**EVIDENCE BASED DENTISTRY**

2 – P.I.C.O. Questions

S.C. BAYNE
Mark Fitzgerald
Mark Mac Eachern

University of Michigan
School of Dentistry, and
Health Sciences Library
Ann Arbor, MI 48109-1078
sbayne@umich.edu

**P-I-C-O TERMINOLOGY**

Know the terms that go with the letters.

**P** = Patient, Population, or People (or Problem)
For which group do you need information?
(Example: teenagers)

**I** = Intervention (or Exposure)
What event do you need to study?
(Example: seeing the dentist two-times per year.)

**C** = Comparison (or Control)
What is the evidence the intervention is better or worse?
(Example: seeing the dentist every other year.)

**O** = Outcome
What is the effect of the intervention?
(Example: reduced DMFS scores.)

**WHY DO WE DO THIS?**

Writing a good question before a search for evidence.

1. PICO – is a strategy to help narrow the search.
2. Categorized question – helps the search engine look for things.

\[
\text{P} \times \text{I} \times \text{C} \times \text{O} = 0.1 \times 0.1 \times 0.1 \times 0.02 \times 0.1 \times 0.05 = 10^{-7}
\]

For a library of 100,000,000 things, you will find 10 items.

**WHY DO WE DO THIS?**

Writing a good question before a search for evidence.

1. PICO – is a strategy to help narrow the search.
2. Categorized question – helps the search engine look for things.

\[
\text{P} \times \text{I} \times \text{C} \times \text{O} = 0.1 \times 0.1 \times 0.1 \times 0.02 \times 0.1 \times 0.05 = 10^{-7}
\]

For a library of 100,000,000 things, you will find 10 items.

**P= Patient, Population, People, Problem**
What group or problem are you examining?

**I = Intervention**
What is the treatment, procedure, or plan of interest?

**C = Comparison (or control)**
What is the reference point for measuring intervention effects?

**O = Outcome**
What is the effect of the intervention?
(Example: reduced DMFS scores.)

Choices for narrowing the search:

- Age group (<6, 6-20, 20-40, 40-60, >60 years old)
- Gender (e.g., male, female)
- Disease (e.g., osteoporosis, high caries risk)
- Region (e.g., born in North America, live in Italy)
- Distinction (e.g., fraternal twin)
- Physical characteristic (e.g., height, weight, hair color, eye color)
- Genetic predisposition (e.g., supernumerary teeth)
- Patient need (e.g., everyone requiring class II restoration)

There are lots of examples of these in dentistry, such as:

- Placement of a class II composite restorations
- Use of a 3-component bonding systems
- Guided tissue generation for periodontal problems
- Replacement of an anterior tooth with an implant
- Use of bite splints to mitigate tooth grinding
- Whitening of teeth
- Use of fluoride varnishes
- Prophylactic extraction of third molar teeth
O = Outcome
What is the outcome anticipated and how is it measured?

There are lots of examples of these in dentistry, such as:
- Reduction in DMFS score or caries rate.
- Decrease in the degree of marginal staining.
- Resistance of a whitened tooth toward future discoloration.
- Elimination of tooth sensitivity to cold temperatures.
- Elimination of gingivitis.

Example 1
Writing P.I.C.O. statements

Mrs. C.L Phive: Your patient is a 45-year old woman, is divorced, has dental amalgam restorations in most of her first and second molar teeth and some of her premolars, has moderate gingivitis, has occlusal wear facets on several premolar and molar teeth, has non-carious cervical lesions (NCLs or NCCLs) on the facial surfaces of teeth associated with the wear facets, has no complaints of any tooth sensitivity, and has no active dental caries. You assume the NCLs are abrasions. She would like the NCLs restored with dental composite and you agree to do that – but worry that continuing tooth flexure may defeat your treatment. You wonder about flexible liners.

What is your PICO question?
Should you use a stress-breaking flowable composite liner?
P = Patients older than 40 years with NCLs.
I = Dental composite using stress-breaking flowable composite liner.
C = Patients restored without a stress-breaking liner.
O = Successful restorations without loss of retention or marginal staining at 5 years.

Example 2
Evidence based dentistry

Mr. Al Seramick: Your patient is a 62-year old man with most of his teeth. He has an all-ceramic porcelain-veneered zirconia-core crown on a premolar with a large chip out of the porcelain veneer. You decide to repair the crown using dental composite but are not sure of the procedure that might work the best to do this. You are aware that zirconia is very strong and difficult to roughen to provide mechanical retention. Anything you do must be safe to do in the mouth.

What is your PICO question?
What type of pretreatment is possible to promote adhesion of dental composite to the zirconia core?
P = Patients with fractures of veneered zirconia-core restorations.
I = Mechanical or chemical bonding pretreatment on zirconia.
C = Patients with restorations of similar ages without repairs.
O = Survival rate of repairs at 5 years.

P.I.C.O. VARIATIONS
Do you always need all 4 question parts?

Rule
Variation= P I C O
Variation= P I O
Variation= P O

Is tooth brushing effective in preventing bad breath?
P = Could be children or adults or both.
I = Tooth brushing (or toothpaste or oral hygiene, etc.)
C = (No comparison or placebo)
O = Reduction in halitosis symptoms

CATEGORIES OF QUESTIONS
Problem is “disease or dysfunction.”

Diagnosis = Identification of cause (and effect)
Etiology = Cause
Prevention = Therapy to eliminate cause
Prognosis = Likelihood of outcome from problem
Harm = Extent of damage from problem
Therapy = Attempted remediation of problem

QUICK REVIEW
Review of introduction and orientation to EBD.

- Which part of the manuscript process correspond to “P-I-C-O”? OBJECTIVE
- Which terms define the letters in P-I-C-O?
  POPULATION, INTERVENTION, COMPARISON, OUTCOME
- What is the reason for writing a PICO question?
  HELPS NARROW SEARCH
- Which term(s) do NOT go with P? [gender, age, treatment, disease] TREATMENTS.
- Which term(s) do NOT go with C? [control, result, sham, target] RESULT.
- Is it possible to have a P-I-O question? YES
- What are examples of categories of PICO questions?
  DIAGNOSIS, ETIOLOGY, PREVENTION, PROGNOSIS, HARM, THERAPY
THANK YOU