



# SEEKING INFORMATICS LITERATURE

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- Formulate an answerable clinical/research question using PICO as a guide
- Describe how Boolean operators function in a search strategy
- Pair a research question with the appropriate study type
- Search for journal articles in PubMed effectively using keywords or Medical Subject Headings

# Ever feeling...?

- Unorganized
- Not sure what your key terms are
- Unsure which articles are relevant

PICO can help!



# PICO = focused and answerable



- **P**roblem/Patient/Population
- **I**ntervention/Indicator
- **C**omparison/Control (if any)
- **O**utcome



How can artificial intelligence be incorporated in diagnostic imaging of irritable bowel disease?



## Sample Question

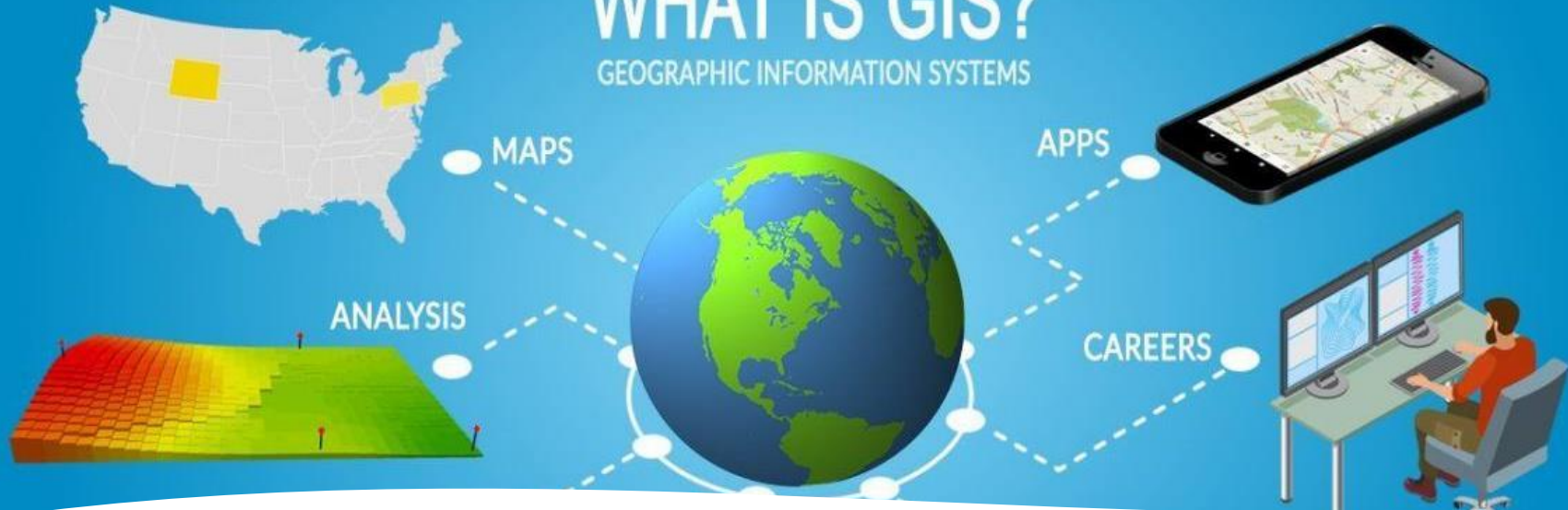
- Population/Patient: Patients with irritable bowel disease symptoms
- Intervention/Indicator: AI imaging
- Comparison: Standard imaging
- Outcome: Sensitivity and specificity



How can GIS mapping be used to decrease time in the emergency department for pediatric asthma patients?

