

# Start with a PICOT question

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# PICO Framework

- ▶ **P**atient Problem, (or Population)
- ▶ **I**ntervention,
- ▶ **C**omparison or Control, and
- ▶ **O**utcome



# PICO

Framework item:

Think about:

Example:

**Patient Problem (or Population)**

What are the patient's demographics such as age, gender and ethnicity? Or what is the or problem type?

Work-related neck muscle pain

**Intervention**

What type of intervention is being considered? For example is this a medication of some type, or exercise, or rest?

Strength training of the painful muscle

**Comparison or Control**

Is there a comparison treatment to be considered? The comparison may be with another medication, another form of treatment such as exercise, or no treatment at all.

Rest

**Outcome**

What would be the desired effect you would like to see? What effects are not wanted? Are there any side effects involved with this form of testing or treatment?

Pain relief

**Timeframe**

(is there a set timeframe you are working with?

Two month

**Setting**

Is there a setting such as primary care? Outpatients etc



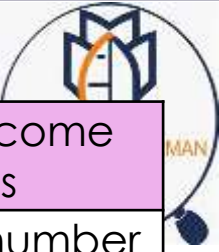
# When forming your question using **PICO**, keep the following points in mind:

- ▶ Your **P**atient is a member of a population as well as a person with (or at risk of) a health problem. So, in addition to age and gender, you may also need to consider ethnicity, socioeconomic status or other demographic variables.
- ▶ A **C**omparison is not always present in a **PICO** analysis.
- ▶ **O**utcomes should be measurable as the best evidence comes from rigorous studies with statistically significant findings.
- ▶ An **O**utcome ideally measures clinical wellbeing or quality of life, and not alternates such as laboratory test results.



# PICO Elements Change According to Question Type (Domain)

- ▶ When forming your question using the **PICO** framework it is useful to think about what type of question it is you are asking, (therapy, prevention, diagnosis, prognosis, etiology).
- ▶ The table below illustrates ways in which **P**roblems, **I**nterventions, **C**omparisons and **O**utcomes vary according to the type (domain) of your question.



Question Type	Patient Problem or Population	Intervention or Exposure	Comparison or Control	Example Outcome Measures
<b>Therapy (Treatment)</b>	Patient's disease or condition.	A therapeutic measure, eg., medication, surgical intervention, or life style change.	Standard care, another intervention, or a placebo.	Mortality rate, number of days off work, pain, disability.
<b>Prevention</b>	Patient's risk factors and general health condition.	A preventive measure, e.g., A lifestyle change or medication.	Another preventative measure OR maybe not applicable.	Mortality rate, number of days off work, disease incidence.
<b>Diagnosis</b>	Specific disease or condition.	A diagnostic test or procedure.	Current "reference standard" or "gold standard" test for that disease or condition.	Measures of the test utility, i.e. sensitivity, specificity, odds ratio.
<b>Prognosis (Forecast)</b>	Duration and severity of main prognostic factor or clinical problem.	Usually time or "watchful waiting".	Usually not applicable.	Survival rates, mortality rates, rates of disease progression.
<b>Etiology (Causation)</b>	Patient's risk factors, current health disorders, or general health condition.	The intervention or exposure of interest. Includes an indication of the strength/dose of the risk factor and the duration of the exposure.	Usually not applicable.	Survival rates, mortality rates, rates of disease progression.



<b>Question Type</b>	<b>Patient Problem or Population</b>	<b>Intervention or Exposure</b>	<b>Comparison or Control</b>	<b>Outcome Measure</b>
<b>Therapy</b>	In patients with osteoarthritis of the knee	is hydrotherapy more effective than	traditional physiotherapy	in relieving pain?
<b>Prevention</b>	For obese children	does the use of community recreation activities	compared to educational programs on lifestyle changes	reduce the risk of diabetes mellitus?
<b>Diagnosis</b>	For deep vein thrombosis	is D-dimer testing or	ultrasound	more accurate for diagnosis?
<b>Prognosis</b>	In healthy older women that suffer hip fractures	within the year after injury		what is the relative risk of death?
<b>Etiology</b>	Do adults	who binge drink	compared to those who do not binge drink	have higher mortality rates?



### For an intervention/therapy:

In \_\_\_\_\_(P), what is the effect of \_\_\_\_\_(I) on \_\_\_\_\_(O) compared with \_\_\_\_\_(C) within \_\_\_\_\_ (T)?

### Prevention:

For \_\_\_\_\_ (P) does the use of \_\_\_\_\_ (I) reduce the future risk of \_\_\_\_\_ (O) compared with \_\_\_\_\_ (C)?

### Diagnosis or diagnostic test:

Are (is) \_\_\_\_\_ (I) more accurate in diagnosing \_\_\_\_\_ (P) compared with \_\_\_\_\_ (C) for \_\_\_\_\_ (O)?

### Prognosis/Predictions

Does \_\_\_\_\_ (I) influence \_\_\_\_\_ (O) in patients who have \_\_\_\_\_ (P) over \_\_\_\_\_ (T)?

