CRITICAL APPRAISAL

PLAN OF PRESENTATION

- Background
- Understanding the Elaboration of a research
- Step by step analysis
- Conclusion

BACKGROUND

- Nurse at JGH for 18 years
- Urology clinic
- Operating room
- IPAC

BACKGROUND

- Bachelor University of Montreal
- Certificate University of Sherbrooke
- EBNP Workshop JGH, winter 2015
- Analyse critique d'articles scientifique, spring 2015

THE FIVE PHASES OF A RESEARCH

- Conception phase
- Methodology phase
- Empiric phase
- Analysis phase
- Diffusion phase

CONCEPTION PHASE

- Choice of a subject and a preliminary question
- literature review
- Elaboration of the frame work
- Formulation of the research problem
- Goals, questions and hypothesis

SUBJECT AND QUESTION

- Subject of interest for the author (could be anything)
- Prelimirary question (to conduct the literature review)

LITERATURE REVIEW

- To give comprehension on the state of knowledge (were are we on the subject?)
- Define bounderies of the problem
- Give an idea on the methods to use

LEVELS OF RESEARCH AND QUESTIONS

- Descritive research:
  - -Exploration of a phenomenon, process or event.
  - -Description of concepts, factors, caracteristics or populations.
- Explanatory research:
  - -Exploration of link between concepts
  - -Verification of links between concepts and variables
- Predictive and control research

RESEARCH FRAME WORK

- Theoretical framework:

  -Explanation is based on existing theories and there is sufficient knowledge on the subject.

- Conceptuel framework:

  -Explanation is based on a group of concepts that are linked together by the researcher.