# WHAT IS GIS?

GEOGRAPHIC INFORMATION SYSTEMS



## Sample Question

- Population/Patient: Pediatric asthma patients
- Intervention/Indicator: GIS data in the EMR
- Comparison: Standard EMR
- Outcome: Decreased time in the ED

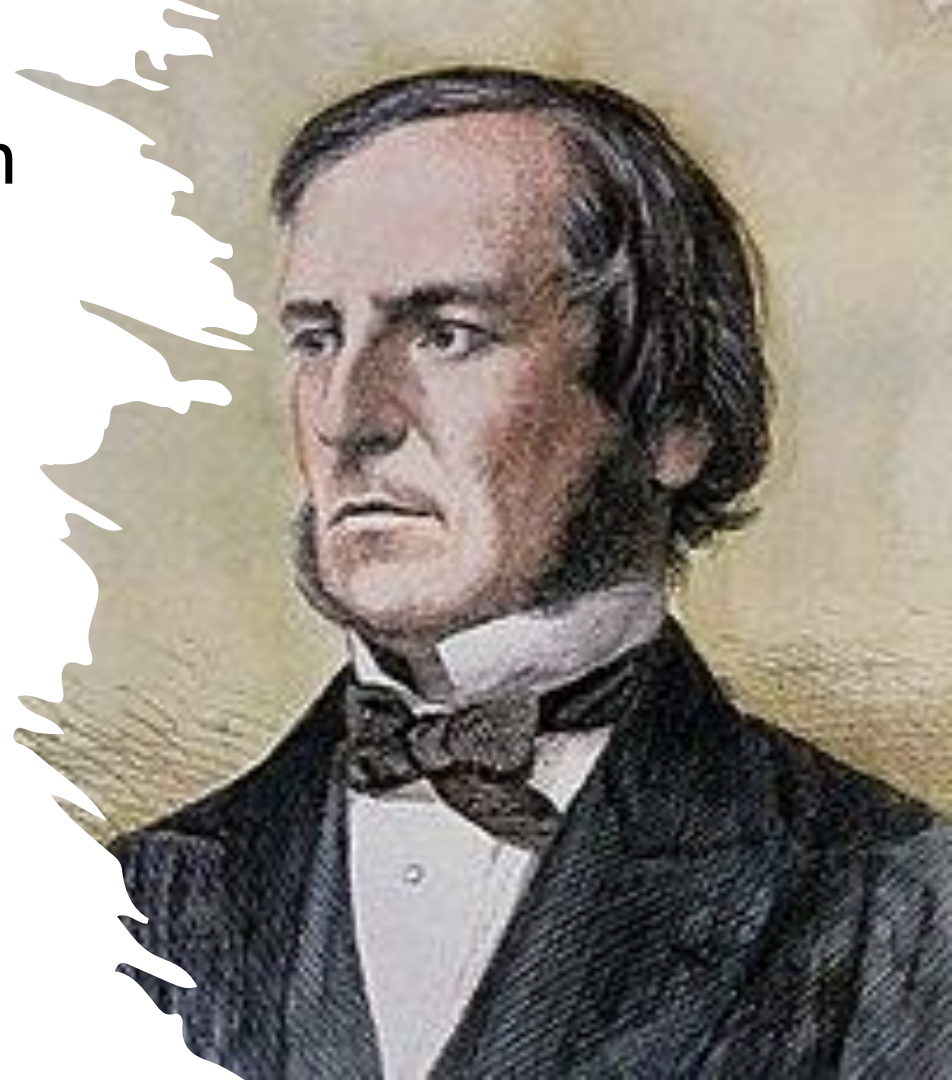


| PICO Elements          | Concepts                       | Search Terms<br>(include<br>synonyms) | Search Strategy |
|------------------------|--------------------------------|---------------------------------------|-----------------|
| Population/<br>Patient | Irritable bowel disease        |                                       |                 |
| Intervention           | Artificial Intelligence        |                                       |                 |
| Intervention           | Imaging                        |                                       |                 |
| Outcomes               | Sensitivity and<br>specificity |                                       |                 |

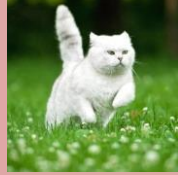
| PICO Elements          | Concepts                       | Search Terms<br>(include<br>synonyms)               | Search Strategy |
|------------------------|--------------------------------|---|-----------------|
| Population/<br>Patient | Irritable bowel disease        | Inflammatory bowel<br>Colitis<br>Crohn's disease    |                 |
| Intervention           | Artificial Intelligence        | Machine learning<br>Deep learning<br>Neural network |                 |
| Intervention           | Imaging                        | MRI<br>CT scan<br>Ultrasonography                   |                 |
| Outcomes               | Sensitivity and<br>specificity | Effectiveness<br>Accuracy<br>Precision              |                 |

What about those Boolean  
operator dealies?

