


Supervisor & Project Information Form

Please complete and return via email ONLY to gdip.hres@utoronto.ca by **Monday September 30, 2019**

Supervisor Information

MUST have unrestricted SGS appointment (appointment to supervise graduate students)

Name: Mark Boulos	Email: mark.boulos@sunnybrook.ca
SGS Department: Institute of Medical Science 	Field of Research: Sleep disorders Cognitive impairment / dementia Cerebrovascular disease Other Neurological disease
Research Institution affiliation (if applicable): Sunnybrook Research Institute	Location of Work: Sunnybrook Health Sciences Centre
Student contact time (number of hours per week YOU are available to the student for any concerns or to review progress): 2-4 hours (more time if necessary, particularly at the beginning of the terms)	

Project Information (will be posted on GDipHR website for student access)

TITLE:

ENhancing Outcomes in Cognitive Impairment through use of Home Sleep Apnea Testing: A Randomized Controlled Trial (ENCHANT study)

DESCRIPTION (MAX 500 WORDS):

STUDY RATIONALE: Diagnosing obstructive sleep apnea (OSA) in patients with cognitive impairment is imperative because OSA is prevalent in the aging population, linked with cognitive deficits and other unfavourable outcomes, but is readily treatable. Treatment of OSA using continuous positive airway pressure (CPAP) has been shown to stabilize or improve cognition,^{1, 2} enhance function,³ improve mood,^{4, 5} as well as increase quality of life.⁵ Completion of sleep testing using either in-laboratory polysomnography or home sleep apnea testing is required to diagnose OSA,⁶ however, in-laboratory polysomnography remains the standard diagnostic tool. Unfortunately, in-laboratory polysomnography is expensive and particularly inconvenient for patients with cognitive impairment who may be dependent on others for care and may require a familiar environment for sleep and to avoid delirium. Home sleep apnea testing has been validated against in-laboratory polysomnography,⁷ and may be a more convenient, accessible, as well as economically attractive alternative method for diagnosing OSA. Moreover, our prior work has shown that home sleep apnea testing is feasible for use in patients with cognitive impairment.^{8, 9} Although there are many potential advantages to using home sleep apnea testing in cognitively impaired patients, this technique is not standard in medical practice. Use of home sleep apnea testing would have the potential to facilitate completion of sleep testing in this clinical population, which would increase diagnosis and treatment of OSA and lead to potentially improved clinical outcomes such as cognition, functional status, mood and quality of life; this approach would also likely improve patient satisfaction and reduce healthcare expenditures. Demonstration of the superiority of home sleep apnea testing over in-laboratory polysomnography across multiple important clinical outcomes, patient satisfaction, and cost-effectiveness could encourage funding models that promote home-based sleep testing.

PRIMARY HYPOTHESIS: In patients with cognitive impairment, use of home sleep apnea testing compared to in-laboratory polysomnography will result in a greater number of patients who complete sleep testing by 6 months post-randomization.

SECONDARY HYPOTHESES: We anticipate that home sleep apnea testing will be superior to in-laboratory polysomnography in terms of the proportion of patients diagnosed with OSA, treated with CPAP, and other clinical outcomes of interest (i.e. cognition, functional status, ambulatory blood pressure, mood, caregiver burden, sleep-related measures, and health-related quality of life) at 6 months post-randomization. Furthermore, we anticipate that the use of home sleep apnea testing will be linked with greater patient satisfaction compared to in-laboratory polysomnography, and that home sleep apnea testing will also be cost-effective for the healthcare system compared to in-laboratory polysomnography.

If human subjects are involved, have the appropriate Research Ethics Board approvals been obtained?

Yes No Application **Approved** (Date: May 21, 2019)

Do you expect this work will be published within the 20 months?

Yes No Uncertain / Other

Student Roles & Responsibilities (please be as specific as possible)

Please indicate who will serve as the student's direct report for daily oversight (PI, PhD student, technician, etc...)

- The student will report directly to Dr. Mark Boulos for daily oversight
- His/her/their responsibilities will be:
 - Participation in weekly lab meetings with Dr. Boulos
 - Patient recruitment
 - Baseline and follow-up assessments
 - Preparation of Research Ethics Board amendments
 - Manuscript preparation and submission

REFERENCES

1. Bucks RS, et al. Neurocognitive function in obstructive sleep apnoea: A meta-review. *Respirology*. 2013;18:61-70.
2. Aaronson JA, et al. Effects of continuous positive airway pressure on cognitive and functional outcome of stroke patients with obstructive sleep apnea: A randomized controlled trial. *J Clin Sleep Med*. 2016;12:533-541.
3. Ryan CM, et al. Influence of continuous positive airway pressure on outcomes of rehabilitation in stroke patients with obstructive sleep apnea. *Stroke*. 2011;42:1062-1067.
4. Sandberg O, et al. Nasal continuous positive airway pressure in stroke patients with sleep apnoea: A randomized treatment study. *Eur Respir J*. 2001;18:630-634.
5. McEvoy RD, et al. Cpap for prevention of cardiovascular events in obstructive sleep apnea. *N Engl J Med*. 2016;375:919-931.
6. Epstein LJ, et al. Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults. *J Clin Sleep Med*. 2009;5:263-276.
7. El Shayeb M, et al. Diagnostic accuracy of level 3 portable sleep tests versus level 1 polysomnography for sleep-disordered breathing: A systematic review and meta-analysis. *CMAJ*. 2014;186:E25-51.
8. Boulos MI, et al. Unattended hospital and home sleep apnea testing following cerebrovascular events. *J Stroke Cerebrovasc Dis*. 2017;26:143-149.
9. Colelli DR, et al. Enhancing cognition by using low-cost in-home portable sleep equipment: A feasibility study (manuscript in preparation). 2019