



COST-UTILITY ANALYSIS OF PREOPERATIVE SCREENING STRATEGIES FOR **OBSTRUCTIVE SLEEP APNEA** AMONG PATIENTS UNDERGOING MAJOR ELECTIVE NON-CARDIAC SURGERY

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SASM

The Society of Anesthesia and Sleep Medicine



Conflicts of Interest

- Early Career Investigator
- Peer reviewed grants
- No Industry Funding
- Educational presentation
- Unedited Images: Image search_Google

BREATHE
the lung association



Ontario

MINISTRY OF HEALTH AND LONG-TERM CARE

Background



The NEW ENGLAND JOURNAL of MEDICINE

PERSPECTIVE

THE PERIOPERATIVE SLEEP APNEA EPIDEMIC

A Rude Awakening — The Perioperative Sleep Apnea Epidemic

Stavros G. Memtsoudis, M.D., Ph.D., Melanie C. Besculides, Dr.P.H., and Madhu Mazumdar, Ph.D.

N ENGL J MED 368;25 NEJM.ORG JUNE 20, 2013

Key Messages:

- High prevalence of OSA, Low clinical recognition
- Cost vs. Patient safety
- OSA <-> Perioperative complications
- Use of perioperative CPAP < 20% OSA patients
- Adherence to guidelines < 20% of hospitals in North America

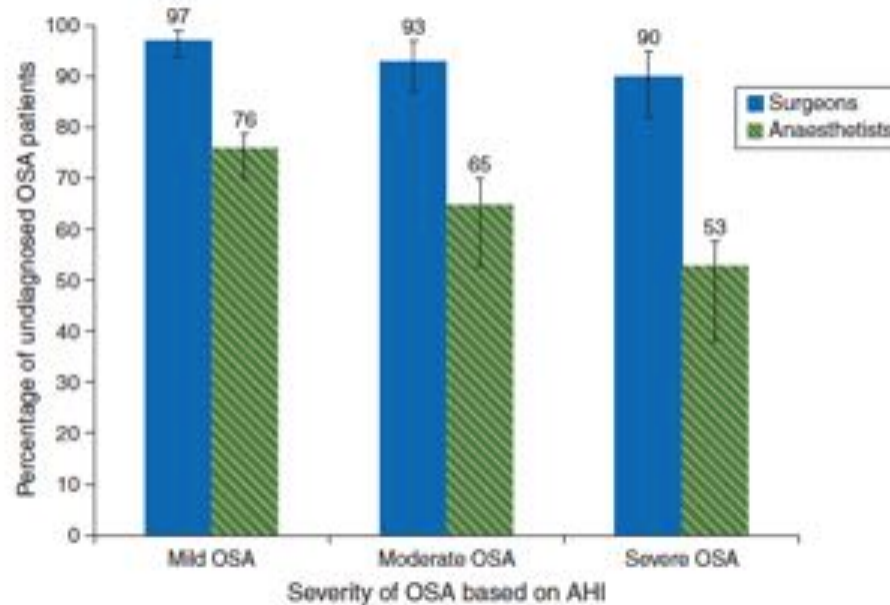
Preoperative Screening

Recommended and makes sense. But how?