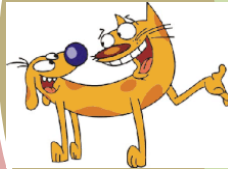
AND  
OR  
NOT



# Cats



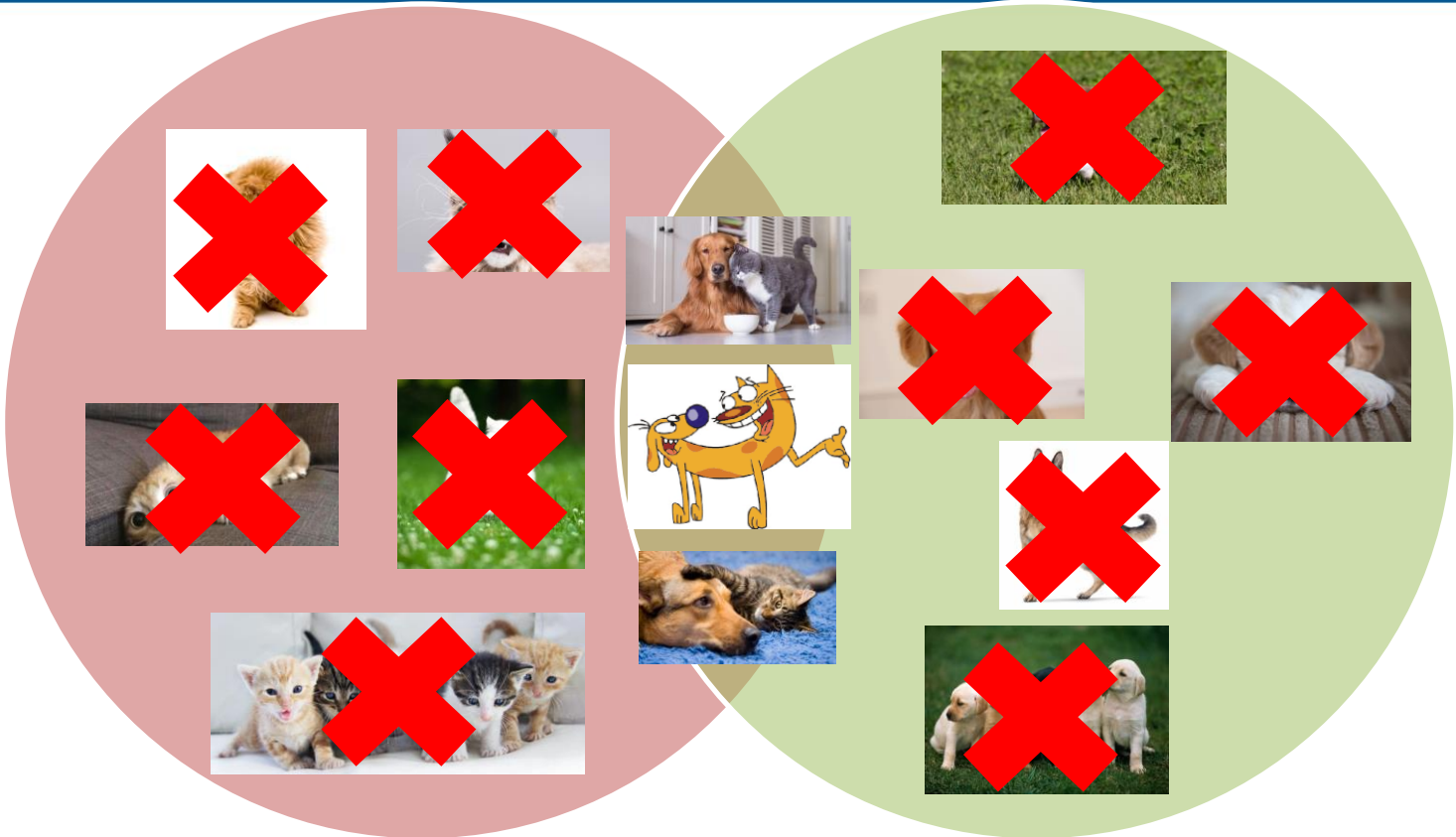
# Cats OR Dogs



# OR is great for similar concepts infants OR newborns



# Cats AND Dogs



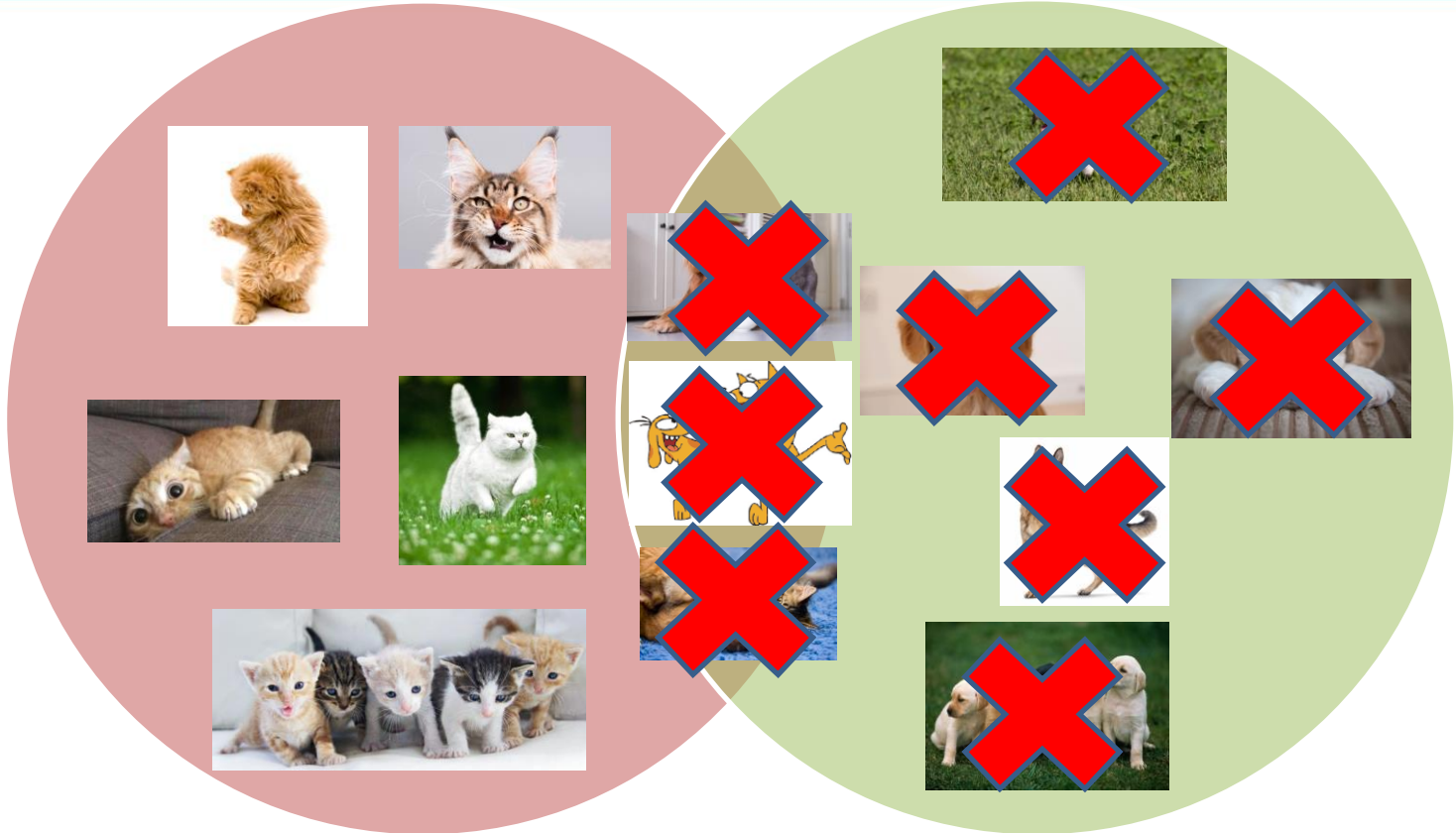
# AND is great for PICO concepts

## Kangaroo AND Newborn





# Search: Cats NOT Dogs



# Careful now!

## Search: asthma NOT adults



Our  
pediatric  
