



Australian
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Drafting a quantitative epidemiological research paper

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Background

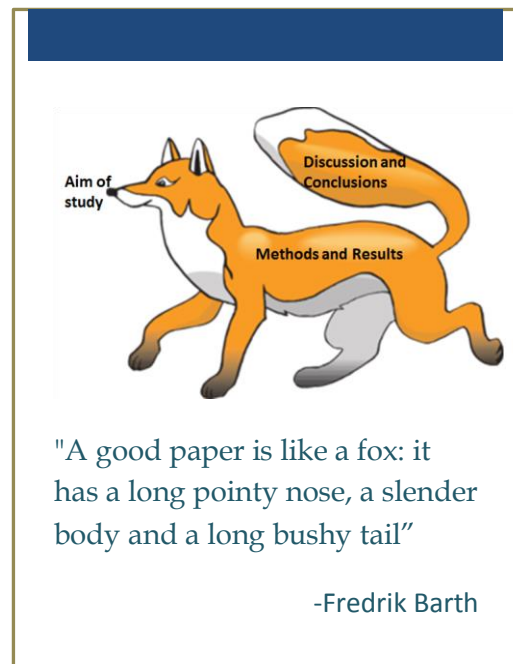
Publishing papers is a key part of an effective strategy to disseminate research results and communicate with your peers. The number of papers published in journals is increasing, as is the competition in getting a paper accepted in journals, with increasingly high rejection rates. As such, it is important to learn how to write a clear and succinct research paper for a scientific audience, keeping in mind what the journal editors and audience expect to see in such a paper.

This module explains the purposes of the various parts of a quantitative epidemiological research paper, and then suggests a structured format for writing each of them. There are different conventions for different types of papers, and the focus here is on quantitative research in epidemiology. Key elements can be translated across disciplines, but care should be taken to adhere to the conventions specific to the discipline.

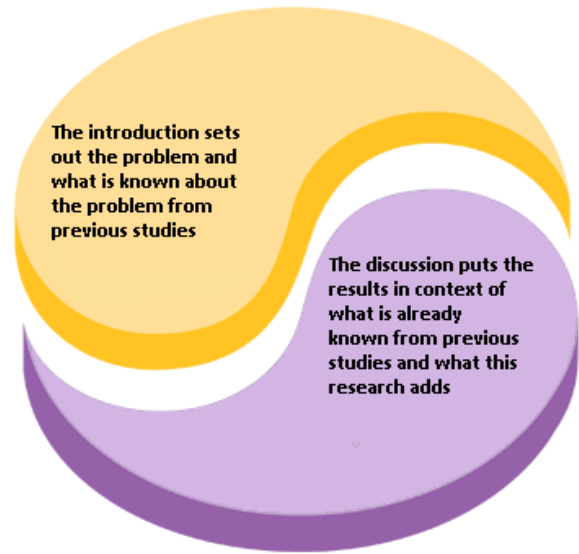
There is no right way to write a paper – this module is not prescriptive, but rather provides some principles that you might want to follow. You should read articles in your discipline, particularly in the actual journals that you are looking to publish in. It is important to identify your targeted journal, or at least the type of journal, before you write your paper so you are aware of your intended audience. This will influence the amount of contextualisation required and the framing of the problem.

It is recommended that you use the sub-headings in each of the structure sections of this module when you first draft your paper, to ensure coherency and that nothing is missed. You should remove these sub-headings before submitting the paper for formal review.

One thing that you may notice about this module is that the sections are not in the order in which they will appear in the paper. The usual order of sections in a paper is Introduction, Methods, Results, Discussion and Conclusions. For this teaching module, we consider the Introduction and Discussion sections first, as these two sections balance or complement each other and we recommend that they be written together, as two parts of one whole. This will help to ensure that the right amount of detail is in each section, and that duplication is avoided.