FORMULATION OF THE RESEARCH PROBLEM

- **Four types of questions**

Descriptive

Exploratory

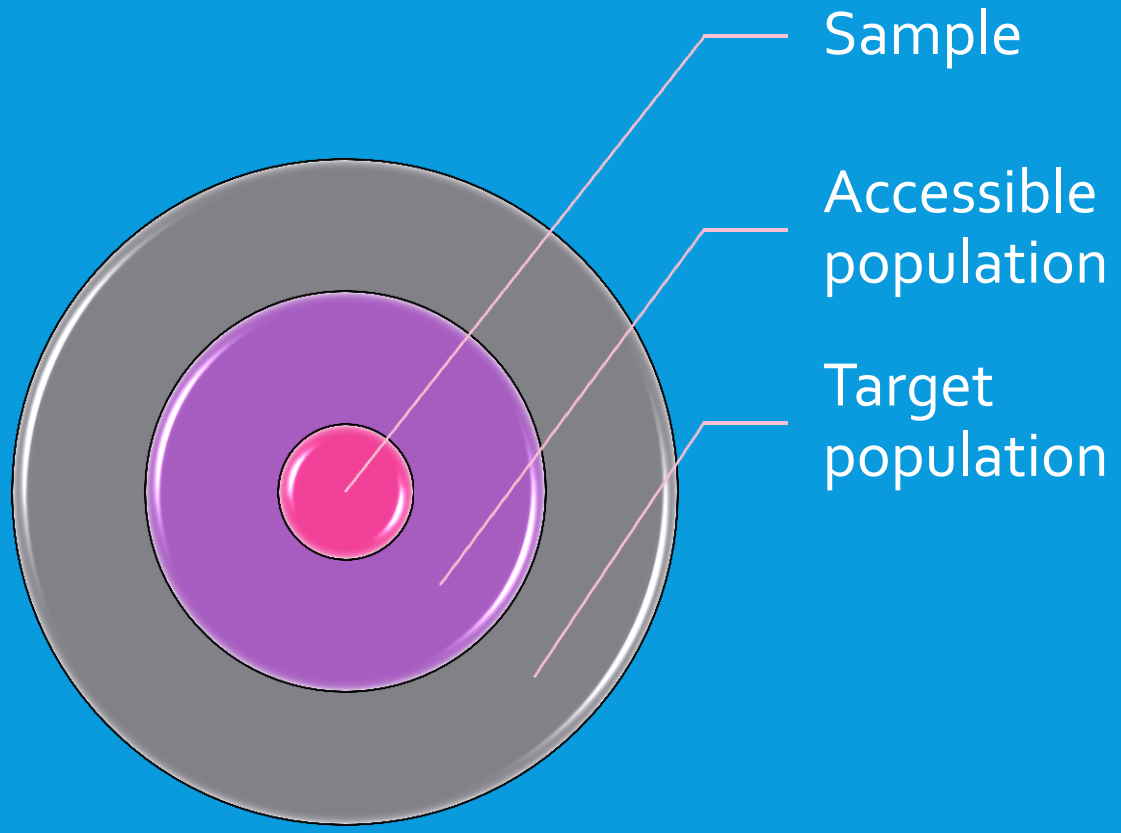
Explanatory

Prediction and control

METHODOLOGY PHASE

- Definition of the population and sample
- Research design
- Description of data collection and analysis
- Ethical considerations

POPULATION AND SAMPLE



RESEARCH DESIGN

- Descriptive
- Cohort study
- Case control study
- Randomised control trial

DESCRIPTION OF DATA COLLECTION AND ANALYSIS

- Probability sample:
  - Chosen at random
  - List, draw, …
- Non-probability sample:
  - Chosen because of availability
  - Volonteers
  - Recrutment
- Sample size:
  - Determined statisticaly (power)
  - Larger = Better

ETHICAL CONSIDERATIONS

- Respects human dignity
- Written consent
- Respect confidentiality
- Approved by ethics comittee

EMPIRIC PHASE

Data collection methodes:

- Interviews
- Observation : Audits
- Questionnaires
- Measurement tools

ANALYSIS PHASE

- Analysis of data
- Interpretation of results
- Presentation of results

ANALYSIS OF DATA

Statistics

- Relative risk
- Ods ratio
- Ratios
- Prevalence

INTERPRETATION OF RESULTS

- Brings out signification of results
- Limits of the study
- Evaluate implications
- Gives recommendations for practice and futures research

PRESENTATION OF RESULTS

- Tables

Tableau 3 Nombre moyen de cas et taux d'incidence des DACD d'origine nosocomiale sur les 87 installations ayant participé à toutes les années de surveillance, périodes 10 à 13, 2004-2005 à 2011-2012