### For etiology:

Are \_\_\_\_\_ (P) who have \_\_\_\_\_ (I) at \_\_\_\_\_ (Increased/decreased) risk for/of \_\_\_\_\_ (O) compared with \_\_\_\_\_ (P) ~~with/without~~ \_\_\_\_\_ (C) over \_\_\_\_\_ (T)?



**PICOT Question:**

**Population:** Bariatric adolescents considering or undergoing gastric bypass surgery.

**Intervention:** The nurse's role as a **primary member of the multidisciplinary** team regarding perioperative care of the bariatric adolescent patient.

**Comparison:** The **nurse's role** as a **secondary member** of the multidisciplinary team without any specialized training and is only involved in **perioperative care** of the bariatric adolescent patient.

**Outcome:** When the nurse is involved as one of the primary members in the multidisciplinary team approach, the bariatric adolescent patient has **better** continuity **of care**.

**Time:** perioperative including the **6 weeks post recovery**.

**PICOT Question:** Does the bariatric adolescent patient undergoing gastric bypass have better continuity of care perioperatively and postoperatively when the nurse is a primary member of the multidisciplinary team versus when the nurse is a secondary member whose only role is in providing perioperative care and has no specialized training?

**2. Intervention PICOT Question, an Intervention example:**

In adult patients with total hip replacements (Patient population) how effective is PCA pain medication (Intervention of interest) compared to IM pain medication (Comparison intervention) in controlling post operative pain (Outcome) during the perioperative and recovery time? *Note: The IM pain medication would be called the control group. It would be unethical to have a control group that received NO pain medication. Many times the control group means they get "business as usual!" or the current standard of care.*



### **3. Therapy PICOT Question, a non-intervention example:**

What is the duration of recovery (O) for patients with total hip replacement (P) who developed a post-operative infection (I) as opposed to those who did not (C) within the first six weeks of recovery (T)?

### **4. Etiology PICOT Question:**

Are kids (P) who have obese adoptive parents (I) at Increased risk for obesity (O) compared with kids (P) without obese adoptive parents (C) during the ages of five and 18 (T)?

### **5. Diagnostic PICOT Question:**

Is a PKU test (I) done on two week old infants (P) more accurate in diagnosis inborn errors in metabolism (O) compared with PKU tests done at 24 hours of age (C)? Time is implied in two weeks and 24 hours old.

### **6. Prevention PICOT Question:**

In OR nurses doing a five minute scrub (P) what are the differences in the presence and types of microbes (O) found on natural polished nails and nail beds (I) and artificial nails (C) at the time of surgery (T)?

### **7. Prognosis/Prediction PICOT question:**

Does telemonitoring blood pressure (I) in urban African Americans with hypertension (P) improve blood pressure control (O) within the six months of initiation of the medication (T)?

### **8. Meaning PICOT Question:**

How do pregnant women (P) newly diagnosed with diabetes (I) perceive reporting their blood sugar levels (O) to their healthcare providers during their pregnancy and six weeks postpartum (T)?



# Prevention

## ► Exercise for pregnant women with gestational diabetes for improving maternal and fetal outcomes

P: pregnant women

I: exercise

C: no exercise

O: risk of induction of labour

O: risk of birth by caesarean

O: risk of pre-eclampsia

O: Body Mass Index (postnatal weight retention or return to pre-pregnancy weight)



# The Effects of Substance Abuse on Blood Glucose Parameters in Patients with Diabetes: A Systematic Review and Meta-Analysis

- ▶ P: Patients with Diabetes
- ▶ I/ E: Substance Abuse
- ▶ C: NO abuse
- ▶ O: postprandial blood glucose
- ▶ O: glycated haemoglobin



## Search Terms and Search Strategy.

Patient/Population	Intervention	Comparator	Outcomes of Interest	Combining Search Terms
<b>Patients with diabetes</b>	<b>Substance Abuse</b>		<b>Outcomes of interest</b>	
Type 2 diabetes OR Type 1 diabetes OR Diabetes complications OR Diabetes mellitus, type 2 OR Diabetes mellitus, type 1 OR Diabetes mellitus	Substance-Related Disorders OR substance * OR Marijuana Abuse OR Amphetamine- Related Disorders OR Cocaine-Related Disorders OR Opioid- Related Disorders OR opiate * OR opioid * OR Heroin Dependence		Glycated hemoglobin OR Fasting blood glucose OR Post- prandial blood glucose OR Fasting insulin OR Fructosamine	Column 1 AND Column 2 AND Column 3



# Diagnosis

Systematic review of the diagnostic accuracy, reliability, and safety of the sharp-purser test

- ▶ P: Atlantoaxial instability
- ▶ I : Sharp-Purser Test
- ▶ C:
- ▶ O: +LR & -LR



# Systematic review of the diagnostic accuracy, reliability, and safety of the sharp-purser test

- ▶ ABSTRACT Introduction: The Sharp-Purser Test (SPT) is used to assess for atlantoaxial instability (AI) in patients with rheumatoid arthritis (RA).
- ▶ The test is commonly used by clinicians; however, many experts argue it lacks reliability and validity along with concerns of safety.
- ▶ The primary purpose of this review is to determine the diagnostic accuracy of the SPT to detect AI.
- ▶ Methods: A search of five databases was performed from inception to 19 December 2018 using search terms related to the SPT. Studies were eligible for inclusion if the SPT was used on a patient/participant.
- ▶ Methodological quality assessment of diagnostic studies was performed with the Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) for studies that reported data to calculate sensitivity (SN), specificity (SP), positive likelihood ratio (+LR), and negative likelihood ratio (-LR). Results: The search yielded 1009 articles, and 32 studies met the inclusion criteria for analysis.