- The Introduction sets out the problem and what is known
- The Discussion puts the results in context of what is known, and what this research adds
- The Introduction and Discussion fit together, creating a complementary whole
- The Introduction is more big picture, with the Discussion having more detail relevant to your specific findings
- Information can be moved between Introduction and Discussion to get the balance of detail right



The Introduction section

Purpose of Introduction

The Introduction defines the problem of interest and how you will address it. It has three clear purposes:

- Describes the problem and its magnitude
- Describes the research gap
- Outlines how the paper will contribute to filling the research gap
- States the aims and hypotheses of the research

It is crucial that you clearly explain why the research was conducted

It is crucial that you clearly explain why the research was conducted. It is not sufficient to say merely that there was a gap – you should show why it is important to fill that gap. Do not be too explicit in defining the gap, as this could lead to the question of why a narrow gap needs to be filled.

The weight of the literature review will be split between the Introduction and Discussion sections; the balance varies between disciplines. It can be helpful to read widely within your discipline to learn what the standard is in your area. For example, in quantitative disciplines such as epidemiology, it is typical to have a short, concise Introduction, with the bulk of the literature review in the Discussion. However, in qualitative disciplines such as anthropology, the Introduction is typically longer and contains more of the literature review than the Discussion section does.

Structure of Introduction

The following sub-headings can be used to structure the Introduction to your paper:

1. Introduction and definition of the problem

This is a brief introduction to the overall subject, such as “heart disease” or “health inequalities”. It is helpful to define the magnitude of the overall subject, such as indicating the numbers of people affected by a disease.

2. What is known about this problem

This is a brief summary of the evidence about your specific problem from previous studies. The details can go in the Discussion section, which we recommend that you prepare at the same time as you prepare the Introduction.

3. What is not known

Here you will describe the research gap. Be clear and explicit about the gap, without being too restrictive. If the gap is too narrow, it may not be worth filling. Explain why it is important that the gap be filled.

4. Aim of your study

This outlines the general contribution that your study will make to knowledge of the subject, and how your study contributes to filling the research gap.

In the Introduction section, the study design can be identified, but all other details on methods belong in the Methods section. For example, in the Introduction you might simply mention that it

was a case-control study or a randomised clinical trial. If the paper is focused on a methodological issue then that should be reflected in the way the problem is framed.

Example of Introduction

This example of an Introduction is from a paper on contraceptive use and cancer in South African women.

The problem

“Hormonal contraceptives are among the most commonly used medications. Worldwide, in 2007, 9% of women aged 15–49 y were estimated to be using the oral contraceptive pill and 4% were using injectable contraceptives or implants, amounting to over 210 million women exposed to these contraceptive types.”

What we know from previous studies

“Large-scale epidemiological evidence has shown that use of oral contraceptives significantly affects the risk of cancers of the liver and of the female reproductive system, specifically cancers of the breast, cervix uteri, ovary, and endometrium.”

What we don't know

“The most recent assessment from the International Agency for Research on Cancer was in 1999 and hence included much of the relevant data on breast, ovarian, and endometrial cancer, but not the 2007 data on cervical cancer; it concluded that there was inadequate evidence in humans for the carcinogenicity of progestagen-only contraceptives.”

Aim

“The objective was to investigate the relationship between use of oral and injectable hormonal contraceptives and cancers of the breast, cervix uteri, ovary, and endometrium.”

Reference: Urban, M., Banks, E., et al. (2012). Injectable and oral contraceptive use and cancers of the breast, cervix, ovary, and endometrium in black South African women: case-control study. *PLoS medicine*, 9(3), e1001182.

The Discussion section

Here we are considering the Discussion section immediately after the Introduction section because the two are linked and should be prepared at the same time. When the paper is assembled in its entirety, the Discussion section will come immediately after the Results section.

Use $\frac{3}{4}$ of the Discussion to focus on what we do know, and $\frac{1}{4}$ to mention what we don't know

Purpose of Discussion

The main purpose of the Discussion is to provide information sufficient to interpret the Results of the study. The Discussion should outline the main results in the context of what is already known in the field and what the research adds to it. You need to discuss:

- How your findings compare to previous literature Contribution to the research gap which was identified in the introduction
- What gap remains – or what are the remaining questions that your research didn't answer

The discussion should give meaning to the results and answer the question, “so what?”. In other words, what do the main findings mean? Why does your research matter and what does it add to what is already known?

