Name:	Peter Piper
Email address:	ppiper@uci.edu
Date:	

*** Question 1.**
PICO (**P**atient/**P**opulation **& P**roblem | **I**ntervention/Exposure | **C**omparison | **O**utcome). Please enter your Clinical Question (in sentence format) and its **P-I-C-O** elements below.
Why frame your clinical question in PICO format? A PICO question:

- forces you to ask a specific and focused question that has a specific goal (outcome).
- helps focus on evidence directly relevant to your patient's needs and your specific knowledge needs.
- helps make a search of the medical literature easier by identifying specific search concepts and keywords.
- is answerable, reinforcing the satisfaction of finding evidence that makes you a better, more effective clinician.
    - **Clinical question example:**

In children with recurrent symptomatic UTI, what is the efficacy of cranberry juice vs. placebo for prevention? (a question of therapy)

1. Your well-built, focused Clinical Question with the PICO components.

In children with obstructive sleep apnea syndrome, what is the efficacy of adenotonsillectomy vs no treatment in reducing symptoms and improving quality of life?

2. What is the category of the clinical question that you asked? (please select one below)

(●) Therapy ( ) Diagnosis ( ) Harm ( ) Prognosis ( ) Other

- **Therapy** - How a treatment (alone or in comparison to another) may affect a patient's outcomes for an existing condition/disease
- **Diagnosis/Screening** - Will a test (often in comparison to the 'Gold Standard') differentiate patients with and without disease?
- **Etiology/Harm/Casualty** - How exposure may affect morbidity and/or mortality in a patient
- **Prognosis** - Likely future outcome for patients with a given diagnosis or possible future diagnosis. (Operative word here is *future*, so can be confused with therapy, but therapy deals with a more immediate result in an existing condition)

3. **P**atient/Population & Problem -- Your target patient group such as age, specific disease or health condition? *(e.g., children with recurrent symptomatic UTI)*

Children with obstructive sleep apnea syndrome.

4. **I**ntervention/Exposure -- What treatment, diagnostic test or exposure are you considering? *(e.g., cranberry juice)*

Adenotonsillectomy

5. **C**omparison -- What intervention, e.g., treatment, no treatment, diagnostic test, exposure are you **Comparing**, if appropriate? *(e.g., placebo or no treatment)*

no treatment

6. **O**utcome -- What **Outcome** do you hope to accomplish, measure, improve or affect? *(e.g., reducing the recurrence of UTI)*

reducing symptoms of obstructive sleep apnea and improving quality of life.

*** Question 2.**
Databases This section will be evaluated partially on how well your search strategies match the concepts in your Clinical Question (PICO). Please:

- Conduct your search in **PubMed Clinical Queries**. If your PubMed Clinical Queries search strategy retrieves either zero or irrelevant results, please re-run your search in the regular PubMed search box.
- Copy and paste your search strategy from the "Search History" section near the top of the "Advanced Search" web page. If no relevant results are obtained, state this clearly and describe the search strategy that you used.
    - **Search example based on the clinical question above:**

(Therapy/Narrow[filter]) AND (cranberry OR cranberries) AND (urinary tract infection OR UTI) Limits: **All Child: 0-18 years)**

PubMed (Clinical Queries - under PubMed Tools)
If your PubMed Clinical Queries search strategy retrieves zero results, please re-run your search in PubMed.

(Therapy/Narrow[filter]) AND ((adenotonsillectomy OR tonsillectomy) AND (obstructive sleep apnea syndrome OR obstructive sleep apnea)) Filters: published in the last 5 years; Child: birth-18 years

I included synonymous terms in my search, e.g. obstructive sleep apnea syndrome and obstructive sleep apnea as well as similar therapies such as "adenotonsillectomy" and "tonsillectomy" in my search, yielding 54 results. Then I filtered for results published within the last 5 years and limited to children under 18 years of age, yielding 16 results, including several randomized control trials.

