

Supplementary Material

Method and Analysis

Secondary Outcomes

A number of secondary outcomes, related to clinical effectiveness, healthcare utilization, system efficiency and cost, will be analyzed. The secondary outcomes include:

Long-term PAP adherence

PAP adherence after one year of therapy will be measured in the same manner as for the primary outcome.

Daytime Sleepiness

The Epworth Sleepiness Scale (ESS) is a validated patient questionnaire assessing daytime sleepiness, in which patients rate their tendency to fall asleep in eight different situations.¹

Health-Related Quality of Life

HRQL will be measured using both general and disease-specific instruments. The Health-Utilities Index (HUI) was selected to measure general HRQL as it offers several advantages over other HRQL instruments (www.healthutilities.com). First, the HUI is a measure of general overall health, and has been used to measure HRQL in patients with a variety of sleep disorders.^{2,3} Second, the HUI has been validated in diverse patient populations and is sensitive to meaningful changes in HRQL.⁴⁻⁶ Third, a validated Canadian societal-preference based scoring algorithm exists to transform each individual's utility score into a quality adjusted life year (QALY).^{5,7,8}

Disease-specific HRQL will be measured using the short-form Sleep Apnea Quality of Life Index (SAQLI). The SAQLI is a validated questionnaire that identifies symptoms and functional impairment in five domains: daily functioning, social interactions, emotional function, symptoms and treatment-related symptoms.^{9,10} The SAQLI is sensitive to changes experienced by patients, and is preferred over other disease-specific HRQL measures for OSA because it includes a domain for treatment-related effects.

Patient Satisfaction

The Visit-Specific Satisfaction Instrument (VSQ-9) is a validated measure of patient satisfaction with an outpatient visit.¹¹ The VSQ-9 consists of nine questions that allow the patient to rate different aspects of the visit (e.g. length of time waiting, time spent with the healthcare provider, technical and interpersonal skills of the provider, etc.) on a five-point scale from 'Poor' to 'Excellent'. It was selected for its ease of use and because it has been used in previous studies of alternative models of care for patients with OSA.^{12,13}

Demand for Sleep Provider Visits and Diagnostic Sleep Testing

The number and dates of patient visits to physicians, ACPs and for HSAT or PSG will be extracted from the clinic scheduling software to determine if care by an ACP leads to any differences in provider visits or testing demand.

Demand for sleep physicians will be measured by collecting time spent by physicians in the assessment and management of patients randomized to the ACP Clinic. A time-in-motion study will be conducted for a subset of ACP Clinics to capture the amount of time the sleep physician spends both reviewing the

case with the ACP and directly assessing the patient. In addition, we will also capture the frequency of ACP communications to the physician to assist with patient management which typically occur by written communication in the patient chart.

Healthcare Utilization

Data on healthcare use will include outpatient physician visits, hospitalizations, and emergency department or urgent care visits from referral to one year following treatment initiation. This data will include visits to the FMC Sleep Centre for provider assessment or diagnostic testing. Data will be obtained from Alberta Health Services' (AHS) Analytics data repository. This repository aggregates data from the hospitalization discharge database, physician claims database, and the National Ambulatory Care Reporting System (NACRS) database. The hospital inpatient data source contains details regarding hospitalizations including admission date, discharge date, length of stay, 25 diagnostic codes (ICD-10-CA), and 10 procedure codes for each admission. The physician claims registry contains information on physician services including dates and location of the visits, diagnostic codes (ICD-9), and provider specialty. The NACRS database contains records on day surgeries, day procedures, and emergency room visits, including 16 diagnostic codes (ICD-10-CA) and 10 procedure codes. We will also obtain Vital Statistics data on each patient for the duration of the trial. Data on testing occurring at the FMC Sleep Centre, which may not be captured in the AHS Analytics data repository, will be obtained from the scheduling software as described above.

Cost Effectiveness

Costs captured from referral to one year after treatment initiation will be summarized in the following categories: sleep physician and ACP visits; sleep investigations; treatment costs; and healthcare utilization costs. Cost-effectiveness will be measured from the perspective of a publicly funded healthcare system.

Costs for sleep physician and ACP visits will be taken from the Alberta Health Schedule of Medical Benefits and the Health Sciences Association of Alberta (HSAA) Collective Agreement, respectively. Diagnostic sleep testing costs for both ambulatory testing and polysomnography include technical fees associated with the administration of the test, sleep technician salaries from the HSAA Collective Agreement, physician interpretation fees and overhead costs. The cost of PAP therapy will be estimated based on current market pricing.

Hospitalization costs will be determined using case-mix grouper (CMG+) methodology.¹⁴ Every hospital encounter is assigned to a CMG based on an ICD-10-CA diagnosis that is most responsible for the hospital stay. The CMG code is used to derive a Resource Intensity Weight (RIW) based on five factors: age, comorbidity level, number of interventions, and type and location of interventions. The RIW is multiplied by the facility-specific Cost per Weighted Case¹⁴ to derive the average cost for a hospitalized individual. Costs for ambulatory visits will be based on methodology used by the Canadian Institute for Health Information (CIHI). Each ambulatory encounter is assigned to a clinically related grouper within CIHI's Comprehensive Ambulatory Classification System (CACS), using ICD-10-CA codes. Costs are determined from the CACS grouper cost table. Hospital and ambulatory care cost data is available from AHS Analytics and the AHS Finance Department.

Wait Times

Time to treatment initiation will be evaluated for patients in each arm. Although wait times for initial assessment may be shorter for the ACP Clinic based on the addition of ACP supply, time to treatment initiation incorporates delays related to PSG and additional physician or ACP visits before a treatment decision is made. Time to treatment initiation is also a clinically relevant outcome particularly for patients with severe SDB.

References

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