As a rule of thumb, you should use three-quarters of the Discussion to focus on what we do know, and one-quarter to mention what we don't know.

Structure of Discussion

The main sub-headings that you should tackle in the Discussion section are:

1. Main findings

In discussing the results you need to steer the readers towards the key findings. When you are writing the discussion you have usually been immersed in the results and the problems; you need to take a step back and identify the main findings. Imagine that you had to write a newspaper headline for your research and distil your results into a few words. Then, elaborate on your main findings.

2. Findings in the context of the literature to date

Here is where it is important to draft the Introduction and Discussion at the same time, to avoid duplication and to ensure that your research is appropriately contextualised. This section should focus on comparing your study findings to those of previous studies. This section should answer the questions: are your findings consistent with results from other studies? If not, what are some possible reasons for the discrepancies?

3. Possible mechanisms to explain the results

Your research will have demonstrated “what”, but now you need to suggest a possible “how”. Although you may not have absolute certainty about the biological mechanisms that have produced your results, it is important to discuss one or more possibilities. This could include a suggestion for future research to tease out the mechanisms involved.

4. Strengths and limitations

You need to provide a balanced view of the strengths and limitations of your research. Be careful not to over-state the strengths of your study. Nor should you focus too much on the limitations; identify the key limitations of the study and discuss how they affect interpretation of the results. Avoid the use of adjectives – provide enough information so that the reader can judge the issue for themselves.

Example of Discussion

Main findings

“This study was conducted among black women in South Africa. Use of injectable contraceptives was very common, with over one quarter of the controls in the study reporting they had used them at some point in their lives.” ...

“The study shows that the risk of breast cancer and cervical cancer is increased significantly among women who are current and recent users of oral and/or injectable contraceptives and, separately, among current and recent users of injectable contraceptives exclusively.”

Findings in context of literature

“These findings add substantially to the previously available evidence. The most comprehensive summary of worldwide evidence on breast cancer and use of progestagen-only injectable contraceptives was published by the Collaborative Group on Hormonal Factors in Breast Cancer in 1996.”

Possible mechanisms

“Oestrogens and progestagens exert different effects on different tissues, and the exact mechanisms underlying their ability to influence the risk of cancer are unclear...Oestrogens are known to increase the rate of cell division within the ductal epithelium of the breast, and hence increase the probability of a mutation occurring or of promotion of an existing mutation.”

Strengths and Limitations

“The large numbers of women in this study, and the high prevalence of use of injectable contraceptives, means that this study is able to add to the existing evidence on the effects on cancer risk of progestagen-only injectable contraceptives: the dataset allowed us to examine risk separately in users of injectable contraceptives exclusively, particularly for breast and cervical cancer.”

“... Although we were able to adjust for multiple potential confounding factors, and sensitivity analyses indicated robust findings in the face of additional adjustment, the possibility that results were affected by uncontrolled confounding cannot be excluded.”

Reference: Urban, M., Banks, E., et al. (2012). Injectable and oral contraceptive use and cancers of the breast, cervix, ovary, and endometrium in black South African women: case-control study. *PLoS Medicine*, 9(3), e1001182.

The Methods section

Purpose of Methods

The Methods section should provide sufficient information on your methodology so that someone else can clearly understand (and potentially repeat) what you have done and that they are convinced that your findings and conclusions are valid.

Structure of Methods

It is important that a minimum set of information is included in the Methods section; for quantitative papers this might include: study design, setting, participants, data variables, data sources and measurement, methods of statistical analysis and ethics approval.