RESPIRATION AND THE AIRWAY

Proportion of surgical patients with undiagnosed obstructive sleep apnoea

M. Singh^{1,2}, P. Liao¹, S. Kobah¹, D. N. Wijeyesundera^{1,3}, C. Shapiro⁴ and F. Chung^{1*}



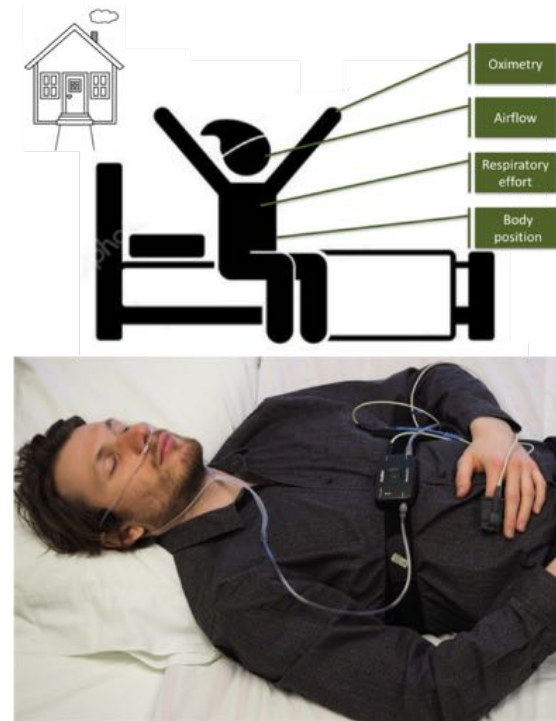
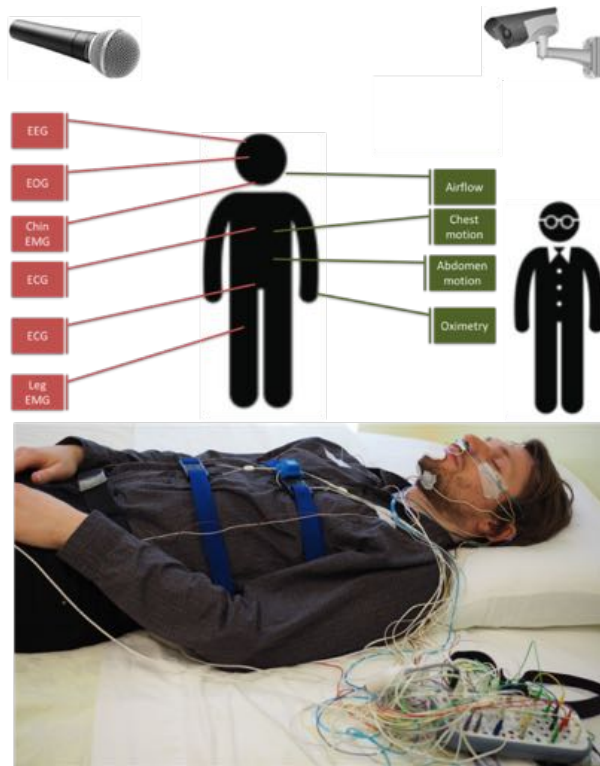
STOP-Bang Questionnaire:
93% of undiagnosed
moderate to severe OSA
patients were at risk of OSA



