



UNIVERSITY OF CALGARY
CUMMING SCHOOL OF MEDICINE



**Alberta Health
Services**

Guideline for Assignments

Resident Research Course

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Submission of Assignments

All assignments (1, 2, 3 and Final Project) must be emailed to the following people by the date and time indicated.

- Course Coordinator (Jolene.haddad@ahs.ca)
- Small Group Leaders
- Project Supervisor

Your supervisor and Small Group Leaders should receive all assignments so that they can give you feedback. Please send in a Word document or in a PDF file. No other file types will be accepted.

Timeline of Assignments

Assignment	Details	Date Due
Assignment 1	Research Question, Hypothesis, and Objectives	Monday, November 1, 2021 by 17:00
Assignment 2	Background, Methods, and Outcome Measures	Monday, November 8, 2021 by 17:00
Assignment 3	Sample size considerations and Statistical Analyses	Monday, November 15, 2021 by 17:00
Digital Poster	Send <u>final</u> copy to only course coordinator	Wednesday, November 17, 2021 by 08:30
Final Project	Completed Research Proposal ready for submission to ethics board/scientific review	Friday, November 19, 2021 by 17:00

Assignment 1: Research Questions, Hypothesis, and Objectives

Length: Approximately, but not constrained to, 1-2 pages double spaced.

Give a few introductory sentences that set the general (biological/health/social) stage (i.e., why is it important to conduct research in this area?), and then the research stage (why is your particular research an important area of inquiry, are there important gaps that you think you will address with your research, etc.).

Clearly state your research question: “Given that sex differences have been identified in fetal glucocorticoid synthesis, how do these sex differences affect fetal growth?” Remember to “reflect” your PICOD (population/patients/problem, intervention or exposure, comparison, outcome, design) in your question.

Next, state your specific objective: “To answer the research question, we have three specific objectives ...”. You should have no more than four specific objectives. These objectives describe the activities that you will perform to answer your research question. Don’t forget to state what each objective accomplishes: “To identify molecular regulators of fetal glucocorticoid synthesis, we will...”.

Taken together, your objectives define an approach to the research question. State why you are using this approach: “Our approach will be to identify the role that sex differences in fetal glucocorticoid synthesis play in regulating fetal growth”.

Finally, state a hypothesis for each of the specific objectives. These hypotheses should be testable and describe the expected outcomes. If your work is not hypothesis driven, be sure to specify what you expect the research will achieve.

Assignment 2: Background, Methods, and Outcome Measures

Length: Approximately 5-6 pages double spaced.

Your background (approximately 2-3 pages) should state how both (i) current knowledge, and (ii) your (or your supervisor’s) preliminary/previous work has led you to your research question. Your summary of the literature should state what is currently known and identify an important gap in our current knowledge, or limitations of already published data. It may be important to note how this gap in knowledge or limitations in previous studies impacts research or practice and how your research will move the field forward. The background should be more than a summary of previous studies. It should critically analyze and synthesize the existing research. Take care that your critique accurately depicts previous studies. For example, avoid terms such as “failed” etc., as in “Nettel-Aguirre et al. failed to take into account that x...”

Your methods (approximately 3-4 pages) should be composed of the following elements:

Study design – a description of the basic approach (randomized controlled trial, prospective cohort, case-control, etc.). If you are confused about the “name” do explain how it will be done.

Study participants - a description of the population from which you will draw your sample, how the sample will be obtained, and any inclusion and exclusion criteria.

Outcomes – what you will obtain from each participant. Be careful not to confuse outcome with outcome measure. Be sure to provide an operational definition of your outcome and make the description of your study consistent with it.

Measures – a description of each measure you are proposing, its validity and reliability (if required) for the purpose you are proposing or with the sample you are using, and its use within your study (primary outcome measure, primary exposure, predictor variable, covariate for statistical analyses, etc.). You should justify the methods and measures you use, especially if there are equally valid alternatives or risks associated with your measures.

Procedures – a description of how the study is conducted, the time points at which measures are obtained, how samples are stored, what analytic techniques are used with samples, etc. If relevant, this section should include who is doing the measurements/intervention and a timeline that details when the work will be done from ethics application through to disseminating results. Think of potential biases incurred and how you expect to mitigate them.

Anticipated difficulties – your methods will describe the research approach that you think is best for your study, but you may wish to describe alternate strategies that you will employ if problems are encountered. This should be brief and is mainly a way to show that you are aware that problems may arise and that you’ve thought of how to address them.

Ethics – what ethical considerations do you need to make for your approach? Will your project require full board review or will it be expedited? How will you obtain consent/assent (if required)?

Assignment 3: Sample size considerations and Statistical Analyses

Length: Approximately 1-2 pages double spaced.

State how the sample size that is available (for projects where data has already been collected) or will be obtained (for projects that will be recruiting participants) is sufficient to address the objectives of your research project. Sample size is a function of many factors, but is always specific to the type of analysis that you intend to conduct. Provide adequate justification for the assumption you make and the specific values that you use in your sample size/power calculation so that they can be reproduced by anyone who reads your proposal.

Describe the statistical analyses that will be used. Be sure to match the statistical approach to the measures and sample size in your project. It is important to match your statistical analyses to each of your research objective. You may need to propose a different analytic approach for each of your objectives, depending on the nature of your objectives. Ultimately your analytic strategy must address

your hypothesis or question. For qualitative projects, be sure to describe your analytic process, what knowledge it produces, and how you will ensure the quality of your findings.

Digital Poster and Research Day Presentation

Poster: A good poster focuses on visuals that are clear and compelling and limits text to a minimum. We use digital posters for Research Day for ease of presentation flow as each session is combined into one larger presentation. Preference is widescreen format (16:9), but standard works as well (4:3). Both PowerPoint and PDF versions are accepted, but the preference is PPT.

Resources:

- [Poster Example](#)
- [Poster Tips from MITACS Conference](#)
- [Digital Poster PPT template](#)

Presentation: Each resident will have 7 minutes to present a poster with 3 minutes allowed for questions (10 minutes total). These presentations will be peer-reviewed, therefore attendance of each session is required even if you are not presenting.

Final Project

Your final project is an accumulation of the 3 assignments previously submitted with revisions made from the feedback given. This culmination should be a research proposal ready for submission to ethics board/scientific review.