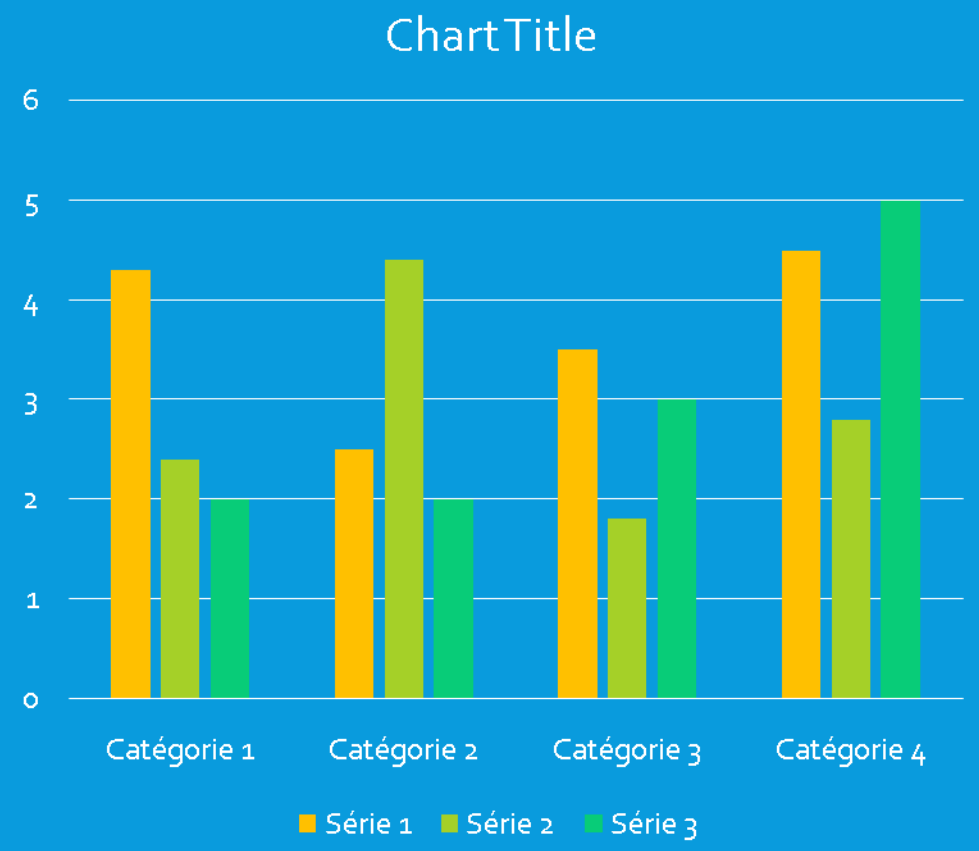
Période	Pic épidémique 2004-2005		Période épidémique tardive 2005-2007		Période post-épidémique 2007-2010		Année de surveillance 2010-2011		Périodes à l'étude 2011-2012	
	Nombre de DACD	Taux d'incidence [IC 95 %]	Nombre moyen annuel de DACD	Taux d'incidence [IC 95 %]	Nombre moyen annuel de DACD	Taux d'incidence [IC 95 %]	Nombre de DACD	Taux d'incidence [IC 95 %]	Nombre de DACD	Taux d'incidence [IC 95 %]
10	466	12,3 [11,2 ; 13,4]	300	8,4 [7,7 ; 9,1]	250	6,9 [6,4 ; 7,4]	283	7,5 [6,6 ; 8,4]	246	6,5 [5,7 ; 7,3][a,b]
11	669	16,2 [15,0 ; 17,5]	417	10,6 [9,9 ; 11,3]	260	6,5 [6,1 ; 7,0]	316	8,0 [7,1 ; 8,9]	275	6,9 [6,1 ; 7,7][a,b,d]
12	733	18,3 [17,0 ; 19,6]	393	10,0 [9,3 ; 10,7]	281	7,0 [6,5 ; 7,5]	405	10,1 [9,1 ; 11,1]	304	7,5 [6,7 ; 8,4][a,b,d]
13	550	15,0 [13,8 ; 16,3]	392	10,1 [9,4 ; 10,8]	312	7,2 [6,7 ; 7,7]	456	9,8 [8,9 ; 10,7]	402	8,2 [7,4 ; 9,0][a,b,c,d]
Total	**2 418**	**15,5 [14,9 ; 16,1]**	**1 501**	**9,8 [9,5 ; 10,2]**	**1 103**	**6,9 [6,7 ; 7,1]**	**1 460**	**8,9 [8,5 ; 9,4]**	**1 227**	**7,3 [6,9 ; 7,8]**

[a] Significativement inférieur au pic épidémique.
[b] Significativement inférieur à la période épidémique tardive.
[c] Significativement supérieur à la période post-épidémique.
[d] Significativement inférieur à l'année de surveillance 2010-2011.

PRESENTATION OF RESULTS

Figures

- Graphics
- Diagrams
- Plot charts



DIFFUSION PHASE

- Essential in research
- Publication of results
    - As scientific articles
    - Reports
    - Theses results
- Symposiums
- Congress
- Workshops

CRITICAL APPRAISAL

TYPES OF STUDIES

- **Case reports/case studies-** detailed report of a single patient
- **Case series-** track patients with a known exposure (e.g. similar treatment)
- **Case-control studies-** compare patients with a disease or outcome with patients who do not have that disease or outcome- can be prospective or retrospective
- **Cohort studies-** track large numbers of people over a long period of time- can be prospective or retrospective
- **Randomized controlled trials-** measure the effect of a treatment in a controlled setting
- **Systematic reviews-** systematically search the published and unpublished literature to synthesis the evidence with reduced bias
- **Meta-analyses-** when quantitative data is homogenous enough it can be statistically pooled to provide a greater statistical significance- often done with systematic review

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To learn more about different study designs see:
http://hsl.lib.umn.edu/biomed/help/understanding-research-study-designs

WHAT IS CRITICAL APPRAISAL?