and  
excluded  
adults



## PICO Concepts = Search Terms



## PICO = Criteria for Studies



**OR gives you MORE**



**AND gives you LESS**



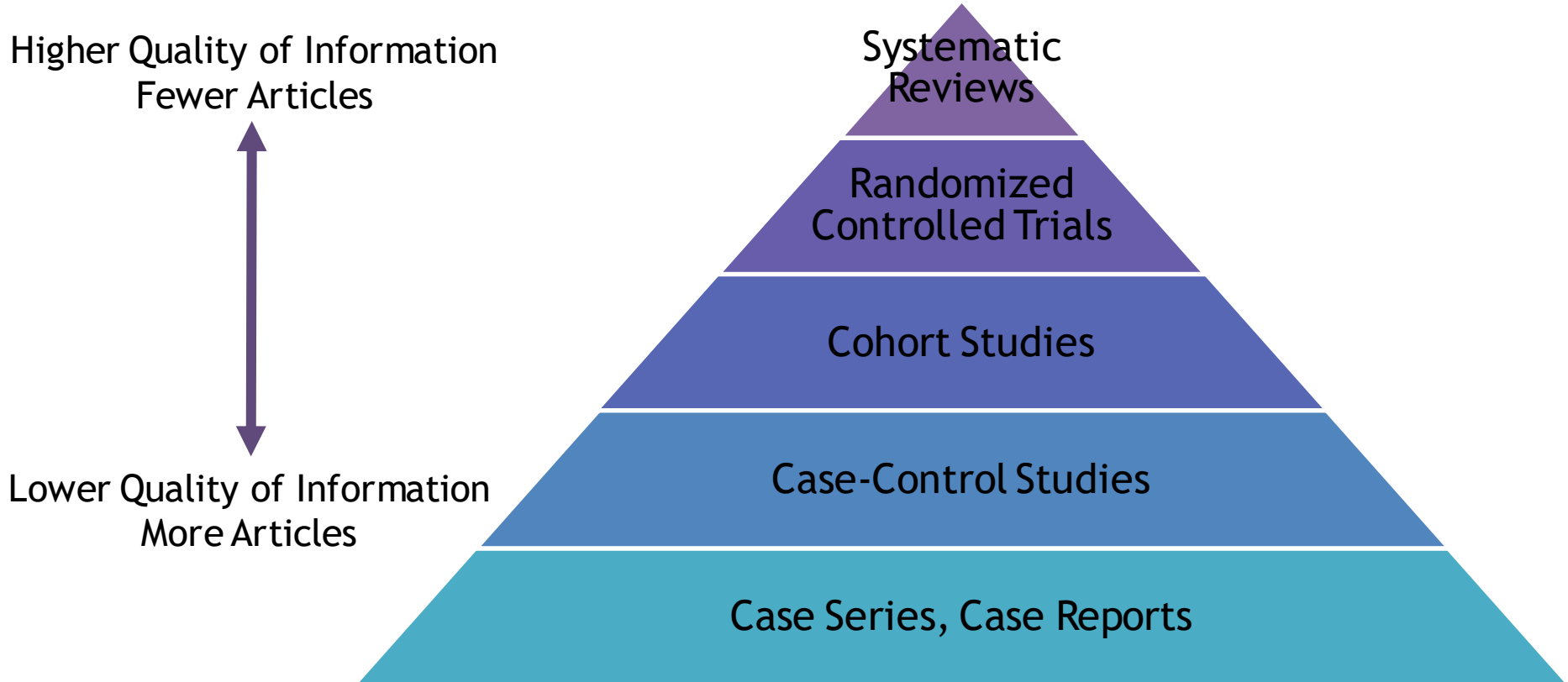
**NOT can be dangerous...**



# Question Type Guides Article Type

| Question Type       | Best Study                                       |
|---------------------|--|
| Diagnosis/Screening | Prospective, blind comparison to a gold standard |
| Prognosis           | Cohort Study > Case Control > Case Series        |
| Therapy             | RCT > Cohort Study                               |
| Etiology/Harm       | RCT > Cohort Study > Case Control > Case Series  |
| Prevention          | RCT > Cohort Study > Case Control > Case Series  |
| Cost                | Economic Analysis                                |

