
<tr>
<th>Description</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures</td>
<td>Standard PSG</td>
<td>Standard PSG-research</td>
<td>PM for sleep apnea</td>
<td>Continuous single or dual bio-parameter</td>
</tr>
<tr>
<td></td>
<td>Minimum 7 channels: EEG, EOG, EMG, ECG, Airflow, respiratory effort, O2 sat</td>
<td>Minimum of 7 channels</td>
<td>Minimum of one channel: O2 sat, flow, or chest movement</td>
<td></td>
</tr>
<tr>
<td>Body Position</td>
<td>Measured</td>
<td>Can measure</td>
<td>Can measure</td>
<td>Not measured</td>
</tr>
<tr>
<td>Leg Movement</td>
<td>Measured</td>
<td>Measured</td>
<td>Measured</td>
<td>Not measured</td>
</tr>
<tr>
<td>Personnel</td>
<td>Attended</td>
<td>Unattended</td>
<td>Unattended</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

Adapted from Hesselbacher S et al. Sleep Medicine Clinics 2011. 6: 261-82.
The utility of PM as a diagnostic test in those cases with low probability of OSA is not validated and thus its use in this group of patients is uncertain.

Regarding the usefulness of PM for the assessment in patients with co-morbid medical condition, the ASSM 2009, SEPAR 2010, CTS 2011 and the ACP 2014 shared the same statement that it is not recommended to be used for diagnosing OSA patients with serious medical condition such as COPD, CHF, or neurologic disorders since this group of patients were often excluded in most studies, and thus its utility is unknown. This recommendation is however based only on moderate quality evidence.
Appendix 7: Performing self-fit testing for N95 masks

**How to Do a Positive Pressure User Seal Check**

A positive pressure seal check is conducted on respirators without exhalation valves.

Once the particulate respirator has been properly donned, the user must place their hands over the facepiece, covering as much surface area as possible. They must then exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure is built up inside the facepiece without any evidence of outward leakage of air at the seal. Examples of leakage include feeling of air movement on the user’s face along the seal of the facepiece, fogging of glasses, or a lack of pressure being built up inside the facepiece.

If air leaks are noted around the nose, the nosepiece must be readjusted and molded to the nose area. Readjust the straps along the sides of the head until a proper seal is achieved.

![Illustrated steps in performing a positive pressure seal check](image)

**How to Do a Negative Pressure User Seal Check**

Negative pressure seal checks are typically conducted on particulate respirators that have exhalation valves. To do this, the user must cover the surface of the filter with their hands as much as possible and then inhale. The facepiece should collapse on the user’s face and the user should not feel air passing between his/her face and the facepiece.

If air leaks are noted around the nose, the nosepiece must be readjusted and molded to the nose area. Readjust the straps along the sides of the head until a proper seal is achieved.

If unable to achieve a proper seal due to air leakage, the user may need to be fit tested for a different respirator model or size.
A negative pressure seal check

The User Seal Check is Not a Substitute for Fit Testing

A user seal check does not have the sensitivity and specificity of qualitative and quantitative fit test methods, and is not meant to replace them. A user must only wear respirator models which have been successfully fit tested on them within the past year.