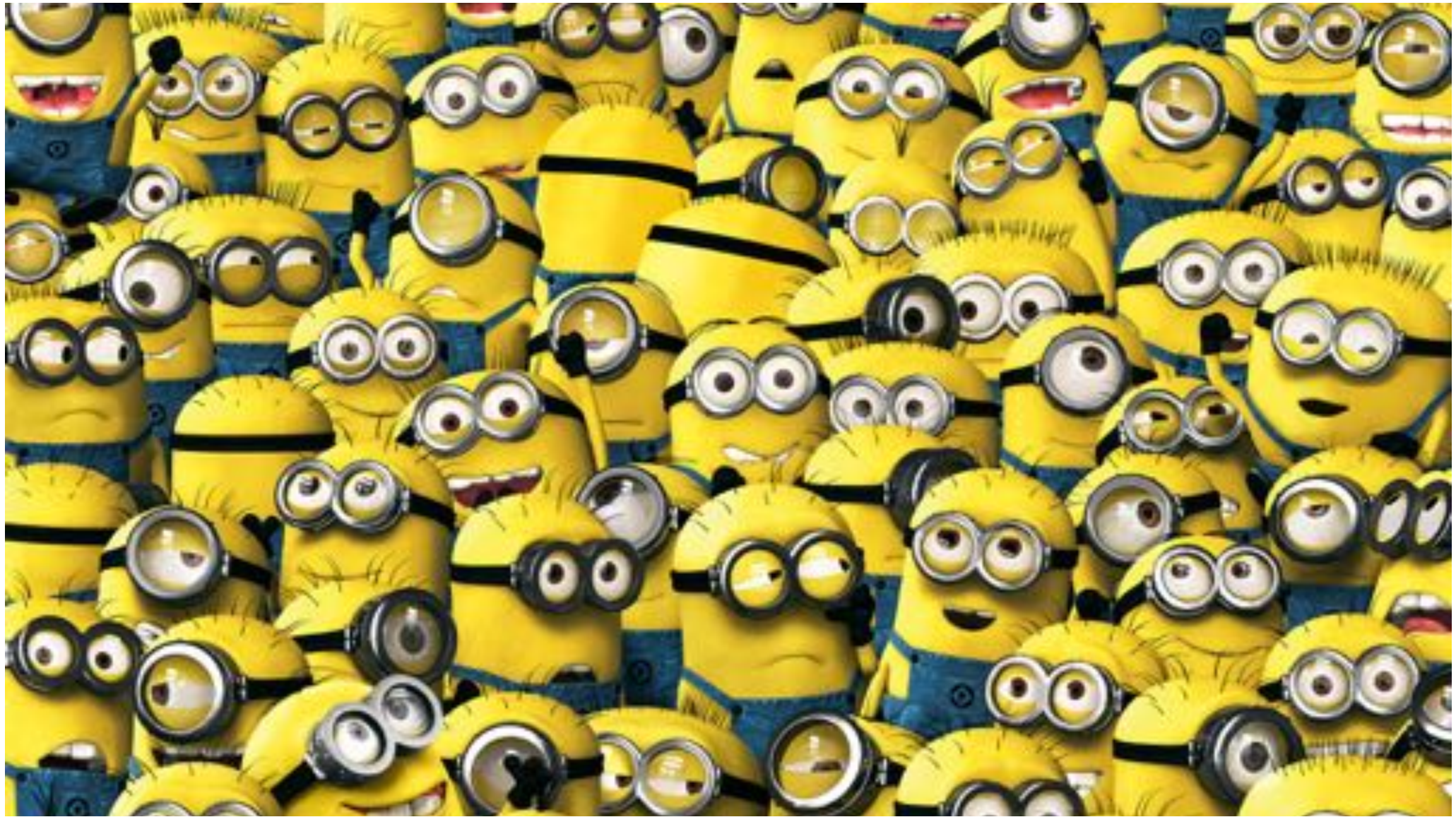
Diagnostic Work-up

Recommended, and makes sense. But how?

Lab vs. portable



Meliana V, Chung F, Li C, Singh M. Interpretation of sleep studies for patients with sleep disordered breathing: what the anesthesiologist needs to know? CJA 2018 Jan;65(1):60-75



What is the most Cost-Effective Pathway?