*** Question 3.**
Article Selected for Critical Appraisal from PubMed. Please enter the complete citation ***including PMID AND the abstract*** for the reference you select. The choice of article will be graded according to its relevancy to the elements of the Clinical Question (PICO) and study type.

A randomized trial of adenotonsillectomy for childhood sleep apnea.

Marcus CL, Moore RH, Rosen CL, Giordani B, Garetz SL, Taylor HG, Mitchell RB, Amin R, Katz ES, Arens R, Paruthi S, Muzumdar H, Gozal D, Thomas NH, Ware J, Beebe D, Snyder K, Elden L, Sprecher RC, Willging P, Jones D, Bent JP, Hoban T, Chervin RD, Ellenberg SS, Redline S; Childhood Adenotonsillectomy Trial (CHAT).

N Engl J Med. 2013 Jun 20;368(25):2366-76. doi: 10.1056/NEJMoa1215881.
PMID:23692173

Abstract:
BACKGROUND
Adenotonsillectomy is commonly performed in children with the obstructive sleep apnea syndrome, yet its usefulness in reducing symptoms and improving cognition, behavior, quality of life, and polysomnographic findings has not been rigorously evaluated. We hypothesized that, in children with the obstructive sleep apnea syndrome without prolonged oxyhemoglobin desaturation, early adenotonsillectomy, as compared with watchful waiting with supportive care, would result in improved outcomes.

METHODS
We randomly assigned 464 children, 5 to 9 years of age, with the obstructive sleep apnea syndrome to early adenotonsillectomy or a strategy of watchful waiting. Polysomnographic, cognitive, behavioral, and health outcomes were assessed at baseline and at 7 months.

RESULTS
The average baseline value for the primary outcome, the attention and executive function score on the Developmental Neuropsychological Assessment (with scores ranging from 50 to 150 and higher scores indicating better functioning), was close to the population mean of 100, and the change from baseline to follow-up did not differ significantly according to study group (mean [±SD] improvement, 7.1±13.9 in the early-adenotonsillectomy group and 5.1±13.4 in the watchful-waiting group;
P = 0.16). In contrast, there were significantly greater improvements in behavioral, quality-of-life, and polysomnographic findings and significantly greater reduction in symptoms in the early-adenotonsillectomy group than in the watchful-waiting group. Normalization of polysomnographic findings was observed in a larger proportion of children in the early-adenotonsillectomy group than in the watchfulwaiting group (79% vs. 46%).

CONCLUSIONS
As compared with a strategy of watchful waiting, surgical treatment for the obstructive sleep apnea syndrome in school-age children did not significantly improve attention or executive function as measured by neuropsychological testing but did reduce symptoms and improve secondary outcomes of behavior, quality of life, and polysomnographic findings, thus providing evidence of beneficial effects of early adenotonsillectomy.(Funded by the National Institutes of Health; CHAT ClinicalTrials.gov number, NCT00560859.)

*** Question 4.**
Critical Appraisal of the Selected Article. For the article you have selected, answer questions 1-9 below.

1. What was the research question of the selected study?

In children with the obstructive sleep apnea syndrome without prolonged oxyhemoglobin desaturation, does early adenotonsillectomy, as compared with watchful waiting with supportive care, reduce symptoms, and show improvement in cognition, behavior, quality of life, and polysomnographic findings?

2. What was the study design *(e.g., Randomized controlled trial, Cohort, Cross-sectional, Case-control, etc.)*?

Randomized controlled trial

3. Where was the study conducted *(e.g., in the U.S., Canada, Germany, China, Kenya, etc.)*?

United States

4. Describe the participants in the study *(e.g., size of study group(s), age, gender, ethnicity, etc).*

464 children between the ages of 5 to 9 years, of various ethnicities and both genders, with obstructive sleep apnea syndrome - defined as an obstructive apnea-hypopnea index (AHI) score of 2 or more events per hour or an obstructive apnea index (OAI) score of 1 or more events per hour, without prolonged oxyhemoglobin desaturation (arterial oxyhemoglobin saturation was not less than 90%).