# Not All Studies Are Created Equal - Searching





- U.S. National Library of Medicine & National Institutes of Health
- MEDLINE, life science journals, online books
- 34+ million citations



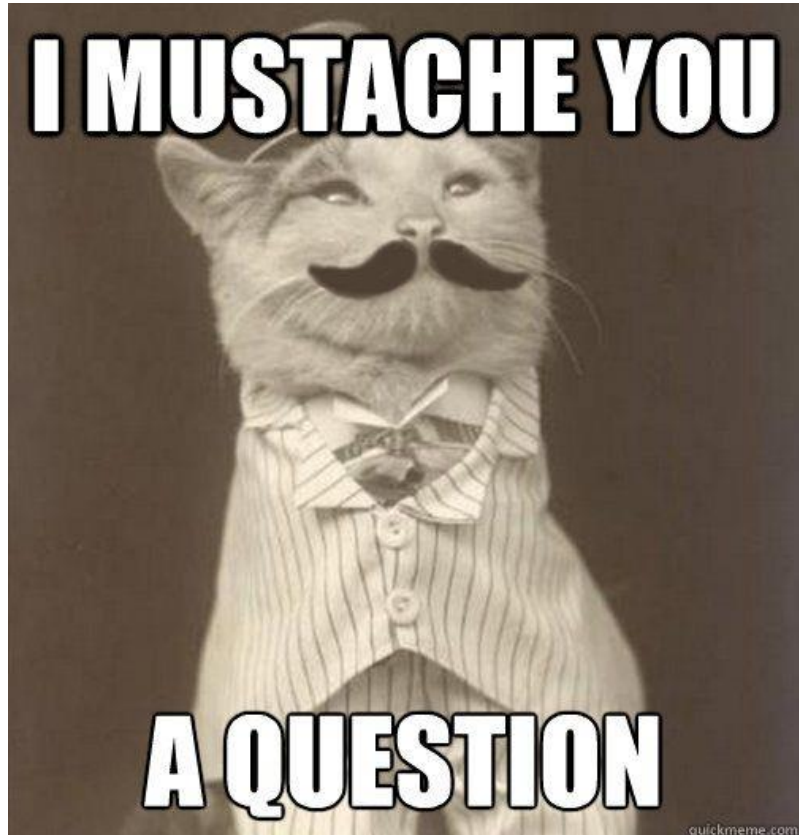
| PICO Elements          | Concepts                    | Search Terms<br>(include<br>synonyms)                       | Search Strategy                               |
|------------------------|-----------------------------|---|---|
| Population/<br>Patient | Low birth weight<br>infants | Low weight<br><br>Infants<br>Neonates                       | low weight AND<br>(infan* OR neonat*)         |
| Intervention           | Kangaroo Mothering          | Kangaroo Mothering<br>Kangaroo Care<br>Skin-to-Skin Contact | kangaroo OR “skin<br>to skin”                 |
| Comparison             | N/A                         |   |   |
| Outcomes               | Decreased length of<br>stay | Length of stay<br>LOS<br>Time to discharge                  | length of stay OR<br>LOS OR discharge<br>time |

| Strengths   | Weaknesses  |
|---|---|
| <ul style="list-style-type: none"><li>• Easy to enter terms &amp; obtain results quickly</li><li>• Includes most recently published information</li></ul> | <ul style="list-style-type: none"><li>• Will include irrelevant citations (searching for words used in citation, not what article is about)</li></ul> |

| Strengths  | Weaknesses  |
|--|---|
| <ul style="list-style-type: none"><li>• Accurately returns relevant articles in search results; capturing “aboutness”</li><li>• Able to specify relationship between terms</li></ul> | <ul style="list-style-type: none"><li>• Requires more effort at the beginning of the search</li><li>• Does not include most recently published information</li><li>• Not all concepts have MeSH terms</li></ul> |

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**T.HANKS**