Methods

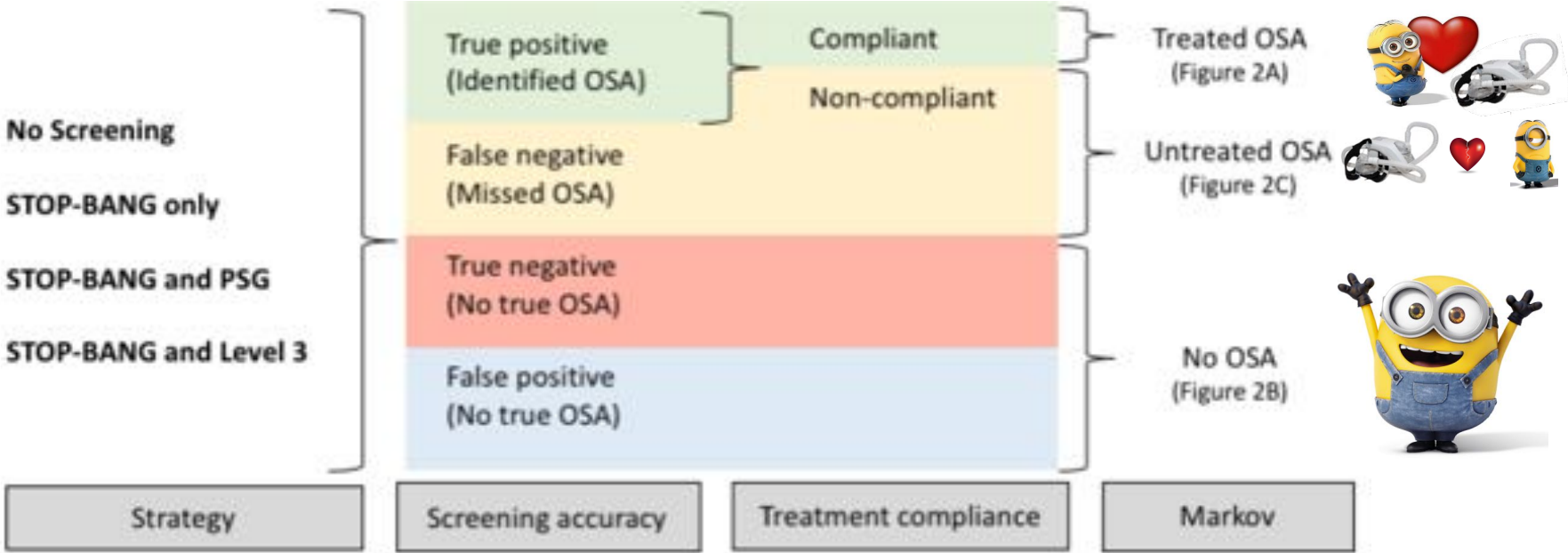
Methods

- *Ethics requirement waived*
- *Objective:* Evaluate the cost-utility of the following screening strategies:
 - i. No Screening;
 - ii. SB only;
 - iii. SB with level 3 PM (SB+PM) if SB+;
 - iv. SB with laboratory PSG (SB+PSG) if SB+
- Cost-utility analysis using Individual-level Markov model
 - Hospital perspective; lifetime horizon