Key elements of the **Study Design** should be presented early in the Methods section, or even at the end of the Introduction section. It is common that authors briefly mention the study design in the final paragraph of the Introduction section. It is at this point (i.e. at the end of the Introduction section) that the authors introduce the main aim of their study and it may be appropriate to briefly mention the study design as well. For example, the authors might mention whether their study is a cohort study, case-control study or cross-sectional study (this is also often mentioned in the title of the paper and some journals require this). However in the Methods section, under the **Study Design** sub-heading, the authors should more fully explain the study design in context and should be explicit about the type of study that was conducted. The terms “prospective” or “retrospective” should not be used as they are ill-defined, and mean different things in different contexts. If the terms **MUST** be used, then they should be clearly defined. If it is difficult to classify the study design then authors can describe the key design components, for example, whether it was an observational study or intervention study and whether the data were collected cross-sectionally, from existing records or longitudinally.

Readers need information on the **Setting** and locations of the study to assess the context and generalisability of a study’s results. Authors should state when and where the study was conducted and should state dates, rather than periods of time, when describing the period of study implementation or data collection. Deciding how much detail to include in the Introduction versus the Method sections may involve some trial and error. One way to do this is to provide brief information on the setting in the Introduction section and then provide a more detailed description of the setting in the Methods section.

Eligibility criteria, and sources and methods of selection of **Participants**, should be detailed. Typical eligibility criteria relate to age, gender, diagnosis and co-morbid conditions. Eligibility criteria may include a case definition or other set of clearly defined criteria and these should be clearly noted in the Methods section. Similarly, if there are exclusion criteria, these should also be explained in the Methods section. Despite their importance, eligibility criteria often are not reported adequately. For

The Methods section is ideally like a recipe that lists all of the necessary ingredients of the study and how they need to be combined during cooking. Writing Tips Series in the Journal of Clinical Epidemiology, 2013: 66 (817)

example, in a survey of observational stroke research, 35% of reports did not specify eligibility criteria. It is also important to clearly outline how and from where participants will be enrolled into the study and how the eligibility criteria will be applied. Follow up of participants should be specified, so a reader can judge the validity of the results.

Authors should define all **Variables** considered for and included in the analysis, including outcomes, exposures, predictors, potential confounders and potential effect modifiers. Disease outcomes require adequately detailed descriptions of the diagnostic criteria.

For each variable of interest give **Data Sources** and details of methods of **Measurement** or assessment. Authors need to clearly outline what was measured, how measurements were made (for exposures, confounders and outcomes), if specific measurement tools were used (and if they have been pre-validated or specifically designed for the study) and when the measurements were made. The way in which exposures, confounders and outcomes were measured affects the reliability and validity of a study. Measurement error and misclassification of exposures or outcomes can make it more difficult to detect cause-effect relationships, may lead to bias or may produce spurious relationships.

Authors should describe any efforts to address potential sources of **bias** including measurement and information bias. For example, for cohort studies, authors should also describe how they will minimise loss to follow up. Note that bias and confounding are not synonyms and confounders should be dealt with separately (as mentioned above in Data Sources/ Measurements).

How the **study size** was arrived at should be explained. If a sample size calculation was performed, it should be described. If a statistical software package was used to do the sample size calculation, this should be mentioned.

Authors should then explain how **quantitative variables** were handled in the analyses, describe which groupings were chosen and why.

Describe all **Statistical Methods**, including those used to control for confounding, and explain how missing data were addressed. It is important that you match your Statistical Methods section with the research question, explaining how your analysis answers the primary research question and any secondary research questions. All statistical procedures should be outlined here with sufficient detail on these procedures (i.e. a name of a statistical procedure is not sufficient). If groups being compared are not similar with regard to some characteristics, adjustment should be made for possible confounding variables by stratification or by multivariate regression. If p-values are being used authors should state what cut-off is considered statistically significant. Authors should outline what statistical package will be used for the analysis. If the methods are extremely detailed then supplementary files can be provided which will be included on the journal website as supplementary materials. Most scientific journals will provide guidance on this.

Example of Methods

Study design

“This study uses an established case control design for cancer epidemiology studies done in resource limited settings, where cases are individuals with the cancer of interest and controls are individuals with other cancers that are not associated with the exposure under investigation.”