5. What was the Intervention or exposure (Experimental Group)?

adenotonsillectomy

6. Was there a Comparison (Control Group) and, if so, what was it?

strategy of watchful waiting with supportive care, e.g. nasal glucocorticoids or montelukast for allergic rhinitis or asthma

7. Briefly describe the results of the study.

This study utilized various assessments at baseline and at 7 months to monitor both the adenotonsillectomy group and the watchful waiting control group.

There was no significant difference between the two groups in attention and executive function based on the children's performance in the Developmental Neuropsychological Assessment (NEPSY). Both groups had scores near the population mean, with slight improvement in adenotonsillectomy group that was not statistically significant (P=0.16).

Behavior was measured via caregiver and teacher ratings of behavior based on Conners' Rating Scale and BRIEF Global Executive scores. Teacher and Caregiver reported Conners' ratings showed significant improvement in the adenotonsillectomy group compared to the control group. The BRIEF scores improvements favored the adenotonsillectomy group according to caregiver reports but no significant difference was found in the teacher-reported version.

Quality-of-life was measured by caregiver scores of PedsQL and OSA-18 assessment tool. Both showed significantly greater improvements in the adenotonsillectomy group compared to the control.

Obstructive sleep apnea symptoms were measured via polysomnographic findings, AHI, PSQ-SRBD, and Epworth Sleepiness scale questionnaires. AHI scores, PSQ-SRBD, and Epworth scales showed signficantly greater reduction in symptoms in the early adenotonsillectomy group

compared to control. There was also greater normalization of polysomnographic findings in the adenotonsillectomy group (79%) compared to control (46%).

8. What was the conclusion described in the study?

This study concluded that adenotonsillectomy group did not have significantly greater improvement in attention and executive function than the watchful waiting group. On the other hand, the procedure gave greater reductions in symptoms of obstructive sleep apnea and improvements in behavior, quality of life, and polysomnographic findings. These findings were considered to have an effect size in the moderate-to-large range. Therefore, the study's authors recommend medical management and reassessment for adenotonsillectomy after a period of observation for patients with obstructive sleep apnea syndrome.

9. Do the study results affect the management of your patient and, if so, in what way?

Obstructive sleep apnea is a relatively common issue in the pediatric population with a minimum prevalence in America of 2-3%. It affects all age groups and sexes and with the rise of childhood obesity, obstructive sleep apnea is increasingly becoming an issue of concern as there are many associated adverse health issues. These issues include cognitive and behavioral deficits so it was interesting to learn about a study that looked at how adenotonsillectomy could address these concerns using a variety of measurements.

There are potential places for bias regarding a child's behavior and quality of life in that parental/caretaker expectations may have influenced responses in determining findings such as the Conners', BRIEF, and PedsQL scores. However, having teachers who are blinded to the child's intervention also give findings that paralleled the caretaker scores is supports the positive findings. While the NEPSY attention and executive function tests showed no significant improvement in the adenotonsillectomy group, it is possible that the closely supervised environment of the NEPSY tests affected childrens' abilities to perform specified tasks.

The behavioral and cognitive findings in this study are somewhat subjective; moreover, the study is limited to a 7 month follow up and does not apply to children under 5 years-old or children with prolonged oxy-hemoglobin desaturation. However, the improvement in obstructive sleep apnea symptoms as measured by polysomnography and AHI score is clear. Also, findings were still significant when adjusted for obesity, baseline behavioral scores, and household income. Additionally, the study had a large sample size and diverse racial representation.

I would tell my patients with sleep apnea about this study's findings. As adenotonsillectomy has a low rate of perioperative complications and significant improvement in symptoms, I would present is a viable option for my patients. I would undertake a period of watchful waiting with supportive management with my patients while informing them of the possibility of adenotonsillectomy. I would make sure to perform a reassessment and based on the patient's severity of symptoms and impact on quality of life, I would revisit adenotonsillectomy as my recommendation.