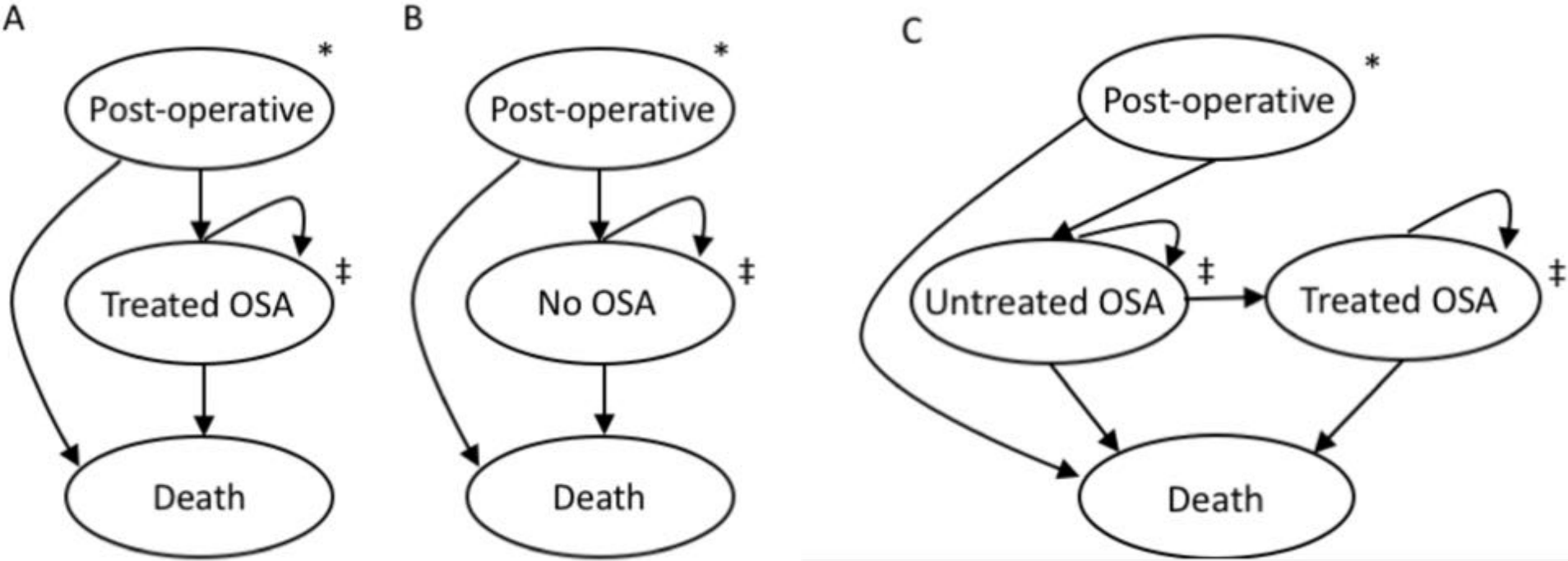
Methods

- Base-case modeled after historic surgical cohort
- Diagnostic accuracy, probabilities, hazard ratios, weighted utilities
 - Structured Literature search
- Costs: Ontario Case Costing Analysis Tool in 2016 CAD with 1.5% discounting
- Outcome: \$/QALY with 1.5% discounting

Methods – Model Structure



Methods – Model Structure



*** Postoperative Complication**

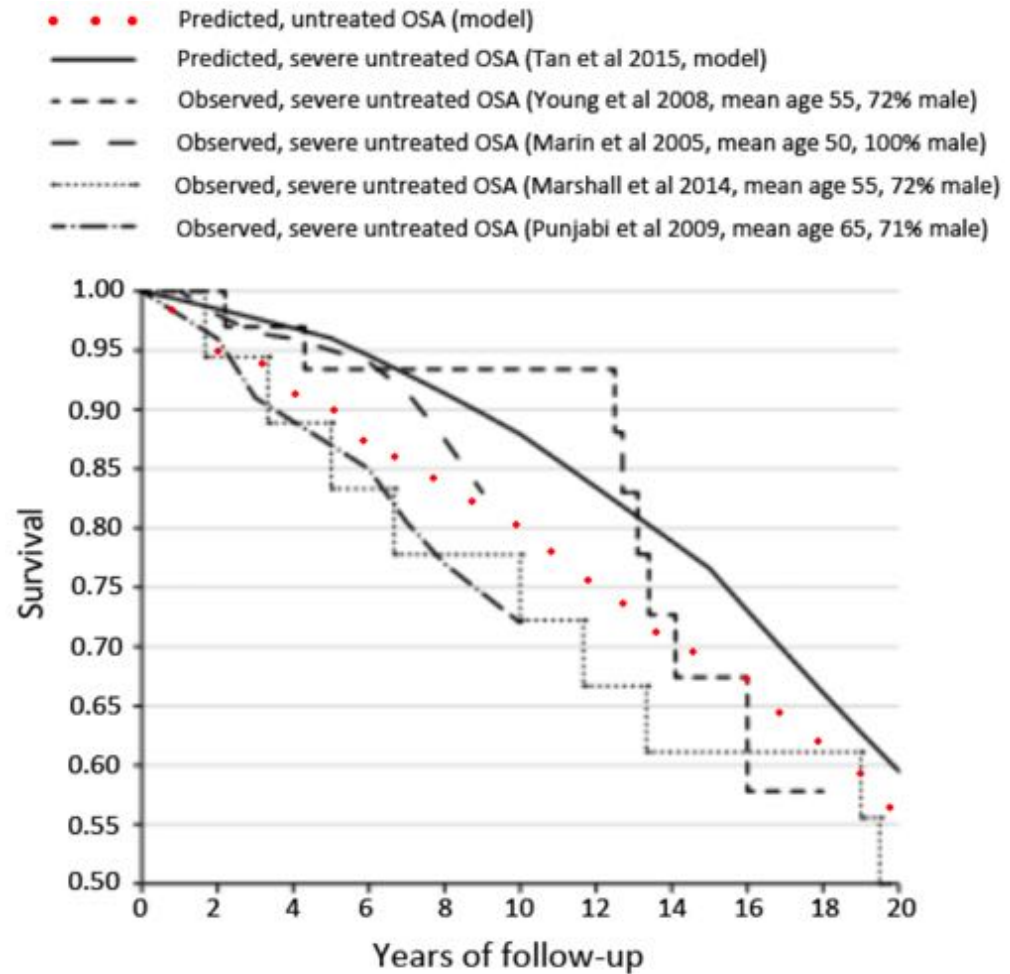
- Pneumonia Arrhythmia Myocardial Infarction
- Reintubation Cardiac Arrest Pulmonary Embolus