# Systematic review of the diagnostic accuracy, reliability, and safety of the sharp-purser test

- ▶ Meta-analysis on diagnostic accuracy studies assessing the SPT was not possible due to statistical heterogeneity. Six diagnostic accuracy studies assessed the SN of the SPT ranging from 0.19 to 1.00.
- ▶ Four of the studies assessed SP of the SPT ranging from 0.71 to 0.98. The +LR was identified in 4 studies was 0.655, 1.73, 22, and 17.25.
- ▶ The -LR was 1.14, 0.799, 0.571, and 0.323. Seven RCT utilized the SPT to screen for AI, and the SPT was used in 18 case reports.
- ▶ Conclusion: The SPT may be inappropriate to use due to inconsistent validity, poor inter-rater reliability, and potential to cause harm. Level of evidence: 1





# Multi-detector CT for suspected hip fragility fractures: A diagnostic test accuracy systematic review and meta-analysis

- ▶ P: proximal femoral (hip) fragility fracture in patients with a negative initial radiograph
- ▶ I: Multi-Detector Computed Tomography (MDCT)
- ▶ C: magnetic resonance imaging (MRI) or clinical follow-up
- ▶ O: diagnostic test accuracy (DTA)
- ▶ sensitivity O: Specificity



# Multi-detector CT for suspected hip fragility fractures: A diagnostic test accuracy systematic review and meta-analysis

- ▶ Abstract
- ▶ To perform a systematic review (SR) and meta-analysis to determine the diagnostic test accuracy (DTA) of Multi-Detector Computed Tomography (MDCT) for detecting proximal femoral (hip) fragility fractures in patients with a negative initial radiograph.

MEDLINE and EMBASE were searched to identify relevant studies published between January 2000 and May 2018. Articles underwent title and abstract screening followed by full-text screening.

Study inclusion criteria are patients with suspected hip fracture, negative initial radiograph, MDCT as the index test, magnetic resonance imaging (MRI) or clinical follow-up as the reference standard, and DTA measure as the outcome. Demographic, methodologic, and study outcome data were extracted. Risk of bias was assessed using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS)-2 tool.

# Multi-detector CT for suspected hip fragility fractures: A diagnostic test accuracy systematic review and meta-analysis

- ▶ DTA metrics were pooled using bivariate random-effects meta-analysis. From an initial 1385 studies, four studies reporting on 418 patients (174 with hip fractures) were included. Pooled summary statistics included the following: sensitivity (87%; 95% confidence interval [CI] 79–93), specificity (98%; 95% CI 95–99), and the area under the summary receiver operating characteristic (ROC) curve (0.972).
- ▶ MDCT has a high specificity for detecting hip fragility fractures, comparable to MRI, but a lower sensitivity. Local institutional factors may play a role in whether a patient receives MDCT or MRI, as imaging should not be delayed. If there is ongoing concern for fracture in a patient with a negative MDCT, MRI should be performed. Cautious interpretation of the results is warranted given the risk of bias and small sample size

# Faecal calprotectin to detect inflammatory bowel disease: a systematic review and exploratory meta-analysis of test accuracy.

- ▶ P: IBD
- ▶ I: faecal calprotectin (FC)
- ▶ C:
- ▶ O: Sensitivity from separate meta-analysis of four assay types ranged from 0.85 (95% CI 0.75 to 0.92) to 0.94 (95% CI 0.75 to 0.90) and specificity from 0.67 (95% CI 0.56 to 0.76) to 0.88 (95% CI 0.77 to 0.94).
- ▶ Conclusive estimates of sensitivity and specificity of FC testing in primary care for the detection of IBD are still missing. There is insufficient evidence in the published literature to support the decision to introduce FC testing in primary care. Studies evaluating FC testing in an appropriate primary care setting are needed.

# Platelet-Lymphocyte Ratio as a Predictor of Prognosis in Head and Neck Cancer: A Systematic Review and Meta-Analysis.

- ▶ P: latelet-to-lymphocyte ratio (PLR) IN Head and Neck Cancer
- ▶ I:
- ▶ C:
- ▶ O: OVERAL survival

# Platelet-Lymphocyte Ratio as a Predictor of Prognosis in Head and Neck Cancer: A Systematic Review and Meta-Analysis.

- ▶ The aim of this systematic review and meta-analysis was to investigate the prognostic utility of the platelet-to-lymphocyte ratio (PLR) in head and neck cancer.
- ▶ meta-analysis were performed to generate the pooled hazard ratios (HR) for overall survival (OS) and disease-specific survival (DSS).
- ▶ **Effect of metformin use on the risk and prognosis of ovarian cancer: an updated systematic review and meta-analysis.**