CRITICAL APPRAISAL
PLAN OF PRESENTATION

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

- Descrptive research:
  - Exploration of a phenomenon, process or event.
  - Description of concepts, factors, characteristics or populations.

- Explanatory research:
  - Exploration of link between concepts
  - Verification of links between concepts and variables

- Predictive and control research
• 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

- Sample
- Accessible population
- Target population
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
  Volunteers
  Recruitment

- Sample size:
  Determined statistically (power)
  Larger = Better
ETHICAL CONSIDERATIONS

- Respects human dignity
- Written consent
- Respect confidentiality
- Approved by ethics committee
EMPIRIC PHASE

Data collection methods:
- Interviews
- Observation: Audits
- Questionnaires
- Measurement tools
ANALYSIS PHASE

• Analysis of data
• Interpretation of results
• Presentation of results
ANALYSIS OF DATA

Statistics

• Relative risk
• Odds 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

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<td>1 227</td>
<td>7.3 [6.9 ; 7.8]</td>
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* Significativement inférieur au pic épidémique.
* Significativement inférieur à la période épidémique tardive.
* Significativement supérieur à la période post-épidémique.
* 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

To learn more about different study designs see: [http://hsl.lib.umn.edu/biomed/help/understanding-research-study-designs](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.
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?
Tools for Critical appraisal

• Worksheets and other tools available on our website: [www.jgh.ca/en/hslintroebp](http://www.jgh.ca/en/hslintroebp)
Step by Step approach to analysis

Key points to look for when analyzing a research article
TITLE OF ARTICLE

- Clear
- Key concepts and population
ABSTRACT

Should give you a resume of these four points

- Research problem
- Method
- Results
- Discussion
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?
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 \((p\text{-value})\) 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).“*
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?
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 judgment.
• When in doubt, call our librarians.
• Practice makes perfect.
THANK YOU