‡ Long-term Complication

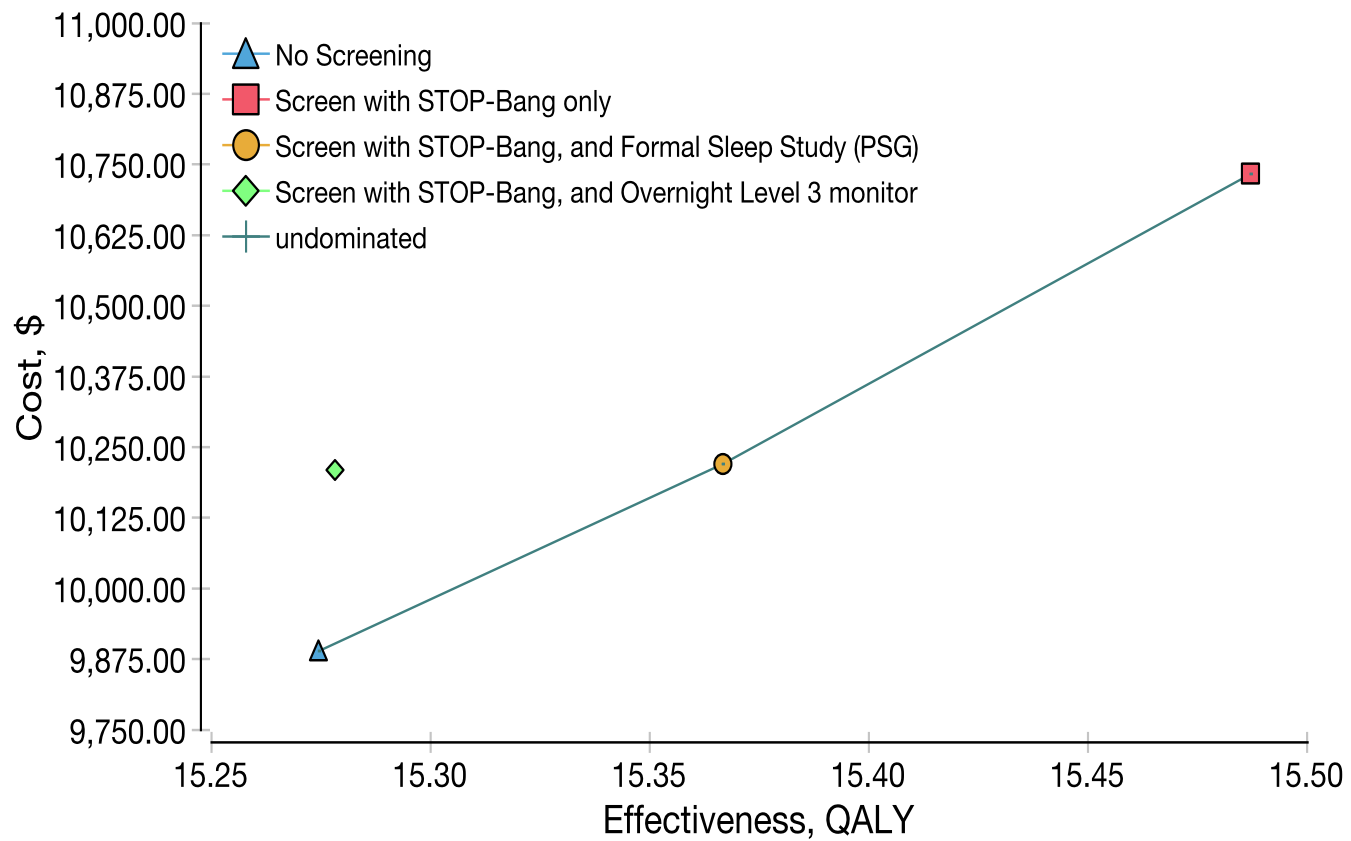
- Myocardial Infarction
- Stroke

Results

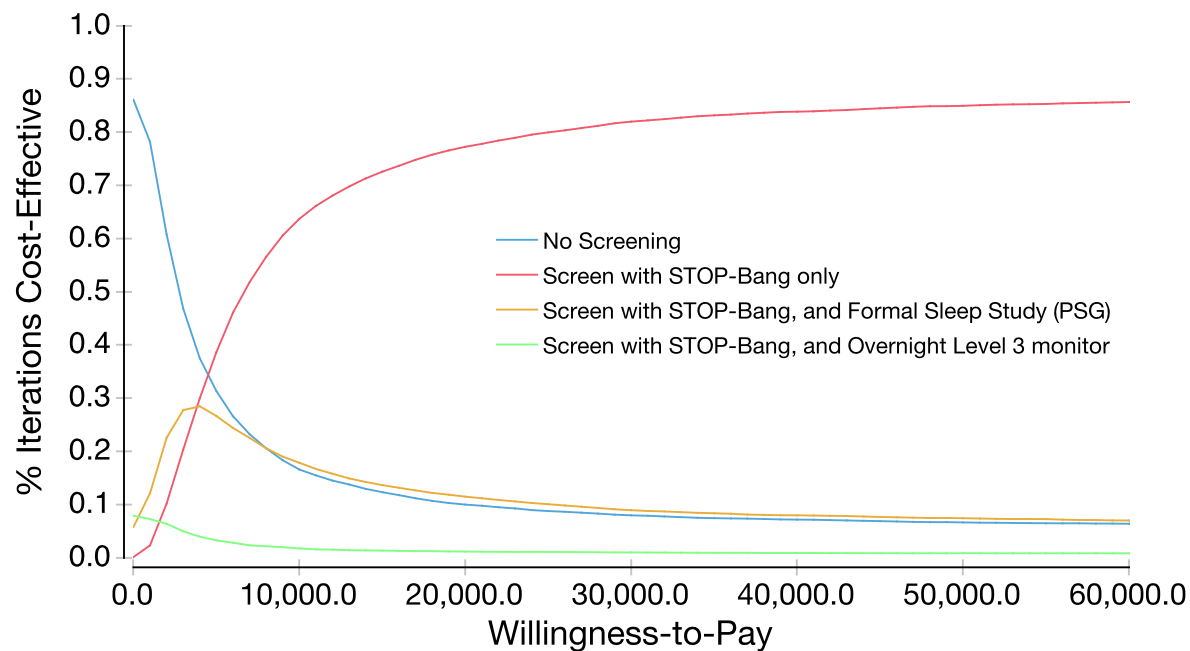
Model comparison



Base Case Analysis



Probabilistic Analysis



Strategy	Cost (CAD)	QALY (Quality-adjusted Life-years)	ICER (vs. No Screen)	ICER (vs. above strategy)
No Screen	11196.22	18.73	-	-
SB and PM	11439.03	18.80	3511.72	3511.72
SB and PSG	11464.65	18.93	1362.07	200.24
SB Alone	11985.74	19.00	2859.40	6592.88

Interpretation

- **Main Findings:**
 - Screening with **any strategy was cost-effective** compared with No Screening
 - Of the screening strategies, **SB > SB+PSG > SB+PM in terms of cost-utility**
 - **SB alone: Most costly**

Interpretation

- **Strengths:**
 - Novel methodology, evidence-based
 - Examined new technologies in the perioperative period
 - Prospective studies limited by cost, and resources
 - Inform key stakeholders (OR, hospital, provincial/state levels)
- **Limitations:** Heterogeneous associations of OSA with outcomes; variability in costs

Acknowledgements

- *Study team:*



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SASM, Of Course!

