

**Boston University** School of Medicine **Division of Graduate Medical Sciences M.S. in Clinical Investigation Program**

**MSCI Thesis Description & Expectations**

Students in the MSCI program are required to complete a *research* thesis that provides a culminating experience and applies the principles and methods learned in the coursework to a real-life clinical study.

Students may conduct their thesis research in wide variety of settings, including academic medical centers and local drug or device companies. Possible thesis topics ***must*** be discussed with the MSCI Director and Assistant Director before submitting the thesis proposal.

Students generally identify their research mentor and develop their thesis proposal while they are completing their course work or practicum. The *thesis research must involve the analysis and interpretation of data*. Students are encouraged but are not required to conduct primary data collection. The thesis proposal, research mentors and thesis readers **must be approved by the MSCI Program Director** ***prior to*** the thesis beginning, and ***prior to*** the submission of the Thesis Title Approval page to the GMS Office.

The ***Thesis proposal*** (usually 1-2 pages), which describes the nature of the thesis research, with a clear statement of the research question or hypothesis, must be submitted for approval to the Program Director and Assistant Director. The specific primary outcome measure that will be used to answer the study question should be clearly described. A brief description of the planned statistical analyses is required. The proposal should conclude with a description of your role in the thesis research. The minimum role is formulating and conducting the analysis, and interpreting and writing up the results. In addition, the student, and the MSCI Director & Assistant Director should agree upon a proposed time line for completion.

**Selection of Thesis Readers**:

1. **Scenario 1**: If the **Research Mentor is a BUMC faculty member**, then s/he can serve as first reader. There should then be two additional readers who are independent of the research project. At least one of these additional readers should be a content or subject matter expert.
2. **Scenario 2**: If the Research mentor is **not** a BUMC faculty member, then s/he can **not** be a first reader. The research mentor can be a second or third reader by special appointment (see below). The first reader must be a BUSM faculty member who takes responsibility for the content of the thesis and the work done.

If any of the readers are not Faculty within GMS, a Special Appointment form [[Special Appointment Form](http://gmsfile.bumc.bu.edu/pdfs/special.pdf)] must be completed and submitted to the GMS Office, along with the reader’s CV for approval. [**PLEASE NOTE**: A Special Appointment form must be completed for **each** non-GMS Faculty reader]

**Readers must be approved by the Director or Assistant Director of MSCI.**

**Once the Readers are selected, you are required to submit to the GMS Registrar the (1) THESIS TITLE APPROVAL FORM, (2) SPECIAL APPOINTMENT FORM and CVs for all NON-GMS FACULTY**

**Thesis Defense:**

The ***near final draft*** of your thesis must first be approved by your readers at least **2 weeks *BEFORE*** moving forward with your actual defense.

Your Readers must Email the Assistant Director, Stacey Hess Pino (sahess@bu.edu), confirmation at ***least 2 weeks BEFORE*** your scheduled defense that your thesis is in its near final form and that you have their permission to move forward with the scheduled oral presentation/defense. *Each reader* must confirm via email that the written thesis is in its ***near final form*** before you will be allowed to present/defend. It is **YOUR** responsibility to make your readers aware of this expectation/requirement. ***At this time, you must also email your near final thesis to the MSCI Director & Asst. Director.***

Once the near final draft is approved by the thesis committee, the MSCI Director and Asst. Director, the student will give a 20 – 30 minute oral presentation on the thesis research to the thesis readers, research mentor, MSCI students and faculty members, and any other interested parties. (Thesis defense).

**The purpose of the defense/oral presentation is to demonstrate the student’s ability (1) to describe clearly the thesis research question, methods, and results; (2) to demonstrate an understanding of the study design, analytic principles, conclusions and limitations of his/her research; and (3) to place his/her research into a clinical context, while then proposing the next steps which should be taken with respect to future research. The presentation is followed by a question and answer period.**

**The near final draft the thesis must be distributed (via email) to the MSCI Director & Assistant Director, your readers and Research Mentor 2 weeks PRIOR to your defense.**

**You must submit (via email) your power point presentation of your defense to MSCI Director & Assistant Director 2-3 days**

***PRIOR TO* your defense.**

The final thesis document must be prepared according to the GMS guidelines for theses and dissertations.