Setting

“The Johannesburg Cancer Case Control Study is a large ongoing case-control study recruiting self-defined black (not mixed race/ ancestry) male and female cancer patients with all cancer types, conducted at the greater Johannesburg public referral hospitals that offer cancer treatment.”

Participants

“Female patients recruited from 8 March 1995 to 31 December 2006 were included in the present analysis... Cases for this study were women with a newly diagnosed invasive breast, cervical, ovarian or endometrial cancer. Controls consisted of women diagnosed with cancer types that have no relationship to oral or injectable contraception ... Excluded from the controls were ...”

Variables

“Socio-demographic and behavioural information was solicited, including age, birthplace, residence, years of education, alcohol and tobacco use, reproductive history and lifetime sexual history. In the large majority of cases, the clinical diagnosis of cancer was supported by laboratory investigations giving microscopic verification.”

Data Sources/ Measurement

“Trained nurses used a standard questionnaire to interview newly diagnosed black cancer patients in their preferred language (generally Zulu or Sotho). Participants were interviewed as soon as possible (maximum 6 months) after diagnosis, prior to receiving chemotherapy and or radiotherapy (verified from medical records).”

Statistical Methods

“In order to investigate independently the effects of oral and injectable contraceptive use, the estimated odds ratios (ORs) for specific cancer types were presented for users of oral contraceptives exclusively, users of both oral and injectable contraceptives, and users of oral and /or injectable contraceptives.” “Cancer-specific multivariable unconditional binary logistic regression models were fitted to the data, and separate models were fitted for non-mutually exclusive categories of contraceptive use (e.g., “both oral and injectable” and “oral and /or injectable.” “All multivariable unconditional logistic regression models were adjusted for age at diagnosis...”

Reference: Urban, M., Banks, E., et al. (2012). Injectable and oral contraceptive use and cancers of the breast, cervix, ovary, and endometrium in black South African women: case-control study. *PLoS Medicine*, 9(3), e1001182.

The Results section

Purpose of Results

The purpose of the Results section is to give a clear, detailed description of what was found.

Structure of Results

A Results section should include information on: Main Results, Participants, Descriptive Data, Outcome Data and Other Analyses.

When writing the Results section, authors should keep the story line of their paper in mind. For example findings in the Results section should align with and answer the research question from the Introduction section using the methods outlined in the Methods section. This focus keeps the Results section concise. The Results section is usually written in the past tense.

Don't interpret your results in the Results section, it is for reporting the facts. Any interpretation and or comparison to other studies should be in the Discussion section. Therefore, don't use words such as "alarmingly" or "unsurprisingly" in the Results section.

"The Results section should give a factual account of what was found, from the recruitment of study participants, the description of the study population to the main results and ancillary analyses. It should be free of interpretation and discursive text reflecting the authors' views and opinions." The STROBE Statement

Notes on tables and figures

- Tables and figures are key components of the Results section and support the main text.
- The information in tables and figures does not need to be repeated in its entirety in the text, but rather key findings should be highlighted in the text. When presenting data in a table or figure, they should stand alone. The reader should be able to understand the table or figure without reading the text.
- Tables and figures should have titles that describe the what, where and when of the data in the table, without abbreviations. In public health, titles go above tables and below figures. If abbreviations are needed in the body of the table or figure, these should be explained in footnotes.
- If the number of tables and figures exceeds the journal's limits, then additional tables can be included as "web only" supplementary material.

Main Results

The STROBE guidelines suggest that Main Results are 4th item in the Results section. We prefer to put them first, to emphasise the key messages.

Start this section with the main results from univariate or primary analyses, followed by results from multivariate or secondary analyses.

Provide unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence intervals, with associated p-values).

If presenting measures of central tendency, present these together with their appropriate measures of variability (i.e. mean and standard deviation or median and interquartile range).