- A systematic way of assessing the quality and relevance to practice of a given research article.
- Instead of looking at the abstract we look at the methods section of the study
- Each study design (type of evidence) has a methodology that needs to be followed in order to achieve its objectives
- Some evidence has been pre-appraised and assigned a “level of evidence”
- There are worksheets to help with this.

WHY IS CRITICAL APPRAISAL IMPORTANT?

- Not all studies are of equally good quality
  - Many systematic reviews are poorly done
  - Sometimes the author's conclusions are not supported by the data
- Not all patients are the same
- This is where your clinical judgment and patients' preferences come in!

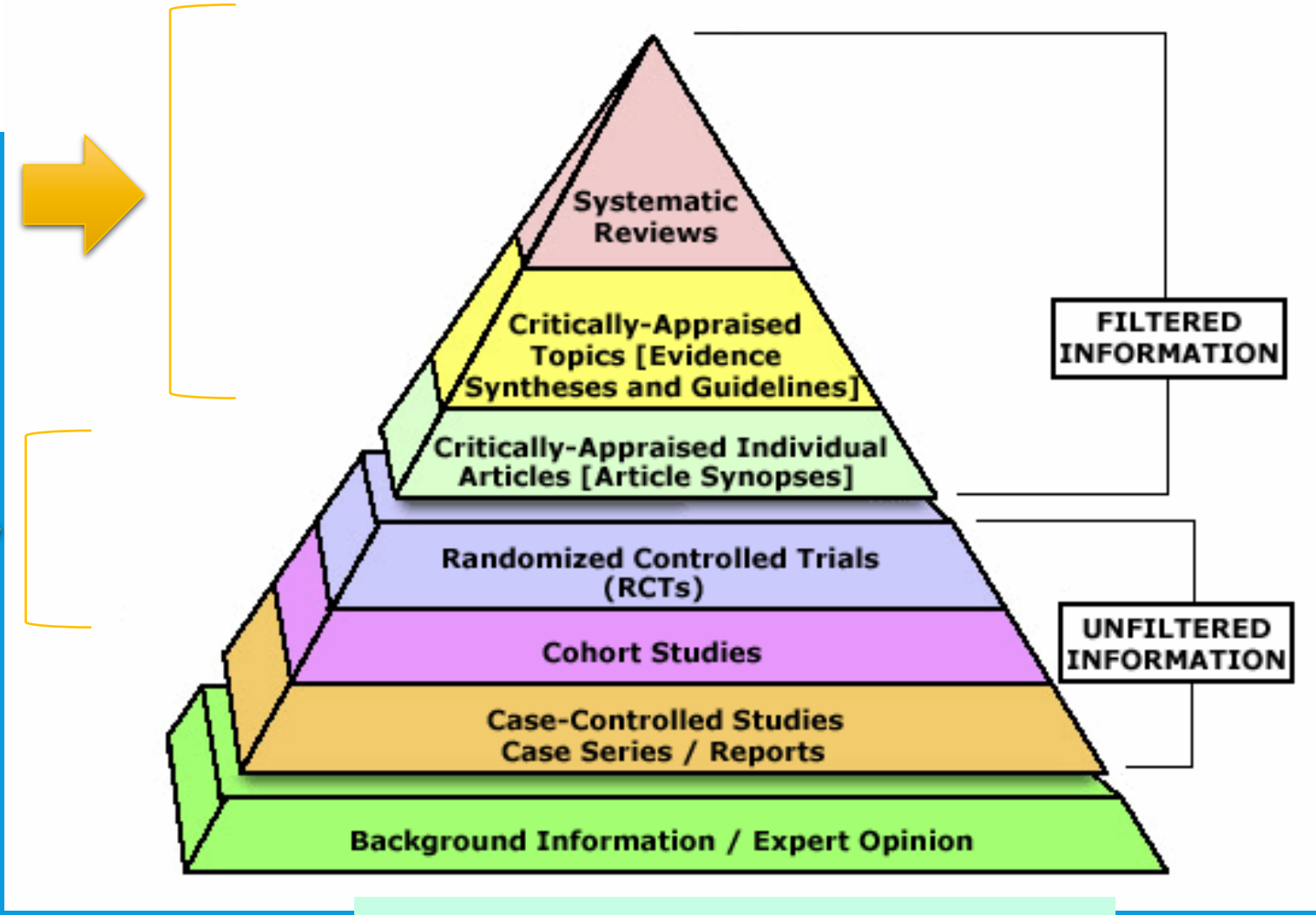
NOT ALL RESEARCH IS CREATED EQUAL

- Even studies at the top of the evidence pyramid (systematic reviews, RCTs) can be poorly done
- Authors can reach conclusions not supported by the data
- Studies can be biased- did the authors do anything to mitigate this?
- You need to assess whether the study is relevant to your patients and your context

JUST BECAUSE IT'S FILTERED, DOESN'T MEAN IT'S PRE-APPRAISED

May still need to be appraised by you

Needs to be appraised by you



See course website for interactive version of this pyramid.

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HOW DO WE APPRAISE AN ARTICLE?

- Critical appraisal looks at whether a given study has met the standards for its chosen design.
- Each type of evidence has its own set of criteria- you can use worksheets to help you.
- Some general criteria:
  - Is the methodology appropriate and clearly reported?
  - Is the study well designed?
  - Are the findings well reported?
  - Are the findings relevant to your institution/patient(s)?
  - Should you change your practice based on these findings?

How do we appraise an article?

TEN QUESTIONS TO ASK WHEN CRITICALLY APPRAISING A RESEARCH ARTICLE.

- Is the study question relevant?
- Does the study add anything new?
- What type of research question is being asked?
- Was the study design appropriate for the research question?
- Did the study methods address the most important potential sources of bias?