**Thesis Content/Written Expectations**

**For MSCI Students**

**I. Abstract:** This should be a **succinct description** (< 350 words) of your project, and should include:

* Purpose: clear, brief statement of your thesis; the argument you are going to prove
* Methods/Procedures
* Results
* Conclusions
* \*\*This should be written **AFTER** you write your full thesis

**II. Background:**

* This Section provides the ***theoretical and/or historical background information*** necessary for the reader to understand the project, to place it in its appropriate context, or to judge its contribution to the field, i.e. **you should present the previous literature to support WHY you are doing your study/what is missing from the current literature that led you to your study aims.**
* This Section is essentially the ***introduction,*** which explains in general terms what the thesis is about and provides a context for your work.
* This Section should include a description of what is the “***state of the art***” and an explanation of how your research contributes to the field:
	1. **Purpose:** after you have provided the background/introductory information, the ***Purpose*** of your thesis should be stated within this Section.
	2. **Primary Study Question:** the Purpose paragraph should be followed by a statement/explanation of your ***Primary Study Question***, i.e. what did you intend to answer with your research.
	3. **Primary/Secondary Objectives:** the next paragraphs should describe the primary and secondary objectives of your research.
	4. **Study Rationale:** this final paragraph in this Section should include a description/statement of your study rationale, i.e. the reasoning or motivation for conducting/performing your proposed research/who has tried to address this issue in the past and why were their results inadequate.

**III. Materials and Methods:**

* This Section should provide the details of the materials and methods used to test your hypothesis, including the experimental design.
* This Section should provide the reader with the impression of ***HOW*** the study was conducted overall, and which techniques/procedures were used/executed. You should also define/differentiate the standard of care from the research procedures [if a clinical research study was conducted].
	1. **Subject Population:** You should provide a description of how the subjects were selected, including the details of your inclusion and exclusion criteria.
	2. **Study Design:** A statement/description of your study design should be included.
	3. **Statistical Analysis:**
* You should provide a description of what type of statistical analyses were performed to assess your outcome measures, i.e. primary outcome, secondary outcomes. **You should clearly define your outcomes, endpoints and measures.**
	+ - ***Sample size***: A description should be provided of how your sample size was calculated, if appropriate.
		- ***Confounders***: You should describe those elements/factors that are potential confounders in your research and describe how you will address confounding in your statistical analysis.

**IV. Results:**

* In this Section you should report on what you found from your research, i.e. the data/findings that resulted from your research. ***You should always provide data to support a claim or finding***.
* You should describe the findings that resulted from the analyses of the data.
* You should describe the differences that were found between the groups studied and any situations where differences were not found; any trends that became apparent; and any associations that were found.
* You should also describe what is presented in your tables and figures. **Do NOT simply repeat what is in your tables & figures, but note important or interesting features of your data.**

**V. Discussion: \*\*\*CRITICAL THINKING PIECE\*\*\***

* This Section should present***, interpret*** and discuss the adequacy of your results and of the research that was performed
* The Section summarizes the preceding ones, but it also should re-enforce the relationship, if any, of your results and its contribution to the field:
	+ - Does your work support current theories and observations in the field
		- Have your results advanced our understanding of the area
		- How are your results relevant to what is understood today.
		- What are the implications of your results today?
1. **Limitations:**  You should ***discuss*** the limitations of your research, i.e. discuss any constraints, failures, or weaknesses of your project. Don’t just state what the limitations of your research were, rather EXPLAIN them and how they may have affected your study’s findings.
2. **Future Directions:** Student should discuss the future directions of their research and recommendations for future studies, i.e. student should stress the potential impact of their accomplishments if work on the project were to continue or discuss whether a new study could address some of the difficulties or challenges encountered in this study.

**VI. Conclusions:**

* This Section is a summary of intent of your research, the methods used to assess your study objectives, the results found and the conclusion drawn from the results, i.e. were you able to answer your study question from the results obtained in your research.

**Tips:**

Probably the most common problem with the early stages of thesis writing is the ***inability to support your claims***. **You need to back up every idea, result or claim in a thesis with data that logically supports it;** it isn't enough to base a hypothesis on a simple hunch. If you're having difficulty finding data to support a point in your thesis, consider removing the point; not being able to support an idea might mean the idea isn't presently valid.

***EDIT THE COPY AND CONTENT***
Be prepared: you'll probably spend almost as much time editing your thesis as you did writing it. Consider the content first: Is your argument logical? Does each section make sense in relation to those before and after it? Is each bit of information relevant and backed up with supporting data? Are there repetitions? Then, move on to the copy: are there misspellings or punctuation and grammar mistakes? Run-on sentences? Are all of your pronouns and antecedents crystal clear? Are the acronyms explained? Strive to make everything completely and perfectly understandable.