Make clear which confounders were adjusted for and why they were included. Report category boundaries, or cut-offs, when continuous variables were categorised. If relevant, consider translating estimates of *relative risk* into *absolute risk* for a meaningful time period. Odds ratios, relative risks and other measures of association should be reported here as well. Always present the absolute numbers in addition to the relative ones (i.e. the proportion was 25% (25/100) in the exposed group versus 10% (10/100) in the unexposed group). Relative associations tend to be more consistent across studies and populations than absolute measures, but what often tends to be the case may be irrelevant in a particular instance. For example, similar relative risks were obtained for the classic cardiovascular risk factors for men living in Northern Ireland, France, the USA and Germany, despite the fact that the underlying risk of coronary heart disease varies substantially between these countries.

Participants

Describe the recruitment/response of the participants. Give detailed information on the process of recruiting participants at each stage e.g. numbers potentially eligible, numbers confirmed eligible, numbers included in the study, numbers completing follow-up. A flow diagram might be helpful. Those included in a study often differ in relevant ways from the target population and this may result in selection bias, giving estimates of prevalence that do not reflect the experience of the target population. Participation in epidemiological studies may have declined in recent decades, which underscores the need for transparent reporting about participation.

Inclusions/exclusion criteria and final sample numbers are recommended by STROBE to go in the Results section, but some authors put them in the Methods section.

Descriptive Data

Provide an outline of the characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders, and indicate number of participants with

Notes on consistency

- Report decimal figures consistently. Unless you have a very large sample size, report numerical figures to one decimal place.
- Use the same order when presenting the main results. e.g. if presenting results from an intervention and a control group, always report the results from the intervention group first, and be consistent throughout the Results section.

missing data for each variable of interest. Data on the study participants can be provided very efficiently in a table. Readers need descriptions of study participants and their exposures to judge the generalisability of the findings.

Outcome Data

This will depend on the study type.

- *Cohort study*: authors might report the numbers of outcome events or summary measures over time
- *Case-control study*: this might be about reporting the number of cases and controls in each exposure category, or summary measures of exposure
- *Cross-sectional study* this might be the numbers of outcome events or summary measures

Other Analyses

Report any other analyses that were carried out, e.g. analyses of subgroups and interactions, sensitivity analyses, exploratory analyses and post hoc analyses. It should be clear that some of these findings (i.e. from post hoc analyses) are hypothesis generating and have been carried out based on some of the initial results.

Example of Results

Main Results

“The risk of breast cancer was significantly increased (OR 1.66 95% CI 1.28-2.16, $p < 0.001$) in women who had used either oral or injectable contraceptives within the previous 10 y and did not differ significantly (OR 1.11, 0.91-1.36, $p = 0.3$) in those ceasing use ≥ 10 y previously, compared to women who had never used hormonal contraceptives. There was no significant difference in risk between users of oral contraceptives exclusively, users of injectable contraceptives exclusively and users of both in the last 10 y with ORs of 1.57 (1.03-2.40), 1.83 (1.31-2.55) and 1.50 (1.04-2.17), respectively. In women who had used either or both preparations [*i.e. oral or injectable contraceptives*], this elevated risk declined significantly with increasing time since last use of hormonal contraceptives ($p = 0.004$), but was not significantly related to duration of use ($p = 0.4$)”

Participants

“For each study period there was a total of 5,702 study participants with full information on the exposures and risk factors of interest. The sample included women with newly diagnosed invasive breast cancer ($n = 1,664$), cervical ($n = 2,182$), ovarian ($n = 182$) or endometrial ($n = 182$) cancer. There were 1,492 controls, comprising patients with other types of invasive cancers not known to be influenced by hormonal contraceptive use...”

Descriptive Data

“Compared with women who had never used hormonal contraceptives, users were, on average, younger, more educated, and less likely to live in a rural area. Users were less likely than non-users, on average, to have ever smoked, to have consumed alcohol, to have one or no sexual partners, and to have had three or more live births.”