- Was the study performed according to the original protocol?
- Does the study test a stated hypothesis?
- Were the statistical analyses performed correctly?
- Do the data justify the conclusions?
- Are there any conflicts of interest?

Young JM, Solomon MJ. How to critically appraise an article. *Nature Clinical Practice Gastroenterology & Hepatology* (2009) **6**, 82-91

Tools for Critical appraisal

- Worksheets and other tools available on our website: www.jgh.ca/en/hslintroebp

Step by Step approach to analysis

Key points to look for when analyzing a research article

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TITLE OF ARTICLE

- Clear
- Key concepts and population

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ABSTRACT

Should give you a resume of these four points

- Research problem
- Method
- Results
- Discussion

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RESEARCH PROBLEM

- Is it clearly formulated and concise
- What is under study?

LITTERATURE REVIEW

- Are the anterior research pertinent and are they critically reported
- Does it give a synthesis of the state of the question in relation to the problem

GOAL, QUESTION OR HYPOTHESIS

- Is the goal clearly mentioned
- Are the research questions and hypothesis clearly mentioned
- Do they logically come from the literature review

POPULATION AND SAMPLE

- Is the targeted population well defined?
- Does the sampling method give a representative sample of the population?
- Is the size of the sample statistically justified?

ETHICAL CONSIDERATIONS

- Where the participants rights preserved?
- Was the study designed to minimize risk and maximize benefits to participants?

RESEARCH DESIGN

- Does the design allow to reach the goal, to examine the questions or hypothesis?
- Is it appropriate for the research problem?

DATA COLLECTION

- Are the tools described clearly and can they measure variables
- Was the tool pre-existing or created for the study?
- Are the fidelity and validity of the tool measured ?

DATA COLLECTION

- Was the collection clearly explained ?
- Was it conducted by competent people in order to minimize bias?