Outcome Data

“The risk of breast cancer was significantly increased (OR 1.66 95% CI 1.28-2.16, $p < 0.001$) in women who had used either oral or injectable contraceptives within the previous 10 y and did not differ significantly (OR 1.11, 0.91-1.36, $p = 0.3$) in those ceasing use ≥ 10 y previously, compared to women who had never used hormonal contraceptives.”

Other Analyses

“Additional adjustment for the number of previous Pap smears (using multiply imputed data) and for HIV status had no material effect on the OR for cervical cancer in relation to recent or past use of hormonal contraceptives.”

Reference: Urban, M., Banks, E., et al. (2012). Injectable and oral contraceptive use and cancers of the breast, cervix, ovary, and endometrium in black South African women: case-control study. *PLoS Medicine*, 9(3), e1001182.

The Conclusion section

Finally, the Conclusion section should wrap the paper up. It should summarise the findings in a few sentences and outline what can be concluded from the findings. Be careful not to overstate the meaning of the results. Ensure that you distinguish between what the data has told us about the problem and what is speculation.

The Conclusion can identify a way forward, such as suggesting more large-scale research in a specific area.

The Conclusion can, if appropriate, address public policy on a related issue. Remember that your paper is one part of the body of knowledge – the entire body of knowledge is used to guide policy; the results of a single study usually do not. Your paper doesn't need to determine policy options, but can help to inform policy options. This can include stating the obvious. Findings can help to negate assumptions that inform existing policy; this requires an understanding of the policy assumptions being made.

Example of Conclusion

“The evidence from this study, in the context of the evidence to date, indicates that the adverse effects of both oral and injectable hormonal contraceptives on breast and cervical cancer are transient, and risks in users return to those of never users within 10 y after stopping use. However, the exact time point at which the risk in users returns to that in never users is not known. Beneficial effects of both types of hormonal contraceptives on ovarian and endometrial cancers are predominantly in long duration users.”

Handy hints

Introduction

- Make the first sentence and first paragraph of the Introduction succinct and perfect: they are very important for setting the scene and hooking the reader
- Clearly identify the research gaps, and the aim of the paper

Methods

- Describe the study design, study setting and participants and how data variables were measured, defined and collected, statistical analysis and if ethics approval was provided
- Ensure that the Methods section is sufficiently detailed and clear such that someone could replicate your study if they wanted to; if there is too much material for the Methods section to include in the paper it can be provided as supplementary material

Results

- Report just the facts and try not to provide interpretations of the data
- Start by describing the study participants, then describe the descriptive data, outcome data, and other analyses
- Tables and figures are an efficient way to present the results
- Ensure that all of your results relate to your research question, objectives and hypotheses and be clear about any results from exploratory analyses (i.e. that might be hypothesis generating rather than testing your stated hypothesis)
- Look at absolute risks as well as relative risks in order to translate findings to a population level

Discussion

- Only mention things in the Discussion that relate to the results – be succinct
- Start with what you can reliably state based on the data
- Make sure you have a good sense of perspective on strengths and limitations
- Read the Introduction and Discussion together to make sure they tell a consistent story and aren't redundant

Conclusion

- Be clear: what is based on quantitative evidence and what is speculation?

Drafts

- There can be multiple drafts of a paper – don't be discouraged if you get drafts in the double-digits
- Have one author who doesn't see every iteration of the paper. They could look at drafts at the beginning, middle and end. This will help to provide a big-picture perspective
- Have someone external to your group read the paper: it should contain all the necessary information to interpret what you've done

Presentation

- Adhere to the requirements of the specific journal that you are targeting
- Ensure consistency of presentation throughout the paper
- Titles shouldn't be more than 15 words long. Many journals will specify the length of a "short title" and a "long title"
- Ensure that you don't waffle, and that the level of detail is consistent

Other resources

- For observational studies read the STROBE statement – checklist of reporting requirements

<http://www.strobe-statement.org/>

- The case for structuring the discussion of scientific papers

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1115625/>

- Tips for preparing your manuscript

<http://www.biomedcentral.com/authors/report>

- Writing titles and abstracts

<http://www.biomedcentral.com/authors/abstracts>

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