ANALYSIS

- **P-value:** "The probability that the difference(s) observed between two or more groups in a study would occurred if there were no differences between the groups other than those created by random selection. Many researchers use a probability **(p-value) of less than 0.05 as the cut-off for "statistical significance",** i.e. when the sort of result seen in a study would occur by chance less than once in 20 studies."*

- **Odds ratio**: "the odds in favor of being exposed in subjects with the target disorder divided by the odds in favor of being exposed in control subjects (without the target disorder)."*

ANALYSIS

- AR (**Absolute Risk**) versus RR (**Relative Risk**): risk of developing a disease in the population at large versus comparative risk in two different groups of people (i.e smokers vs non-smokers)

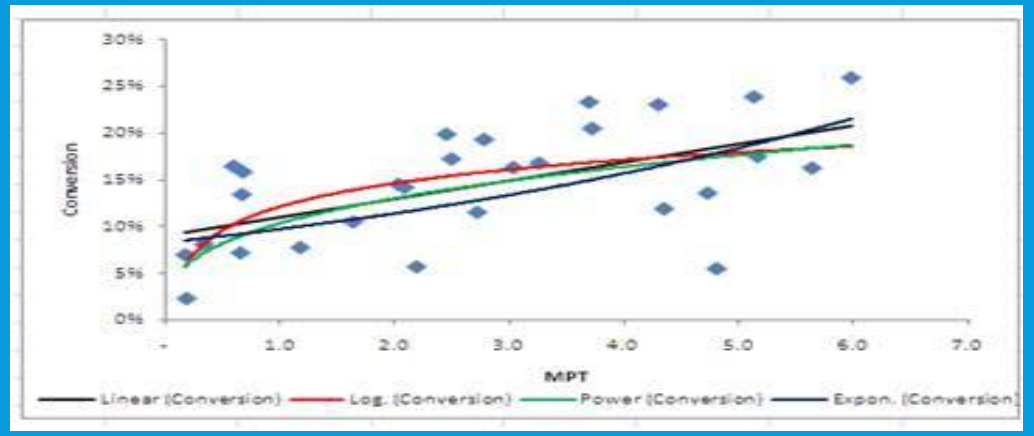
- **Intention to treat**: "A method of analysis for randomized trials in which all patients randomly assigned to one of the treatment groups is analyzed with that assigned group, regardless of whether or not they completed or received the treatment."

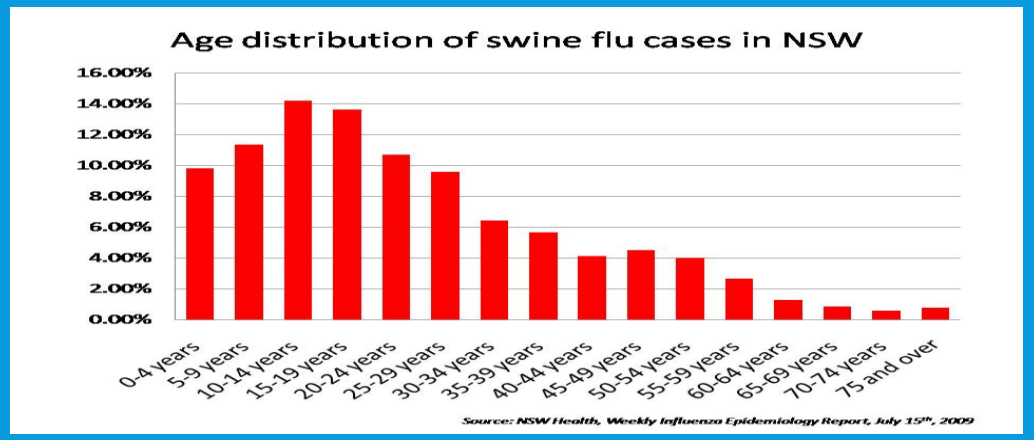
ANALYSIS

- Are the calculations well explained?
- Is it chinese to you?
- Ask a Professional

PRESENTATION OF RESULTS

- Are the tables and figures understandable?
- Do they have a title and legends ?





INTERPRETATION OF RESULTS

- Do the results match the ones from previous studies?
- Does the interpretation and conclusion of results match the analysis?
- Do they mention the limits of the study?

RECOMMENDATIONS

- Does the author give recommendations for implementation of the results or for further investigation?

IN CONCLUSION

- Not all answers will be present in an article.
- Use your jugment.
- When in doubt, call our librarians.
- Practice makes perfect.

THANK YOU